3. ENVIRONMENT - REGENERATING RESOURCES AND CLOSING THE CIRCLE

3.01 Objectives, performance and targets

What we said we would do	What we did	SDGs	Progress*
Transition towards a circular economy			
77% sorted waste collection by 2026 (67.8% in 2022) also thanks to a strong investment focused on the engagement of residents and businesses (78% Hera, 68% AcegasApsAmga, 81% Marche Multiservizi).	72.2% of sorted waste collection in 2023, up on 2022 (74.4% Hera, 57.7% AcegasApsAmga, 72.5% Marche Multiservizi). (see p. 85)	11, 12	
73% recycling rate of packaging by 2026 and >80% by 2030 (higher than the EU 2030 targets).	66% packaging recycling rate in 2022. The overall recycling rate was 61% in 2022. The 2023 data will be reported in the "Tracking waste" report.	11, 12	
Increase in recycled plastic: +102% recycled plastic from Aliplast by 2026 and +150% by 2030 (compared to 2017). Complete an innovative plant by 2024, for the production of high-quality recycled polymers for the IT and electronic sector in Modena. Complete a new plant by 2025, for the recycling of carbon fibre, which is especially reusable in the automotive sector, also thanks to NRRP funds.	+42% plastic recycled by Aliplast in 2023 (compared to 2017). The innovative plant for the production of high-quality recycled polymers for the IT and electronics sector in Modena will be completed in the first half of 2026, having obtained the environmental authorisation to start construction in late 2023. Construction of the carbon fibre recycling plant began in 2023, and the plant will be fully operational in mid-2024. (see p.111)	11, 12, 17	
13% by 2026 and 18% by 2030 reusable wastewater out of total wastewater.	10.1% by 2023 of reusable wastewater out of the Group's total wastewater. (see p. 111)	6, 8, 12, 14	
22% reduction in internal water consumption by 2026 and 25% by 2030 compared to 2017 consumption. Extending the water management project to Herambiente	21.5% reduction in household consumption in 2022 compared to 2017 consumption due to specific water-saving activities. The Water management project is also being extended to Herambiente. (see p.108)	6, 8	
380,000 customers with a "Water consumption Log" by 2026, equal to 52% of the total (260,000 customers in 2022, equal to 35% of the total).	325,046 household customers with the "Water Consumption Log" at the end of 2023 (37.5% of resident household customers; they stood at 35% at the end of 2022). (see p.114)	6, 8, 17	
-6% linear water leakages in 2026 compared to 2021. 27 thousand km of network analysed in 2023-2026 (there were 2.8 thousand in 2020-2021).	Linear water losses to 2022 were stable (8.1 cu m/km/day) compared to 2021 (8.1 cu m/km/day) (see p. 114) 27 thousand km of network analysed in a search for leakage (see p. 121)	6, 8	
Development of paper and plastic sorting/pre-sorting plants (Pesaro, Padua, Vicenza): 60k ton/year of paper and cardboard and 40k ton/year of plastic processed in the new plants.	The paper and plastic sorting/pre-sorting plant in Padua is in the planning stage, the one in Pesaro is in the feasibility study stage while the Vicenza project has not been finalised.	11, 12	

What we said we would do	What we did	SDGs	Progress*
Sustainable management of water resources			
100% urban agglomerations >2,000 p.e. upgraded by 2025 thanks to the continuation of the modernisation plan of the purification sector. In addition, upgrade all of the 239 agglomerations managed with a size of between 200 and 2,000 p.e. by 2026, of which: ▪ 44 to be upgraded out of 202 agglomerations managed with a size of between 200 and 2,000 p.e. in Emilia-Romagna; ▪ 1 to be upgrade out of 37 agglomerations managed with a size of between 200 and 2,000 p.e. in Triveneto. Implementation by 2030 of a further 27 interventions in agglomerations with a size of between 2,000 and 10,000 and more than 10,000 p.e. in relation to the requirements laid down in resolutions 201/2016, 569/2019 and 2153/2021 of the Emilia-Romagna Region regarding the upgrading of urban wastewater discharge treatment.	99.8% urban agglomerations >2,000 p.e. upgraded by 2023 thanks to the continuation of the modernisation plan of the purification sector (1 agglomerate upgraded in 2023). In addition, 186 upgraded agglomerations out of 229 managed with a size of between 200 and 2,000 p.e. at 2023, of which: ▪ 42 to be upgraded out of 192 agglomerations managed with a size of between 200 and 2,000 p.e. in Emilia-Romagna (two agglomerates upgraded in 2023); ▪ 1 agglomerate remains to be upgraded out of 37 managed with a consistency between 200 and 2,000 p.e. in Triveneto (it will be upgraded by 2026 interventions carried out in agglomerations of between 2,000 and 10,000 and more than 10,000 p.e. (in Emilia-Romagna) in relation to the requirements laid down in resolutions 201/2016, 569/2019 and 2153/2021 of the Emilia-Romagna Region regarding the upgrading of urban wastewater treatment by 2023. (vedi pag. 115)	6, 14	🟢
Complete by 2025 all 14 interventions envisaged by the Rimini seawater protection plan (10 interventions completed by 2022).	No intervention concluded, as expected. Of the remaining 4 interventions, 3 will be completed in 2025 and 1 in 2026. (see page 115)	6, 14	🟢
90% of users served in areas with a Water Safety Plan defined by 2026 and 100% by 2030 (61.9% by 2022).	65.8% users served in areas covered by a Water Safety Plan. (see p. 112)	6	🟢
Protection of air, land, and biodiversity			
887,000 square metres of land reused by 2026 in infrastructure constructions (over 80% of the total land involved in constructions completed between 2018 and 2026).	662 thousand square metres of land reused in the construction of infrastructures from 2018 to 2023 (76% of the total land involved). (see p. 140)	8	🟡
▪ 7% increase in the volume served by district heating in 2026 compared to 2021 to the benefit of the air quality in the cities served. ▪ 75% of energy from district heating from renewable sources, cogeneration and recovery by 2026. ▪ In Bologna, continue the construction of the interconnection of four systems (CAAB Pilastro, Berti, Bologna Fiere and Navile facilities) aimed at obtaining a substantial reduction in CO_2 and NOx. emissions. ▪ Development of geothermal production in Ferrara and extension of the interconnection of the district heating system in Forlì, also thanks to NRRP funds.	▪ 6% increase in the volume served by district heating in 2023 compared to 2021 (stable compared to 2021). ▪ 66% of the energy produced in 2023 will come from renewable sources, cogeneration or recovery. ▪ Work continues in Bologna and Forlì on city system interconnections, financed by NRRP funds. ▪ In Ferrara, work has been carried out to further improve production from geothermal energy. (see p.126)	7, 11, 13, 14	🟢
Over 5,000 charging infrastructures (public and private) installed by 2026 for electric mobility (around 1,800 in 2022)	Over 2,100 public and private charging points installed by 2023 for electric mobility.(see p. 140)	11, 17	🟢
Ecotrees Initiative: 10 thousand trees planted and maintained in the three-year period 2022-2024 through customer purchases of sustainable solutions (about 5,700 as of 2022).	Donated additional trees to the area through the initiative, reaching the goal of 10,000 trees planted and maintained a year early. (see p. 383)	7, 11, 12, 17	🟢

* 🟢 Result achieved or in line with planning; 🟡 Result with moderate variance from planning; 🔴 Result with significant variance from planning.

What we will do	SDGs
Transition towards a circular economy	
78% sorted waste collection by 2027 also thanks to a strong investment focused on the engagement of residents and businesses (80% Hera, 68% AcegasApsAmga, 74% Marche Multiservizi).	11.12
72% recycling rate of packaging by 2027 and >80% by 2030 (higher than the EU 2030 targets) (65.7% by 2022).	11.12
Increase in recycled plastic: +122% plastic recycled by Aliplast by 2027 and +150% by 2030 (compared to 60 thousand tonnes in 2017). Start work on an innovative plant in Modena in 2026 to produce high-quality recycled polymers for the IT and electronics industries. Complete by 2024 a new plant for recycling carbon fibre, reusable particularly in the automotive sector.	11,12,17
13.6% by 2027 and 18% by 2030 reusable wastewater to total wastewater.	6,8,12,14
24% reduction in household water consumption to 2027 and 25% to 2030 compared to 2017 consumption.	6.8
560,000 customers with a “Water consumption Log” by 2027, equal to 77% of the total (325,000 customers in 2023, equal to 37,5% of the total).	6,8,17
-8.6% linear water leakages by 2027 compared to 2022. 30 thousand km of aqueduct analysed from with predictive algorithms by 2027.	6.8
Sustainable management of water resources	
100% urban agglomerations >2,000 p.e. upgraded by 2025 thanks to the continuation of the modernisation plan of the purification sector. In addition, upgrade all of the 226 agglomerations managed with a size of between 200 and 2,000 p.e. by 2027, of which: ▪ 42 to be upgraded out of 189 agglomerations managed with a size of between 200 and 2,000 p.e. in Emilia-Romagna; ▪ 1 to be upgrade out of 37 agglomerations managed with a size of between 200 and 2,000 p.e. in Triveneto. ▪ Implementation by 2030 of a further 24 interventions in agglomerations with a size of more than 10,000 p.e. in relation to the requests of resolution 201/2016 of the Emilia-Romagna Region on the upgrading of the treatment of urban wastewater discharges.	6.14
Complete by 2026 all 14 interventions envisaged by the Rimini seawater protection plan.	6.14
91% of users served in areas with a Water Safety Plan defined by 2027 and 100% by 2030.	6
Protection of air, land, and biodiversity	
828,000 square metres of land reused by 2027 in constructions of infrastructure (70% of the total land involved in constructions completed between 2018 and 2027).	8
▪ 2% increase in the volume served by district heating in 2027 compared to 2022 to the benefit of the air quality in the cities served. ▪ 79% of energy from district heating from renewable sources, cogeneration and recovery by 2027. ▪ In Bologna, continue the implementation of the interconnection of two systems (Caab/Pilastro, Sede Berti/San Giacomo) by 2026 aimed at achieving substantial reductions in CO_2 and NOX emissions. ▪ Doubling of geothermal production in Ferrara and extension of district heating system interconnection to Forlì by 2026.	7,11,13,14
Over 5.1 thousand charging infrastructures (public and private) installed by 2027 for electric mobility.	11.17

3.02 Transition towards a circular economy

The circular economy of municipal waste

Waste management, while not exhausting the measures which are necessary to ensure a transition to a circular economy, represents one of the most urgent areas, on which European directives have been focused for several years.

The Hera Group plays a primary role in managing urban waste, serving **188 municipalities in five regions for a total population of 3.2 million inhabitants.** In Emilia-Romagna, Hera Spa manages the urban cleanliness service in six provinces totalling 136 municipalities. In addition to these municipalities, Hera Spa manages three others in the province of Florence. Furthermore, through Marche Multiservizi, it serves 44 municipalities in the provinces of Pesaro-Urbino and Ancona. It has, since 2013, through AcegasApsAmga, served eight municipalities in the provinces of Padua and Trieste.

TOTAL MUNICIPAL WASTE COLLECTED BY REGION

Thousands of tonnes	2021	2022	2023
Emilia Romagna	**1,477,5**	1,474.6	1,633.0
Triveneto	255.3	244.5	248.5
Marche	153.6	153.5	150.0
Total	**1,886.4**	**1,872.6**	**2,031.5**
Kilograms per inhabitant	586	586	635

In 2022, the quantities of waste collected by the Group are not perfectly comparable with those of 2021, following an interpretative comparison with the Emilia-Romagna region regarding the transposition of Legislative Decree 116/2020 for which it was possible to include the volumes relating to inert waste, mitigating the effect of the legislation which last year instead had led to a reduction in the total waste collected. With the same regulations, waste collected would decline by -2%. Considering instead the effect of the new interpretation, the volumes relating to waste collected in 2022 recorded a slight decrease of -0.7%.

In addition to the above, it should be noted that 2023 saw the introduction of Legislative Decree No. 213/2022 amending the previous Legislative Decree No. 116/2020, going on to consider residually as municipal waste also inert waste produced by households, considerably increasing the overall waste stream. In the light of the above, there is consequently a significant increase in the volume of waste collected both in Emilia-Romagna (+11%) and in Triveneto (+2%), with per capita production increasing by 8.3% at Group level.

Moreover, compared to 2022, in 2023, in line with the regional reporting criteria, sandy waste (both ordinary collection and collection related to emergency situations) as well as waste deriving from natural disasters that hit the Emilia-Romagna area were also counted. The total amount of waste collected during the flood emergency was 119.2 thousand tons, mainly concentrated during the second half of May, including 77.8 thousand tons of municipal waste, mainly bulky waste, and 39.1 thousand tons of municipal sandy waste, collected on the coast.

Net of the aforementioned regulatory change introduced in 2023 as well as the flooding that affected the local areas served by the Group, the total waste amount as well as the per capita production of municipal waste remained stable.

The area served by Hera Spa and Marche Multiservizi is characterised by a high level of assimilation which determines an **annual per capita production of waste which is among the highest in Italy**; in these local areas about 574 kilograms per inhabitant are produced (633 kilograms per inhabitant in Emilia-Romagna, 516 in the Marche) compared to a 2022 national average of 494 kilograms. While in the Triveneto area, annual per capita waste production was lower than the national average: 477 kilograms per inhabitant collected in 2022 (Source: ISPRA, Municipal Waste Report 2023

The Group's waste management system is characterised by five main services:

- **local collections**: these are collections spread throughout the area and are aimed at family users and small non-household users and can be carried out through;

- **streetside containers**, with a deployment oriented according to the basic recycling centre model which provides for the concentration of the main collection chains grouped in individual locations (sometimes even underground); in recent years, electronic traceability systems for the control of deliveries are becoming increasingly common in combination with roadside containers (e.g. “waste containers with a lid” model for unsorted waste or lock for sorted collection of waste chains);
- **curbisde collections**, carried out at the users premises, where the resident puts out the waste on pre-established days and times for collection.
- **home collections** from “target” users: they are aimed at non-household users who produce specific waste assimilated to urban waste, such as cardboard in shops, glass or cans in bars, organic waste in canteens and restaurants;
- **sorted waste collection centres**: also known as drop-off centres or ecological stations, these are infrastructures present in almost all Hera municipalities which complete the service offer to residents for the sorted disposal of urban waste. The use of collection centres is becoming a real habit for residents: a very wide range of municipal waste categories (even certain wastes that are considered hazardous) can be safely brought in, as well as the dropping off of bulky and heavy waste. Furthermore, in many areas there is a system of discounts which rewards the provision of various categories of differentiated waste.

The system is moreover supplemented by the collection of bulky waste at homes (free of charge by calling or making an appointment), by the collection of green waste, as well as by the collection of some types of hazardous waste such as batteries and medicines, at specific establishments. Finally, the collection of WEEE (waste from electrical and electronic equipment) and used vegetable oils on the streets or in shopping centres is gradually spreading.

To increase effectiveness, collection services are **differentiated by homogeneous local area** (historic centres, residential areas, tourist areas, extra-urban areas, industrial areas). For each area, that collection system that best integrates with the urban, environmental, and local area characteristics is identified. The aim is to **maximise the percentage of sorted waste collection** as well as its quality through a technically and economically sustainable service.

MAIN WASTE COLLECTION SYSTEMS USED

Number of municipalities served	2021	2022	2023	2023 (% of the number of residents)
Street collection	74	57	42	12%
Streetside collection with delivery control mechanisms	38	37	44	45%
Mixed system (unsorted household waste and streetside sorted waste collection)	44	59	64	21%
Curbside collection	33	35	38	22%
Total	**189**	**188**	**188**	**100%**

In 2023, municipalities with a simple container-based **streetside collection** system dropped from 57 to 42 and the number of municipalities with a **“mixed” system** (combination of street and door-to-door collection for at least two fractions) increased from 59 to 64, mainly because of the alignment of waste collection systems in the provinces of Ravenna, Modena, Bologna, and Forlì-Cesena with what is envisaged by the new concessions. Up from 37 to 44 are municipalities with **delivery control systems** that allow user identification at delivery for the introduction or readiness for the start of unit pricing, while those with **curbside collection** systems increased by three (from 35 to 38). In **Emilia-Romagna**, in view of the gradual introduction of unit pricing in the local area, and thus of systems to control conferment, activities to reorganise services to enable the identification and measurement of conferment are underway and will continue in the coming years.

Sorted waste collection

The main types of waste collected in a sorted manner are:

- **packaging and similar**: paper and cardboard, plastic, glass, aluminium and steel cans, wood;
- **durable goods**: iron, waste electrical and electronic equipment (WEEE) and bulky items;
- **compostable waste**: kitchen organic waste and “green” waste from mowing and pruning;

- **other waste:** inert waste from households and which does not result from business activities, spent mineral and food oils, batteries and accumulators, medicines and other hazardous municipal wastes.

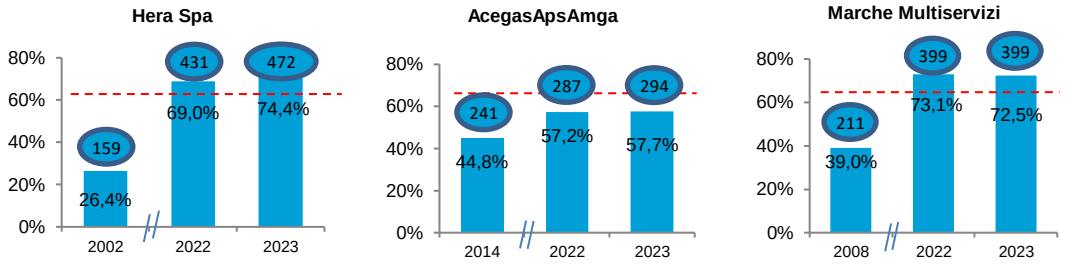
In **Emilia-Romagna**, the Regional Law 16/2015 on the circular economy had set the objective of launching the **pay-as-you-throw** system throughout the region; this objective was reconfirmed with the new 2020-2025 mandate program of the Region presented in June 2020 and taken up by the Regional Waste Management and Reclamation Plan, which set the sorted waste collection portion in Emilia-Romagna at 80% by 2027. The pay-as-you-throw system foresees that the payment of the environmental hygiene service is no longer linked only to the living area and the number of tenants of the house, but also to the quantity of unsorted waste produced.

As regards local collections, which intercept the largest share of flows, the various systems that Hera is implementing in the area are therefore **oriented towards the future application of unit pricing:**

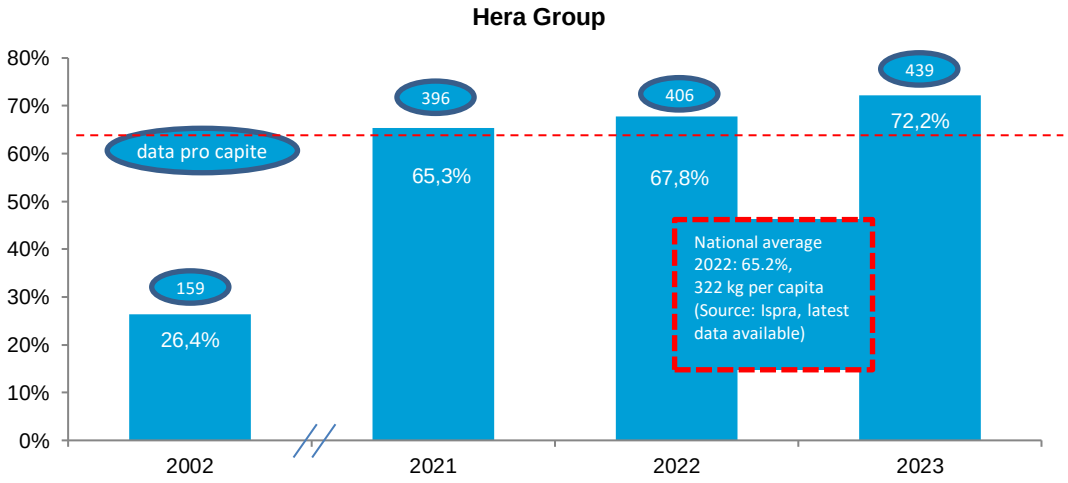
- roadside containers with user control and recognition system (hood);
- home collections with containers equipped with tag-transponders;
- collection centres with weighing systems and user registration.

In other local areas as well, where the Group provides the urban hygiene service, sorted waste collection objectives have been defined through the regional plans. The **Veneto Region** has defined 84% as the portion of sorted waste collection to be reached by 2030, while the **Friuli-Venezia Giulia Region** has set 75% by 2027. In the **Marche region**, on the other hand, the Region has not updated the local area plan or approved the provincial one; in the old plan, the sorted waste collection target was set at 70% by 2020.

SORTED WASTE COLLECTION



The baseline indicated in the graphs corresponds to the first year for which data are available.



Sorted waste collection is calculated according to Decree of the Regional Council No. 2218/2016: thus, excluding neutral waste (streams from stranding, cemetery, and CERs not allowed as municipal) and including the estimate of household composting waste allowed by the Region. In 2023, as a supplement to the current regulations, it was established that waste collected because of the natural disasters that affected Emilia-Romagna and Tuscany was considered a “neutral waste” and was therefore excluded from the waste stream. Pursuant to the Decree of the Regional Council. 2218/2016, street-sweeping and recovery was counted as sorted waste collection. Waste like municipal waste sent for recovery by the producer and waste collected by voluntary associations or directly by the

Municipalities are also considered among the sorted waste collections. The total amount of waste is constituted by sorted collection (CERs admitted initiated for recovery, community composting and household composting allowed) and unsorted (urban solid waste, street sweeping for disposal, bulky waste for disposal and any waste collected which has been sorted but sent for disposal). With the enactment of Legislative Decree No. 116/2020, as of 2021 inert waste is excluded from the municipal waste stream, with the only exception of inert waste from abandonment (waste lying on public land is municipal by definition). More specifically, in the reporting of the 2022 data, the aggregates collected within the municipal hygiene service were considered "neutral waste", applying the guidelines that the Emilia Romagna Region provided on the annual regulatory compliance of the Osservatorio Rifiuti Sovraregionale (Supra-regional Waste Observatory) 2021. From 2023, inert waste from households will also be considered as municipal waste.

In 2023, **sorted waste collection** volumes increased compared to the previous year, reaching **1,405 thousand tonnes** (107 thousand tonnes more than in 2022). This increase was influenced by the excellent performance of the Modena, Forlì-Cesena, and Ravenna areas, which, starting as early as 2022, have adjusted their sorted waste collection service by aligning with the provisions of the new concession and significantly improving their performance (+9%, +8%, and +8%, respectively, compared to 2022). The Group has set a goal of achieving 78 % separate waste collection by 2027, focusing on citizen and business engagement.

The increase in the volumes of sorted waste collection, in conjunction with a reduction in the unsorted component by 76 thousand tons (-16% compared to 2022), has led to a substantial and noticeable growth in the percentage of sorted collection, given by the ratio of the amount of separately collected municipal waste to the total amount of waste delivered (managed and unmanaged sorted and unsorted municipal waste), reaching 72.2% in 2023 (+4% compared to 2022) keeping well above the national average of 65.2% surveyed by ISPRA in 2022 (Source: ISPRA, Municipal Waste Report 2023).

In the **eight capital cities managed by the Hera Group**, sorted waste collection stood at 61.9% in 2022 compared to a value of 55.0% in the national capitals (weighted average, Source: processing of Legambiente data, Urban Ecosystem 2023).

In **Emilia-Romagna**, the percentage of sorted waste collection increased from 69.0% to 74.4%. In the **Triveneto region**, the percentage of sorted waste collection increased by 0.5% to 57.7%, while in the **Marche region** there was a 0.6% decrease to 72.5%.

Taking into consideration the entire area served by the Group and analysing it with a greater level of territorial detail, the percentage of sorted waste collection exceeded:

- 80% in the municipality of Ferrara under unit pricing since 2018 and in the province of Forlì-Cesena;
- 70% in the provinces of Bologna, Modena, Ravenna and Marche;
- 65% in the provinces of Rimini;
- 60% in the province of Padua.

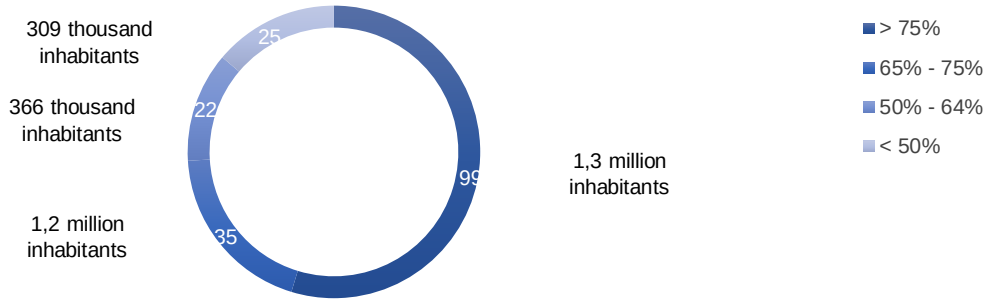
Note the significant increase in the percentage of sorted collection in the provinces of Ravenna (from 70.5% to 78.0%) and Modena (from 65.1% to 73.7%) as a result of the changes in collection systems that took place in these areas.

As regards the province of Trieste, the sorted waste collection rate increased 1 percentage point compared to 2022 but remained below the Group average (45.7%).

At the municipal level, the year 2023 closed with **99 municipalities (17 more than the previous year) out of 188 managed with a percentage of sorted waste collection above 75%**; 40% of the total served population resides in these municipalities.

There are 69 municipalities in Emilia-Romagna that exceed the 75% separate collection rate (+ 22 municipalities compared to 2022), 22 of them are under the pay-as-you-throw system. The business plan objective for 2027 is to reach 77.7% as an average of the municipalities served in the region. In Triveneto, 3 out of eight municipalities exceed 75% and the goal for 2027 is to bring the value of sorted waste collection to an average of 75%. In the Marche region, however, there were 31 municipalities above 75% sorted waste collection (1 less than in 2022); the **Group's 2027 target for separate waste collection was 77.7 percent,** as envisaged in the latest business plan approved by Hera Spa's Board of Directors in January 2024.

NUMBER OF MUNICIPALITIES PER SORTED WASTE COLLECTION PERCENTAGE RANGE (2023)



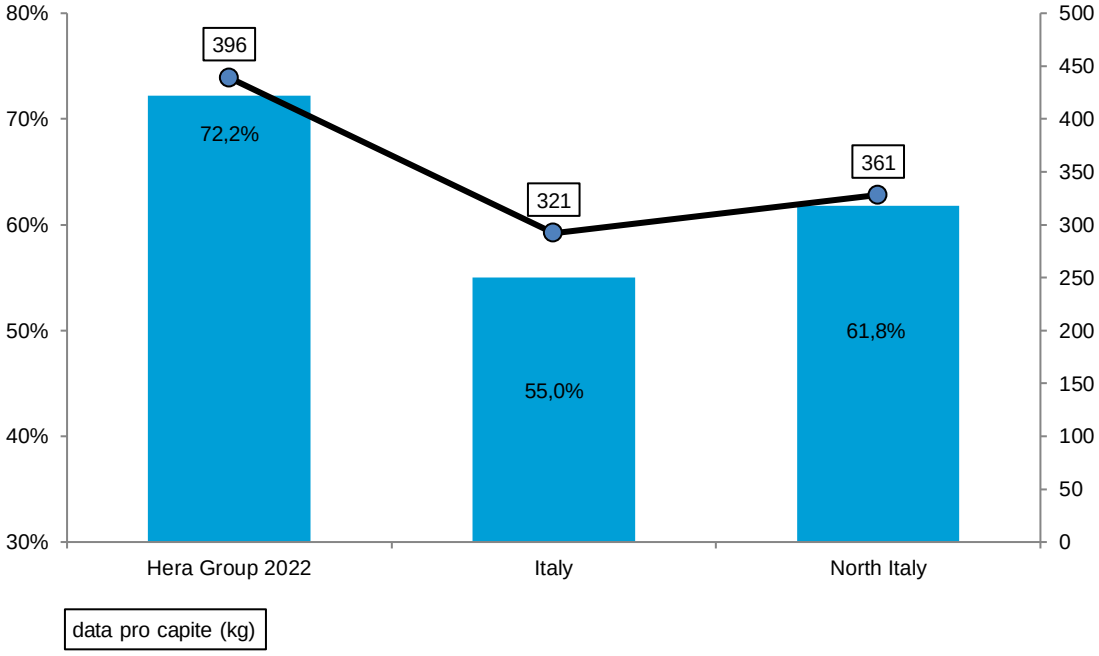
In the Group's sorted waste collection, as regards the data for Emilia-Romagna, assimilated waste delivered for recovery by the producer and sorted waste collected by voluntary associations or directly by municipalities are included, as required by the Decree of the Regional Council No. 2218/2016 and incorporated into current municipal and area regulations. The situation is very diversified in the local areas and depends on the revisions of the regulations of the individual Municipalities.

A useful indicator for evaluating the **effectiveness of sorted waste collection** is the per capita value expressed in kilograms/inhabitant/year, which allows for important analyses of the quantities of waste sent for recovery, both overall and by individual chain; per capita **sorted waste collection**, thanks to the increase in sorted waste collection volumes recorded by Hera, rose from 406 kilograms per inhabitant at Group level in 2022 to 439 kilograms per inhabitant in 2023, an increase of 8.1% compared to the previous year.

At the **per capita** level, sorted waste collection in **Emilia-Romagna** stands at 472 kg/inhabitant, recording an increase of 9.6% compared to 2022, reaching a total quantity of over 1,157 thousand tonnes. At the level of individual local areas, per capita sorted waste collection increased in **Modena** (+14%), **Ravenna** (+11%), **Forlì-Cesena** (+10%), **Bologna** (+8%), **Ferrara** (+8%) and **Rimini** (+5%). In the **Triveneto**, there was a general increase in per capita sorted waste collection in both the province of **Trieste** (+4%) and the province of **Padua** (+2%). While in the **Marches**, after a decline of 3% last year, we note absolute stability in the figure.

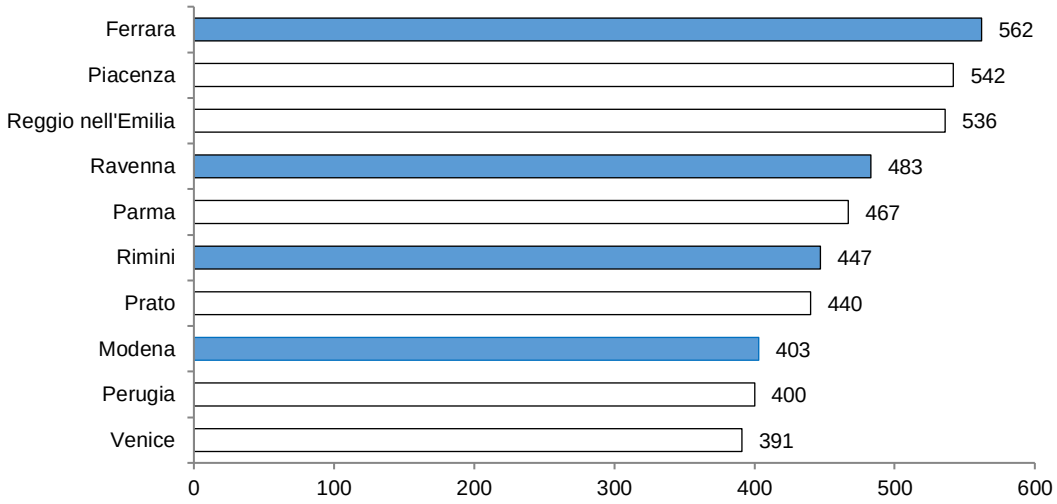
Considering the data for 2022 published by ISPRA, the Hera Group records sorted waste collection per capita 17% higher than the Italian average and 10% higher than the average for Northern Italy.

PERCENTAGE AND PER CAPITA SORTED WASTE COLLECTION (2022)



Considering the provincial capitals with a population of more than 100,000 inhabitants, in 2022 **four of the top ten cities with the best performance in Italy** in terms of per capita sorted waste collection **were managed by the Hera Group.** Of these, Ferrara, with a sorted waste collection rate of 87.6%, is in **first place in the ranking of all provincial capitals**. As shown by the data, the high levels of assimilation expected in the local areas managed by the Group generate important benefits in terms of volumes of waste to be sent for recycling and recovery.

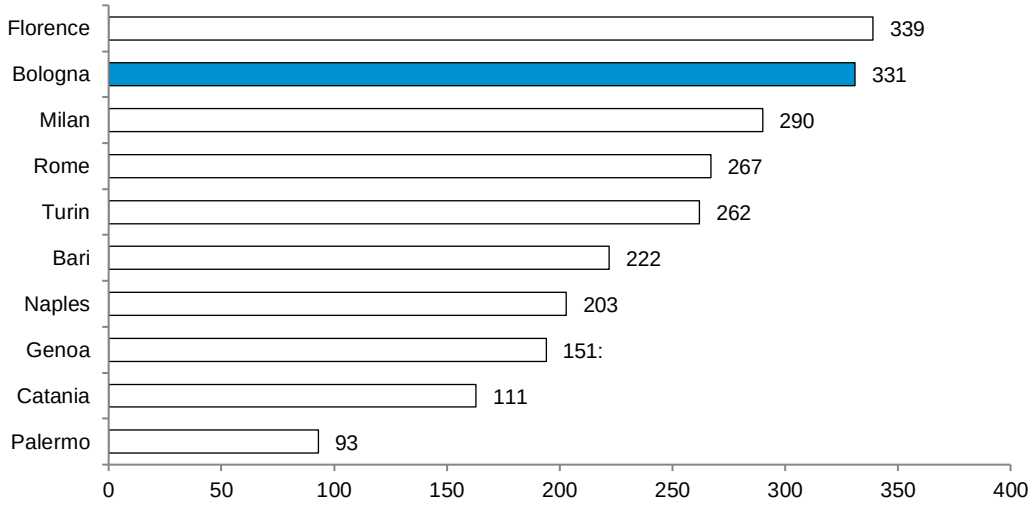
SORTED WASTE COLLECTION PER CAPITA, KILOGRAMS, MUNICIPALITIES WITH MORE THAN 100,000 INHABITANTS (2022)



Source: processing of Legambiente data, Urban Ecosystem 2023

On the other hand, considering the provincial capitals with a population of more than 300,000 inhabitants, **Bologna ranks second** in Italy for per capita sorted waste collection (Source: elaboration on Legambiente data, Urban Ecosystem 2023). In the classification for sorted waste collection, however, Bologna stands at first place. This achievement was made possible by the extension in 2022 of the computerised streetside collection system for the undifferentiated waste with the new smart bins that can be opened with Carta Smeraldo in the Navile and Borgo-Reno residential neighbourhoods to complete the Carta Smeraldo project and smart bins in the areas where the collection system is streetside, and with the delivery of tagged MSW containers to non-domestic users with dedicated services and in suburban areas where the door-to-door collection system is in force.

SORTED WASTE COLLECTION PER CAPITA, KILOGRAMS, MUNICIPALITIES WITH MORE THAN 300,000 INHABITANTS (2022)



Source: processing of Legambiente data, Urban Ecosystem 2023

With reference to sorted collection by **type of material collected** from the data below in the table, in 2023 there was a significant increase in the collection of aggregates and also a major increase in the collection, green waste, organic waste, wood and bulky waste. There are insignificant changes in the collection of glass, plastic containers, iron, WEEE and paper and cardboard, while the remaining data shows a slight decrease. In particular, a long-term collection target was set for packaging: 72 % recycling rate at 2027 and above 80 % at 2023 (much higher than the European targets at 2030).

Details with the most significant changes are shown below:

- collections of **aggregates** (more than tripled), **green waste** (+14%), **organic waste** (+8%), **wood** (+8%), paper **and cardboard** (+4%) **bulky waste** (+8%). The strong growth in aggregates is related to the implementation of the new Legislative Decree No. 213/2022 which, in contrast to last year, considers aggregates from households with allowable EER to be counted in sorted waste collection.
- **multi-material** collection decreased by 3%;
- Increased collection of **plastic containers** (+5%), **paper and cardboard** (+4%), **iron** (+6%), **WEEE** (+4%) and **glass** (+0.7%);
- finally, the item **other** decreased (-4%).

SORTED COLLECTION BY TYPE OF WASTE

Thousands of tonnes	2021	2022	2023
Paper and cardboard	243.7	255.5	265.2
Green scraps	218.0	217.6	246.9
Glass	126.7	132.9	133.8
Organic waste	237.9	249.6	270.4
Plastic containers	119.2	131.6	137.5
Refuse from multi-material collection	50.3	43.7	42.3
Wood	99.9	97.9	106.0
Bulky items	58.3	57.0	61.5
Inert	11.4	6.8	37.5
Iron	12.6	10.6	11.2
WEEE	19.7	17.6	18.3
Other	68.7	67.9	65.4
Total	**1,266.3**	**1,288.7**	**1,396.0**

SORTED WASTE COLLECTION PER CAPITA (2022)

kg/inhabitant	Paper	Glass	Plastic	Wood	Metals	Organic and green
Hera Group	80	42	41	31	3	146
North Italy	68	46	33	27	8	131
Italy	62	40	29	17	6	123:
Best region	91*	61**	57**	67**	12***	180*
Hera Group (2023)	83	42	43	33	4	162:

*Emilia-Romagna, **Valle d'Aosta, *** Trentino-Alto Adige Source: Source: ISPRA, Municipal Waste Report 2023

Heras sorted waste collection levels are due to the widespread coverage of the services provided and to the assimilation rules which encourage the recovery of materials. Hera ranks above all national and northern Italian averages except glass in relation to the northern Italian average and metals in reference to the national and northern Italian averages.

Sorted waste collection centres

The collection centres take in, among other kinds of waste, those which, owing to their nature or size, cannot be collected with normal local services, integrating streetside and household-based collections and represent the most sustainable and low-impact environmental solution for sorted municipal waste collection.

There are 166 sorted waste collection centres, or equipped recycling stations, for direct waste disposal by residents. Of these, 136 are in Emilia-Romagna and are 2 fewer than in the previous year (in 2023 the centres in Cattolica and San Giovanni in Marignano were closed), 11 in the Triveneto, and 19 in Marche. Many centres are equipped with user weighing and recognition systems that allow the traceability of the deliveries and the application of tariff discounts.

At the Group level in 2023, waste delivered to sorted waste collection centres increased significantly from 245,659 tons in 2022 to 294,065 tons (+20%). This significant increase is due to the enactment of Legislative Decree No. 231/2022 which, in contrast to 2022, considers inert waste from households with allowed EER as waste eligible for sorted collection; it should also be noted that most of this waste is delivered to Collection Centres. In the Triveneto region, the volume of waste delivered to waste collection centres increased slightly (+5%), as did the Marche region (+0.7%).

Even considering the increase in total waste delivered, there was an overall increase in **access to the Collection Centres** of 4 percent.

Minor soterd waste collections

For some time now, the Hera Group has been launching sorted waste collections in those waste fractions which produce so-called “smaller” volumes. The main smaller sorted collections are the collections of WEEE (Waste from electrical and electronic equipment), toner, textiles and edible oils. For the latter collection, see the case study in the attachments.

WEEE collection

Currently, 15 “WEEE Point EVO” points and 20 “WEEE Shop EVO” points are installed in Hera’s area, which are distributed throughout the various provinces, mainly in shopping centres, for the collection of small WEEE.

The number of deliveries made by residents to the WEEE Points and WEEE Shops in the local area served were found to have increased in 2023 compared to the previous year, from about 50 thousand to over 52 thousand deliveries made during the last year.

In the Triveneto area, the collection of smaller sorted waste is carried out through ecological stations, the so-called “Ecological Saturdays” and, for some specific types, as well as through dedicated kerbside or unit pricing collections. For example, toner collection takes place through door-to-door collection systems at the premises of non-household users. In smaller municipalities, where there is no collection centre, on specific days of the month, the presence of mobile roll-off containers - called “Eco-Self” sorting containers is guaranteed. These are used for the collection of small WEEE and other fractions that are not able to be transferred to the main circuits.

The collection of toner cartridges

Throughout 2023, the collection and recovery service for used toner cartridges also continued in Emilia-Romagna. Using “Ecobox” containers, distributed to public users such as schools and municipal offices, approximately 155 tons of used cartridges were collected and effectively sent to the re-use market (remanufactured toner cartridges for printers). Quantities are down slightly from the previous year, on the one hand because of the increasing digitisation of documents, which reduces the need for printing, and on the other because spent cartridges are taking alternative recovery channels, such as, for example, pickup by the supplier companies themselves, under existing contracts.

The collection of textiles

Lastly, among the initiatives with solidarity contents, it should be noted that in 2023 both Hera and AcegasApsAmga gave continuity to the textile waste collection service, typically referring to used clothes and fabrics, making use of the companies that won the call for tenders announced at the provincial level.

These contracts stipulate that the contracted firms, private operators, and Social Coops that were awarded the tender, will carry out the collection service by emptying the containers owned by the Group, and make the best use of the collected material by sending it for recovery in their own facilities, giving a new life to these recoverable textile materials, with a view to the circular economy.

No profit margin is derived from the collection of used clothing for the Group and the economic result obtained, net of the coverage of service costs, is allocated by individual municipalities to the abatement of urban hygiene service costs for the resident.

In Emilia-Romagna local areas managed by Hera in 2023, 8,195 tons of textiles were collected, while 1,228 tons were collected in the AcegasApsAmga areas.

In the Marche area there is a collection service for used clothes and clothing accessories which takes place through the special yellow containers positioned in each municipality served., as well In 2023, more than 908 tons of used clothing were collected which are thus removed from landfill disposal and the best use was made of them, by allocating them for reuse and/or recovery.

Bulky waste collection

Bulky waste is waste which, owing to its type, size or weight, cannot be disposed of in urban waste collection containers. Hera currently offers various options for delivering bulky items and large household appliances, offering the possibility of reusing items in good condition by preventing the production of waste or sending them to the correct recovery or disposal flow:

- **donate the good to the non-profit organisation** of the "**Cambia il finale"** project: if the asset is reusable, in the areas of Emilia-Romagna it is possible to make a gesture of solidarity by assigning it for reuse by donating it to one of Heras non-profit partner organisations. Non-profit organisations can collect bulky items free of charge, at their headquarters and at home, to give them new life and use them for charitable purposes. In Ferrara, Ravenna, Modena, Cesena and Rimini it is also possible to allocate reusable goods to non-profit organisations by placing them in the "Reuse Area" located in the sorted waste collection centre;
- **bringing waste to recycling centres** (sorted waste collection centres): if the bulky item is not reusable, it is possible to bring it to the closest recycling centre using the vast and widespread network of recycling centres active in the area;
- **take advantage of Heras home service**: if the good is not reusable and it is not possible to take it to the recycling centre, you can call the call centre to book free home collection. From 2022 it is also possible to book the collection directly from the **Il Rifiutologo app.**

In 2023 these types of waste, including large household appliances, accounted for 4.2% of the total waste collected under management and 5.7% of sorted waste collection, values basically in line with the previous year but on a slightly increased waste stream compared to 2022 (+1 percent).

In the area served by Hera Spa, 193,869 requests for bulky waste pickup were recorded, a sharp increase over the previous year (+15%). Of these, there were specifically about 18,650 carried out by app Il Rifiutologo, a new channel launched in 2022 in addition to the traditional one of calling the toll-free number. The quantities of bulky waste collected, also counting those delivered to sorted collection centres and those abandoned without any reporting, amounted to approximately 60,000 tonnes, recording an increase compared to 2022 equal to 6%.

In the municipalities served in the Triveneto area, a free-of-charge bulky waste collection service is guaranteed upon reservation via toll-free number. In 2023, a total of over 47,000 bulky waste bookings were made across all the local areas served. Household and non-household users can also deliver bulky waste to the collection centres located in the local areas served. In addition to the service by reservation and to the collection centres, it is always possible to deliver bulky waste on the so-called ecological Saturdays that are active in the Municipalities of Padua, Albignasego (Pd), Casalserugo (Pd), Ponte San Nicolò (Pd) and in Trieste.

In the Marche region served, in 2023, through the 'Cambia il finale' project, 916 pickups were made (-63% compared to 2022), managing to recover about 98.4 tons of bulky waste out of 123 tons collected, for a recovery equal to 80% of the collection. In the event that the bulky item cannot be reused, it is possible to take it to one of the 15 Sorted Waste Collection Centres active in the area served, or book an appointment for home collection. In 2023, more than 12,800 home collections were made, and a total of more than 2,300 tons of bulky items were managed overall.

Waste prevention initiatives

Waste prevention is a key element in the transition towards a circular economy, which for the Hera Group represents one of the strategic guidelines for future development. For this reason, the role of prevention is at the centre of many actions and projects that Hera has introduced in the area over the years. Heras commitment is also in line with the new European, national and regional regulations which introduce prevention and reuse objectives as an integral part of integrated waste management.

The European Directive 2008/98/EC on waste, transposed into Italian law by Legislative Decree No. 205/2010, defines the following waste prevention and management hierarchy:

- prevention;
- preparation for reuse;
- recycling;
- other types of recovery, for example energy recovery;
- disposal.

Waste prevention is confirmed as the priority action also with the European package on the circular economy, referred to in one of the case studies in the attachments. Specifically, Directive 851/2018, transposed by Legislative Decree No. 116/2020, places considerable emphasis on the concept of prevention by introducing an obligation for member states to take measures to avoid the production of waste. In fact, it is envisaged that actions will be introduced that encourage the reuse of products and the creation of systems that promote repair and reuse activities. A particular focus is dedicated to the prevention of food waste through the promotion of measures aimed at avoiding its production, also by encouraging the donation of food to prevent its waste.

At the regional level in Regional Law No. 16/2015 of Emilia-Romagna "Provisions in support of circular economy, reduction of municipal waste production, reuse of end-of-life goods, sorted waste collection and amendments to regional law 19 August 1996 no. 31", provisions were introduced to support prevention in waste generation, including the possibility of providing, as part of the waste management service fee regulation, facilities for enterprises that implement actions aimed at preventing waste generation.

Finally, the new "Regional plan for waste management and for the reclamation of polluted areas 2022-2027", recalled the importance of prevention as the "key concept" of waste planning, providing for new measures and specific actions aimed at preventing waste along various supply chains.

Below are some of the most significant initiatives implemented by Hera in 2023 in waste prevention. Other important initiatives such as Cambia il finale, Farmaco Amico and Cibo Amico are covered in detail in this sustainability report (see the case studies in the attachments).

Reuse area

The reuse area is a real box, housed inside a recycling centre, where residents can bring furniture (tables, chairs, beds, etc.), tableware, books, electrical and electronic appliances and various objects, provided that it is in good condition and therefore suitable for a new use by other people. Everything brought by residents is, to all intents and purposes, a donation and at the time of delivery, documentation is compiled which serves as a receipt for the contribution. The material is then delivered to one of the Third Sector Entities participating in the Cambia il Finale project (described in a case study in the appendix), which arranges for the goods deemed suitable to be reused. With this initiative, every time a resident goes to the recycling centre, he can then choose whether to give his good a second chance at life through the reuse area or whether to use it for material recovery, through the recycling chains. Through the activities of the entities involved in the project, the reuse area also serves social purposes by offering support to sensitive segments of the citizenry, making used goods available and creating employment opportunities for people who are unemployed, disabled or disadvantaged.

There are six reuse areas active as of 2018, in the municipalities of Rimini, Ravenna (2), Cesena, Ferrara and Modena.

A total of 5,768 objects were donated in 2023 (considering a single object the simultaneous contribution of a plurality of goods of small size or value, such as for example books or tableware or small objects) equivalent to a total weight of approximately 10 tons.

Trashware

The project, which saw its implementation starting from the year 2011 thanks to the S.P.R.I.Te student association in agreement with the Municipality of Cesena, Hera and the Cesena scientific and educational hub, it represents a point of reference in the area for those who have computer equipment that is dated but still functional that they want to get rid of and for all companies that need reconditioned and computers that are useful for basic computer science. The aim of the project is to recover PCs and IT components in general to stem the phenomenon of dangerous electronic waste. At the same time, it aims to reduce the digital divide of residents by donating PCs with attached peripherals to individuals, associations and schools in the municipality of Cesena. The project is promoted above all through social media and the internet (Facebook as a channel for giving information or receiving requests; Instagram, aimed at younger people, to give visibility to events or the normal laboratory session; trashwarecesena.it as an internet showcase, for those are less accustomed to social networks).

In 2023, there were 95 contacts from stakeholders interested in the equipment donation activity (surpassing the number of 3,400 since the start of the project), and the refurbished PCs and peripherals that have been delivered total 586 (more than 2,500 since the start of the project) of which as many as 346 have been delivered to schools and associations.

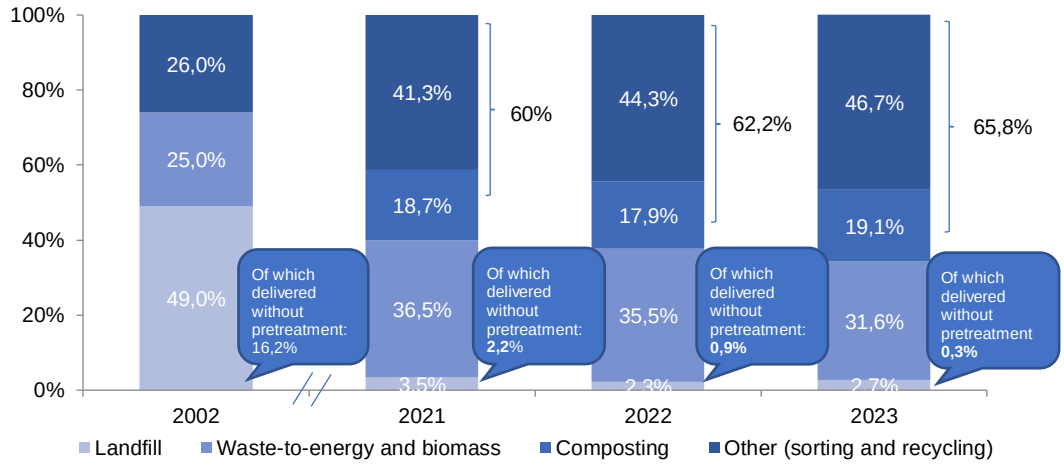
The disposal of municipal waste in Italy and Europe and the comparison with Hera

European Union and national legislation define principles and priorities in waste management which, starting from the minimisation of the waste at the origin, provide for the recovery of materials, the recovery of energy and, only as a final and residual system, disposal in landfills.

The Hera Group has worked in this direction over the years, as demonstrated by the comparison between the 2023 data and those of the last three years. In terms of reducing the use of landfills, the Group managed to maintain the already excellent performance achieved in 2022. This is in line with the Group's objectives which, in line with national and European Union regulations and the planning of the responsible bodies, envisage a reduction in the use of landfills and an increase in sorted waste collection.

In 2023, the share of municipal waste disposed of in landfills downstream of pretreatment was 2.7% compared to an Italian average reported for 2021 of 21.3% (Source: Eurostat) and thus lower than the 2035 target set by European directives of 10%. Landfill use was particularly low in the areas served in Emilia-Romagna, standing at 1.2% in 2023 (0.9% in 2022), compared to the Emilia-Romagna average of 5.2% in 2022 (Source: ISPRA, Municipal Waste Report 2023). While in the Marche areas the positive trend of landfill reduction that began last year (from 22.2% in 2022 to 21.5% in 2023) continues, mainly due to a gradual return to the situation prior to the health emergency in which it was possible to return to pre-treatment of waste, through mechanical biological treatment plants, before landfilling; in addition, there has been a general decrease in the production of sorted and unsorted waste, which has affected the volumes landfilled. In the Triveneto area, the absence of a landfill for the disposal of municipal solid waste was also confirmed in 2022.

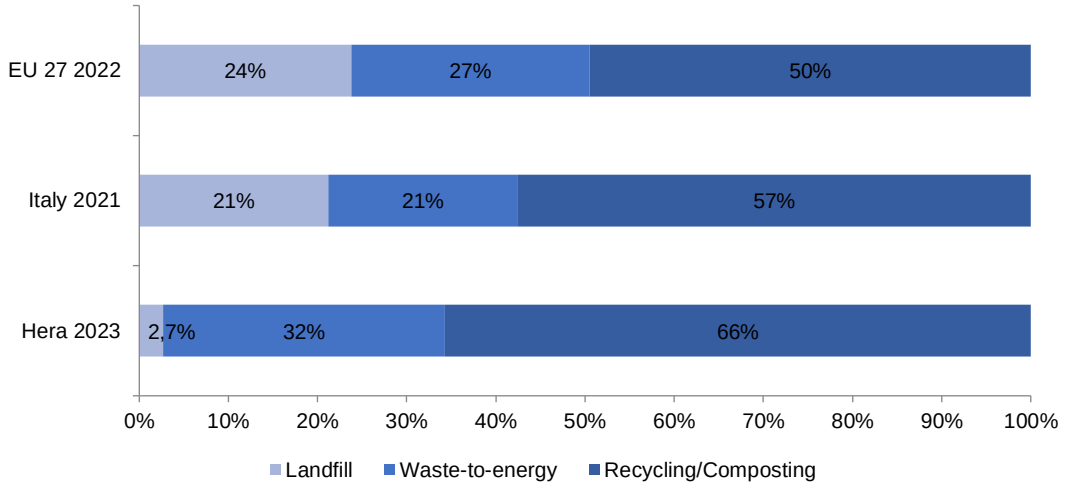
MUNICIPAL WASTE COLLECTED BY HERA BY DESTINATION



At European level, the use of landfill as a form of municipal waste disposal was stable compared to the previous year, with significant differences from country to country: in the EU-27, the figure for 2022 was 24% (source: Eurostat). In Italy, the decrease in the percentage of waste sent to landfills continues (21% in 2021 versus 23% in 2020), while the figure for deliveries to waste-to-energy plants remained stable at 21%.

Landfills continue to be the main treatment modality in 11 European countries, with peaks reaching 86% in Malta or higher than 75% in Greece, Romania and Cyprus. Conversely, in Denmark, Belgium, Germany, Finland, Sweden and the Netherlands, the use of landfills stands at between 0% and 1%; in these virtuous countries, waste-to-energy fluctuates from 30% to 61%; while the remainder is sent for recycling. Hera is in line with these countries in terms of recycling, with further improvements planned over the next few years.

URBAN WASTE MANAGEMENT IN EUROPE AND ITALY AND HERA'S RANKING (2022)



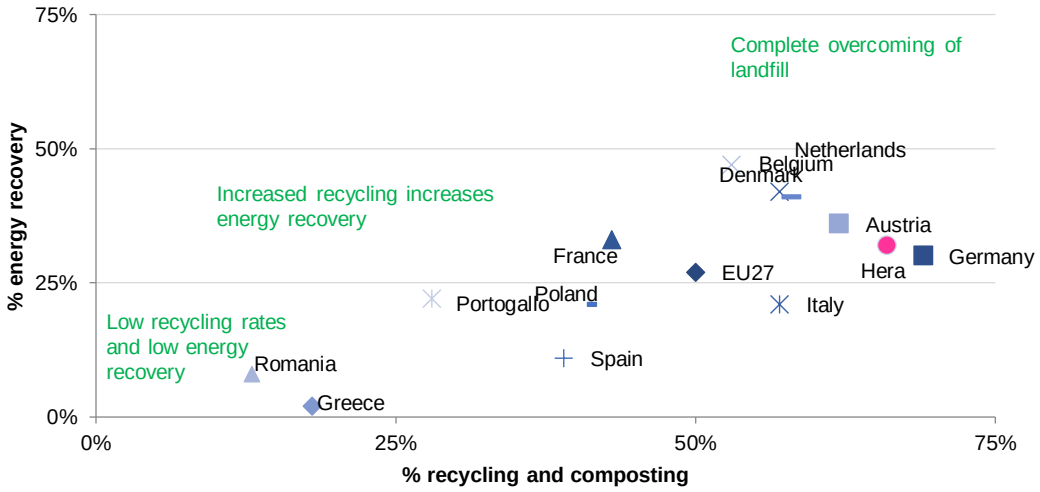
MUNICIPAL WASTE: EUROPE AT THREE SPEEDS AND THE HERA AREA AMONG THE MOST VIRTUOUS (2022)

Country	Landfill	Waste-to-energy	Recycling / Composting
Countries with deliveries to landfills lower than or equal to the European average			
Belgium	0%	47%	53%
Finland	0%	61%	39%
Sweden	1%	59%	40%
Denmark	1%	42%	57%
Germany	1%	30%	69%
Holland	1%	41%	58%
Hera Group	***2%***	***32%***	***66%***
Austria*	2%	36	62%
Luxembourg	4%	42%	55%
Slovenia	9%	15%	75%
Lithuania	14%	38%	48%
Estonia	15%	48%	37%
Ireland**	16%	43%	41%
Italy*	21%	21%	57%
European Union (27 countries)	**24%**	**27%**	**50%**
Countries with deliveries to landfills less than or equal to 55% but greater than the European average			
France	24%	33%	43%
Poland	38%	21%	41%
Slovakia	41%	8%	51%
Czech Republic*	45%	12%	43%

Country	Landfill	Waste-to-energy	Recycling / Composting
Bulgaria*	49%	4%	47%
Portugal*	50%	22%	28%
Spain	50%	11%	39%
Latvia*	52%	3%	44%
Hungary	55%	12%	33%
Countries with deliveries to landfills greater than 55%			
Croatia	62%	0%	38%
Cyprus	77%	3%	19%
Romania	79%	8%	13%
Greece*	81%	2%	18%
Malta	86%	1%	13%

*2021 Data, ** 2020 Data Source: based on Eurostat data

MUNICIPAL WASTE DISPOSAL IN EUROPE: THE CORRELATION BETWEEN RECYCLING/COMPOSTING AND ENERGY RECOVERY. HERA AMONG EUROPEAN BEST PRACTICES (2022)



Source: Eurostat data processing

Recovery of materials and energy in Herambiente's sorting plants

The evolution of the Hera Group's strategy develops in full harmony with the criteria of the circular economy organised into various actions and choices that lead to perceiving the change in the area and in everyday life. The Herambiente Group pursues specific objectives determined by the general strategy of the Group, in particular, new solutions for the recovery of waste as well as waste for the production of biofuels or biomethane, new recycled plastic materials, derived for example from molecular recycling, new recycling options, including cutting-edge solutions such as carbon fibre recovery, and the involvement of residents to improve the quality of sorted waste.

Among **sorting plants**, 6 (out of the 15 total) treat urban and special waste coming from sorted collection and from production/craft activities mainly in the provincial area in which they are located. The objective of the process, carried out with more or less complex technologies and specific treatment lines for the type of collection to be treated, is to recover the greatest possible quantity of material from the delivered flow and reduce the use of landfills. These plants recover: paper/cardboard, plastic, wood, metals, glass, biodegradable waste (from pruning), tyres, textiles, aggregates. The treatment lines used are specific for the characteristics of each collection, five plants out of six are equipped with particularly performing optical reading lines in the selection of urban plastic and paper collections both in terms of flow rate

(hourly quantity of treated waste) and the quality of the material obtained from the selection. The treatment waste, so-called waste and not destined for material recovery, is destined for energy recovery or disposal.

In 2023, Herambiente's sorting and recovery plants produced **445,892 tonnes of waste**, an increase of 3% compared to 2022. This increase is mainly due to the increase in waste from sorted waste collection in the area. The amount sent to **material recovery** accounts for 71.9%, while the portion sent to **energy recovery** accounts for 13.0% leading to an **overall recovery of 84.9%** up from 2022. A share of the produced surplus is allocated to energy recovery, amounting to about 48.9% in 2023, an increase from the previous year of about 79%. The amount of plastic selected and sent for recycling in 2023 increased to **58,793 tons** (+25% compared to 2017). The increase in the quantities of plastic selected and sent for recycling is one of the three objectives of the Group as part of the New Plastics Economy Global Commitment, an initiative with which in 2018 the Ellen MacArthur Foundation aimed to address the problem of plastic pollution worldwide origin and make the whole plastic production chain more circular.

The shredding activity aimed at the volumetric reduction of the large size waste, deriving from the mechanised selection of the separate collection of bulky waste, already present in the Ferrara, Bologna, Coriano and Modena plants, was started up and put into operation also on the plant of Voltana, which in 2022 launched the new automatic line for the enhancement of the value of the glass from collection.

DESTINATION OF TOTAL WASTE LEAVING HERAMBIENTE SORTING PLANTS

Thousands of tonnes	2021	2022	2023
Waste sent for material recovery	323.6	317.2	320.4
Irrecoverable in the output	102.8	116.3	118.5
of which energy recovery	*20.7*	*32.3*	*57.9*
Other waste for disposal	0.1	0.06	7.0
Total waste treated in selection plants	**426.5**	**433.5**	**445.9**
of which sent for material recovery (%)	*75.9%*	*73.2%*	*71.9%*
of which sent to energy recovery (%)	*4.9%*	*7.4%*	*13.0%*
of which sent for material and energy recovery (%)	***80.8%***	***80.6%***	***84.8%***

The circular economy at the service of businesses

The Hera Group, through its subsidiary Herambiente, manages over 90 plants for the recovery and disposal of hazardous and non-hazardous municipal, special and industrial waste. The range of facilities includes waste-to-energy plants, composting/digestion plants, sorting and material recovery plants, chemical/physical plants and inertisation plants and soil washing; several plants are dedicated exclusively to the treatment of special waste in order to provide increasingly comprehensive and punctual services to industries and companies for managing their waste and scrap.

The acquisition of A.C.R. in 2023 further expanded the range of services offered to businesses, such as decommissioning activities, and also enhanced the remediation service offered.

In 2023, there was confirmation of the lines of development that characterise the transformation of the Herambiente Group's business, which tends to become a company capable of transforming all the waste it delivers into products, with a view to the circular economy, while ensuring the correct and timely management of waste, tailoring its activities to the nature of the latter.

In particular, note:

- the consolidation of **biomethane production** through the S. Agata Bolognese (Bo) plant, which is already in industrial operation, and the Spilamberto (Mo) plant, operated by the subsidiary Biorg, which is in the start-up phase. When fully operational, the two plants will produce a total of about 12 million cubic metres of biomethane for automotive use;
- the expansion of the range of **plastic waste recovered** through Aliplast obtaining a single authorisation (ex art. 208 of Legislative Decree No. 152/2006) for the construction and operation of the rigid plastics recovery plant to be built in Modena, where the waste-to-energy plant and the civil purification plant operated by Hera Spa already exist on the same site, financed in part by NRRP funds. The plant will be able to process 30k ton/y of plastic waste to produce about 27k ton/y of high-quality polymers (PP, HDPE, PE, PO mix) in the form of flakes or pellets;

- the implementation of the project to upgrade **PE production and regeneration** capacity, with an increase of 20k ton/y, at Aliplast's plant located in Novara; the authorisation process will start in 2024;
- the implementation of an innovative plant for **recovering carbon fibre** from waste composite materials. Construction of the first of two planned carbon fibre recovery lines at the plant located in Imola (Bo) began in 2023. Civil preparations and connections have also been made and the on-site assembly phase has also begun, which will be completed when production is scheduled to start in the first half of 2025. This plant adopts an innovative technology based on pyrolysis and gasification that was developed together with industrial partner Curti and with the contribution of the Faculty of Chemistry of the University of Bologna. This project was also partly financed by NRRP funds;
- the completion of logistics platforms that operate the storage, characterisation and pre-treatment of the waste in such a way as to make it compatible with the recovery and/or disposal systems available in Italy and abroad. From this point of view, the agreement signed in 2020 with the company **Eni Rewind** for the construction, in the "Ponticelle" area, adjacent to the petrochemical pole of Ravenna, of a technologically advanced platform for the treatment of industrial waste, assumes significant importance. It can receive and pre-treating up to 60,000 tons per year of solid, liquid and sludge like (mainly hazardous) industrial waste. The project was developed in 2020 and was authorised at the end of 2023. Work and supplies have also been awarded for the construction of the facility, with construction to begin in the first half of 2024.

In 2023, Hasi completed the construction of an osmosis and evaporation plant for the treatment of saline solutions at the Malpasso (Pi) site, which will allow the recovery of water for production activities, as well as the construction of new facilities to serve the sludge, reclaimed soil and industrial dust inerting plant at the Ragghianti (Pi) site.

Hasi also continued its corporate acquisition activities for 2023, implementing the activities of the acquired companies, such as the work carried out for the new plant of the company Vallortigara located in Marano Vicentino (Vi), which is now operational, and the completion of Recycla's plant located in Maniago (Pn), with the annexed installation of the photovoltaic system.

Of particular note is the acquisition of the company A.C.R., which was an additional and relevant piece in the service to companies for remediation and full-service interventions. A.C.R.'s operational capacity, which can count on specialised vehicles, machinery and equipment, as well as a large and competent operational workforce, allows the Herambiente Group's operational arm and scope of action in the remediation, full service and decommissioning sector to be completed and expanded in a consistent manner.

In 2023, the new Line 2 of the waste-to-energy plant in Trieste went into industrial operation, while in August the start-up of the hazardous waste incineration plant named 'F3' in Ravenna began, after a major renovation of the combustion, boiler and flue gas treatment sections. As for the work to replace lines 1 and 2 of the Padua waste-to-energy plant with a new line (Line 4), the authorisation process was completed in 2022, and the procurement phase as well as work on site activities began in 2023. The primary objective of these interventions was to give a long-term perspective to the current waste-to-energy capacity of these plants, increasing the efficiency of energy recovery, reliability and continuity of operation, and, above all, equipping the plants with better and more innovative fume purification systems in order to further reduce the environmental impact.

In addition to interventions on individual projects, the feasibility of initiatives aimed at researching **new technologies** to extract resources and value from waste and its assets is ongoing. On this point, we highlight the commissioning of the 1MW photovoltaic plant on the exhausted landfill in Baricella (Bo) managed by Herambiente. Another element in the valorisation of its assets is the assignment by tender to a joint venture of Hera, Herambiente and SNAM of the construction of a hydrogen production plant in the disused area of Via Cavazza in Modena. Post-management landfill areas will be used on the site for the production of renewable energy using photovoltaic systems (6 MWe) that will feed a water hydrolysis plant for generating green hydrogen to be used both for transport and to replace fossil fuels in hard-to-abate industries.

For more information on the progress of the interventions and the expected/obtained environmental benefits, refer to the table in the paragraph "The development of the plant system".

Industrial waste recovery with Herambiente Servizi Industriali (Hasi)

Herambiente Servizi Industriali (Hasi) is the Group company that offers environmental solutions and services dedicated to companies. Today **it represents the largest Italian company dedicated to the treatment of industrial waste** and boasts a **plant system** that is unique in Italy consisting of 26 plants of different types, located in different areas of the national area, such as Tuscany, Emilia-Romagna, Veneto, Friuli-Venezia Giulia and Molise. Below is the list of plants owned by Hasi and its subsidiaries A.C.R., Recycla and Vallortigara:

:

- 11 storage facilities;
- 6 chemical-physical-biological treatment plants;
- 3 waste treatment plants (hazardous waste, special waste, sludge);
- 3 inertisation plants;
- 3 packaging sorting and washing plants.

Key elements of Hasi's offer are **maximum traceability, compliance with all environmental regulations** and identification of the optimal recovery and recycling solution that **minimises landfill disposal**.

Hasi acquired 60% of A.C.R., one of Italy's largest companies in the remediation, industrial waste treatment, industrial plant decommissioning and civil works (construction and maintenance) sector with headquarters in Mirandola (Mo). This operation is expected to create the first national operator in reclamation and global service activities, with a widespread presence throughout the Italian peninsula.

In addition to global service and reclamation solutions, Hasi offers O&M (operations and maintenance) services provided to large manufacturing groups of private waste treatment plants, implementation of improvement/efficiency plans, solutions for maximising recovery and overall reduction of waste produced, such as managing some streams as by-products.

Some examples of recovery-oriented solutions applied to the customer portfolio are:

- leather scraps that converge for the production of soil conditioners and fertilizers;
- recoverable fractions of paper that are sent to paper mills;
- washed and reclaimed plastic that is reproduced in flakes for future processing;
- wood scraps that are used to make chipboard panels;
- ferrous materials that are selected for recovery in the foundry;
- organic waste from food manufacturing companies destined for composting for the production of energy and compost;
- some types of plastic production waste or polylaminates (which until recently were destined for energy recovery) selected and separated directly in the company and sent for material recovery at proprietary plants or third-party suppliers;
- all non-hazardous unsortable waste, or waste that is not selectable or recoverable in terms of material, directed to energy recovery.

The integration of the waste management offer with that of on-site plant management guarantees the Group effectiveness and notoriety on the market, high customer loyalty and value creation, as well as an element of differentiation compared to competitors.

Hera guarantees its customers complete traceability of all waste. Since 2015, a reserved area dedicated to customers has been active on the Herambiente website, who can remotely view the status of their contributions, the validity of the approvals and the status of the payments. For each contract, information relating to the treatment operations is provided in real time, with evidence of the individual destinations and the percentage of recovery achieved with respect to the total waste delivered. More recently, a new feature has also been introduced that allows customers to book their deliveries online.

DESTINATION OF TOTAL MANAGED WASTE - HERAMBIENTE SERVIZI INDUSTRIALI (HASI) AND SUBSIDIARIES

Thousands of tonnes	2021	2022	2023
Waste sent for material and energy recovery	488.4	592.3	700.6
Waste sent for disposal	645.8	626.8	650.0
Total waste managed	**1,134.3**	**1,219.1**	**1,350.6**
Waste sent for material or energy recovery (% of total waste treated)	**43.1%**	**48.6%**	**51.8%**

In 2023, the volume of waste managed by Hasi and its subsidiaries, through the intermediation service and in its plants, amounted to approximately **1,350.6 (+10.8% compared to 2022**) of which 51.8% (approximately 700.6 thousand tons) sent for material or energy recovery or recovered directly as secondary raw material, while the remaining part was sent for disposal.

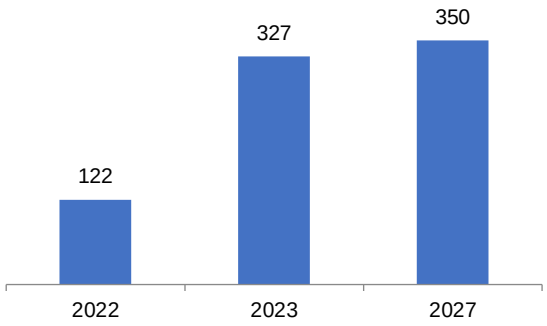
In 2023, Hasi and its subsidiaries (A.C.R., Recycla, SEA, Vallortigara) treated 646.6 thousand tons of waste in their plants, of which 63% (corresponding to about 406 thousand tons) was sent to recovery or recovered by generating secondary raw material. Analysing the performances, note the increase in waste sent for energy recovery equal to 14 thousand tonnes (+26% compared to 2022) and the increase in the **reuse of water leaving purifiers**, which came to 261 thousand tonnes (+27% compared to 2022). This latter result was possible thanks to the innovative osmotisation process in the Malpasso and Ragghianti plants, through which a high level of recovered water quality is guaranteed, higher than, for example, that emitted from artesian wells.

Through the **brokerage service**, Hasi and subsidiaries, in 2023, handled 703.9 thousand tons with its customers, of which 41.8% (294.2 thousand tons) were sent for material recovery (82.7% corresponding to 243.6 thousand tons) and energy (17.2% corresponding to 50.6 thousand tons).

DESTINATION OF TOTAL WASTE TREATED IN ITS OWN PLANTS - HERAMBIENTE SERVIZI INDUSTRIALI (HASI) AND SUBSIDIARIES

Thousands of tonnes	2022	2023
Waste sent for recovery and recovered	**325.1**	**406.2**
Second raw material produced	*27.0*	*35.8*
Material recovery start	*48.4*	*62.6*
Purified water recovered	*205.4*	*261.1*
Start-up of energy recovery	*44.4*	*46.9*
Waste sent for disposal	**278.1**	**240.4**
Of which discharge into industrial sewers	*19.0*	
Total waste treated in the operations area	**603.2**	**646.7**
Waste sent for recovery and recovered (% of total waste treated)	**53.9%**	**62.8%**

WASTE TREATED IN REMEDIATION AND GLOBAL SERVICES (THOUSAND TONNES)



Focusing on global services and remediation activities, the waste treated in the last two years has seen significant growth (+164%) thanks to the acquisition of A.C.R. in 2023.

The development of A.C.R.'s activities in the time covered by the plan will particularly concern remediation, which, however, is not reflected in the figure for treated waste, also as a result of the possible in-situ treatments that do not result in the production of waste.

The contribution of the Hera Group to the plastics of the future

The Aliplast Group, acquired in 2017 by Herambiente, owns **nine plants**. The three foreign plants located in Spain, Poland and France, the two Italian plants in Formigine (Mo) and Quinto di Treviso (TV), are dedicated to the procurement and selection of plastics, the plants in Ospedaletto di Istrana (TV) and Borgolavezzaro (No) transform plastic waste into finished products, while the Gualdo Cattaneo (Pg) plant produces finished products starting from semi-finished products in recycled plastic.

Aliplast **manages the integrated plastic cycle**, transforming waste into a finished product, mainly PE film, PET sheet and granules/flakes of the main polymers. Its main commitment is to give sustainability to the life cycle of plastic, by collecting and recycling it to produce new materials, with the minimum possible environmental impact. Through constant research and development and continuous technological innovation (of product, service, process), Aliplast oversees a traceable plastic supply chain, capable of transforming a fractional chain into a virtuous circuit and ensuring a quality, efficient and economical final production cheaper than traditional materials.

Furthermore, Aliplast continues to constantly implement synergies that are aimed at the recovery of base polymers, through the agreement signed with Nextchem for the design and construction of a plant which is capable of regenerating polymers which constitute “rigid” and three-dimensional objects. The plant will be built in the municipality of Modena near the waste-to-energy plant and the wastewater treatment plant, both operated by the Hera Group, creating a true circular economy district and will be completed by 2026.

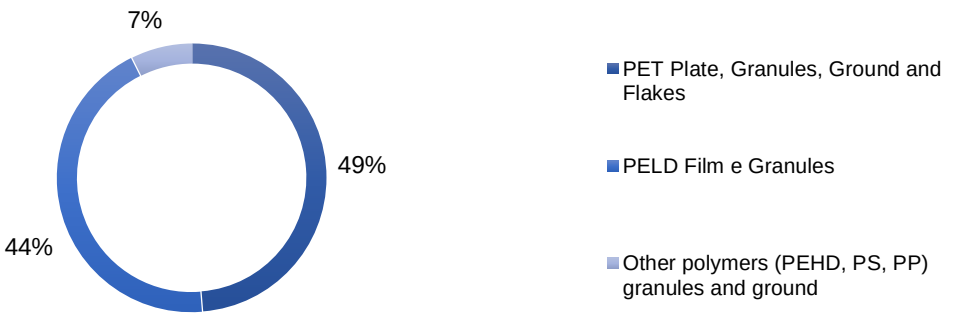
WASTE TREATED BY ALIPLAST

Thousands of tonnes	2021	2022	2023
Incoming waste (A)	97.4	99.2	108.4
Total incoming waste sent for recycling (B=C+D)	88.3	86.2	92.8
Secondary raw material obtained from incoming waste (New plastics economy Global Commitment) (C)	80.9	79.2	84.6
Incoming waste sold (started for recycling at third parties) (D)	7.4	7.1	8.2
Percentage of secondary raw material and waste sent for recycling out of total incoming waste ((B/A)	90.6%	86.9%	85.6%

The plants treat **waste from industrial waste and sorted urban waste collection.** This waste was transformed into new products or, to a residual extent, transferred to third-party companies operating in the recycling sector. The Aliplast Group directly recycles a large part of the incoming waste and only a small percentage is discarded because it is made up of non-recyclable polymers or due to weight loss due to the presence of liquids. The percentage of input waste sent for material recovery is more than 85%.

The secondary raw material obtained from the incoming waste is sold or used to produce recycled plastic products. The products sold by Aliplast in 2023 contained around 86% of secondary raw material derived from plastic waste. Also in the same year, Aliplast sold 100.1 thousand tons of recycled plastic products (it was 99.6 thousand tons in 2022), registering a growth of about 1% over 2022. This increase was driven mainly by PET polymer, which, thanks to a major reduction in the cost of plastic bottles, has enabled recycled materials to be competitive. The aforementioned increase in sales consequently led to an increase in the amount of secondary raw material obtained (+7% over 2022 from 79,172 tons to 84,619 tons) and the amount of waste input (+8%). This data is the subject of public reporting as part of the **New Plastics Economy Global Commitment** promoted by the Ellen MacArthur Foundation, described in a case study of this report. The Group has set a target of increasing recycled plastics by +122% to 2027 and +150% to 2030 from the 60 thousand tons recorded in base year 2017.

PRODUCTS SOLD BY ALIPLAST BY TYPE (100.1 THOUSAND TONS IN 2023)



The food industry requires compliance with high safety standards and demands strict compliance with applicable food regulations. The range of Aliplast products, fully certified at European level for food

contact, consists of polymer granules and flakes, and PET sheets for thermoforming and extrusion, which are ideal for the production of food trays and bottles.

Since 2018, Aliplast has been using its own IT tool to calculate the **carbon footprint** of five types of products, as described in more detail in a case study within this sustainability report.

The development of the plant system

The main interventions

In 2023, the Herambiente Group made operational investments in **material and energy recovery**, as well as in the construction of additional landfill volumes and implementation of its plant equipment, totalling **123.9 million euro**.

The following table shows the construction, upgrading or restoration of the plants completed during the year and under construction. For a description of the main interventions carried out, see the paragraph "The circular economy at the service of businesses".

MAIN CONSTRUCTION/ENLARGEMENT/IMPROVEMENT INTERVENTIONS OF WASTE TREATMENT PLANTS

Plant	Status as of December 31, 2023	Type of intervention	Expected / achieved environmental benefits
Spilamberto plant (Mo)	Started and close to industrial operation	Implementation of the biomethane production section	Biomethane production in 2023 of about 1.5 Mmc. Full industrial operation expected in 2024
S. Agata Bolognese (Bo) plant	Plant in industrial operation	Biomethane plant implementation	Biomethane production in 2023 of 7 Mmc (performed in 2023 scheduled maintenance)
Carbon Fibre Recovery Plant (Bo)	In progress	Implementation of no. 2 carbon fibre recovery lines from composite materials	Increase in the range of recoverable waste and production of recycled materials with less energy expenditure than virgin raw materials
Rigid plastics recovery plant of Aliplast (Mo)	Authorised intervention	New plant	Increased range of recoverable plastic waste; treatment of 30 kton/a of plastic waste and production of 27 kton/a of PP, PE, HOPE, PO flakes and pellets etc.
Special waste recovery plant in Marano Vicentino (Vi) of Vallortigara	Implemented and in operation	New plant	Recovery of special waste (paper/cardboard, wood, metals, etc.)
Malpasso(Pi) site of Hasi	Osmosis line finished; Evaporation line under construction	New osmosis/evaporation line for wastewater/liquid waste	Recovery of water for industrial use
Torrebelvicino (VI) plant of Vallortigara	In progress	Plant expansion	Increase in special waste treatment capacity
Maniago (Pn) plant owned by Recycla	In progress	Construction of new department	Increase in special waste treatment capacity
Maniago (Pn) plant owned by Recycla	Terminated	Photovoltaic system on Maniago warehouses	Renewable e.e. production also for self-consumption
Castiglione delle Stiviere plant (Mn)	Plant in industrial operation	Modification and revamping of high-quality CSS production line	Reduction of waste scraps from processing that cannot be used as fuel
Castiglione delle Stiviere plant (Mn)	Terminated	Insertion of 2 abatement towers on the air treatment system	Reduction of odour emissions
Ragghianti (Pi) of Hasi Site	Implemented and in operation	Doubling of the tank park for flammable waste	Capacity increase
Ponticelle platform (Ra) of Hasi	Authorised intervention	New platform for industrial waste storage and pre-treatment	Capacity increase
Voltana selection plant (Ra)	Terminated	New glass waste treatment line from separate collection	Improved glass recovery system from separate collection

Plant	Status as of December 31, 2023	Type of intervention	Expected / achieved environmental benefits
Paper/cardboard, plastic (Pu) sorting plant	Feasibility study and obtained opinion of no need for EIA	New plant	Plant for the treatment of Sorted Waste portions of paper/cardboard and plastic
Pozzilli treatment plant (Is)	Authorised intervention	Purifier expansion	Increased handling capacity
Pozzilli Spillway (Is)	Terminated	Insertion of spillway and first rain accumulation tank on the wastewater inlet pipe via pipe	Adjustment of inflow/load to purifier and spillway management
Trieste waste-to-energy plant	In industrial operation	Line 2 revamping	Increase in treatment capacity and energy recovery (expected 20 thousand MWh/year)
Ravenna waste-to-energy plant (F3)	In startup/testing	Revamping of the F3 hazardous waste incinerator (Ravenna)	Increased treatment capacity (+10 kt/year) and energy recovery (+7,000 MWh/year) Startup to begin in August 2023, expected industrial operation in the first half of 2024
Padua waste-to-energy plant	In progress	Replacement of lines 1 and 2 with new line 4	Increase in energy recovery (expected + 70,000 MWh/year), BAT adjustment and continuity of operation.
Landfill 5th section of Ravenna	In the authorisation phase	Construction of the 5th sector landfill of inertised NP and P waste	Capacity increase
Landfill 9th sector Ravenna	Terminated	Capping and environmental restoration	Reduction of leachate production and environmental restoration
Landfill site km 3.8 Ravenna	Authorised intervention	Restoration and renaturation of the area	Renaturation and landscaping. Internal site of the Po Delta Park
Gaggio Montano (Bo) Landfill	In the authorisation phase	Implementation of 6th sector	Capacity increase
Finale Emilia (MO) landfill	In progress	Implementation of lots 5,6 and auxiliary systems	Capacity increase
Landfill of Loria (Tv)	Lot 6 implemented and in operation; Lot 5 implemented	Implementation of lots 5 and 6	Capacity increase
Discarica Cordenons (Pn)	Terminated	Implementation of lots 5,6,7,8	Capacity increase
Serravalle Pistoiese landfill (Pt)	In progress	Implementation of lots 12,13	Reduction of leachate production and environmental restoration
Landfill leachate treatment plant Cà Asprete (Pu)	In progress	New plant	Landfill leachate treatment plant using reverse osmosis technology

Environmental impact assessments [2-23]

The **EIA and Screening** requests are accompanied by a series of **environmental assessments** aimed at evaluating the effects of the works (both in the construction phase and in the project stage) on the environment and on human health and well-being, based on the characteristics of the project itself and following the analysis of the components involved in the pre-construction work situation. Interferences with the following components are analysed: atmosphere, water resources, soil and subsoil, flora, fauna and ecosystems, noise, human health and well-being, landscape and cultural heritage, settlement system and socio-economic conditions.

The approach used involves the execution, in addition to qualitative and descriptive assessments, of specific **modelling and forecasting simulations** with software and calculation algorithms, in order to obtain numerical data that can be compared with the standards and limits defined by the sector legislation and such as to be able to assess the significance of the impact. The modelling simulations are carried out in particular for the emission of pollutants and odorous substances into the atmosphere, and noise emissions. They are also used for the preparation of the risk analysis in the landfill sites, where it is necessary to request derogations from the admissibility criteria of the incoming waste and in any case

necessary during the plant closure procedure phase as envisaged by the recent regulatory updates on landfills.

All the simulations carried out envisage the punctual characterisation of the sources and the evaluation of the most disadvantageous scenario for the purpose of carrying out **a precautionary analysis.** In order to evaluate the visual effect of the new work on the surrounding environment, for example, for the construction of new landfill lots/sectors, landscape assessments are carried out through the creation of renderings and photo-insertions. In addition, where the planned works fall within or near sites of community interest (sites belonging to the Natura 2000 Network), special impact assessments (VINCA) are provided to analyze the significance or otherwise of the interference that the planned works/activities could have on these sites. Finally, in some cases, the requests are also accompanied by a specific "Health impact assessment and health monitoring plan proposal". Once the impacts have been assessed, specific **mitigation measures** are identified, where necessary, in order to reduce their significance and, where not possible, specific compensatory measures are prepared (construction of photovoltaic systems, planting, creation of electric recharging points for cars, etc.).

It should be noted that the design of the works is always carried out through the identification and use of the best available technologies as stipulated in Legislative Decree No. 152/2006 Art. 29 b paragraph 3, which, for landfills, are defined by Legislative Decree No. 36/2003.

During 2023, the following Environmental Impact Assessment Procedures were activated under Art. 27b of Legislative Decree 152/2006 "Single Regional Authorisation Provision":

- Serravalle Pistoiese (PT) Landfill - Volumetric optimisation project: updating the landfill capacity with the same morphological profile to increase the amount of waste that can be landfilled. With this project, the landfill capacity would increase from 3,010,000 m3 to 3,392,500 m3.
- Gaggio Montano (BO) landfill - Optimisation project of the existing plant site with construction of the 6th landfill sector in order to extend the landfill's operational horizon, guaranteeing a disposal service without the need to build new landfill facilities.

In addition, during 2023, the process of verification of subjectivity to EIA (so-called Screening) of the project of non-substantial modification by Vallortigara Servizi Ambientali Spa (a Herambiente Group company) of the A.I.A. of the Torrebelvicino (VI) plant in order to undertake a synergistic operational management with its own new waste management plant located at Marano Vicentino (VI), with a view to optimising the waste flow, was initiated. These modifications concern technological, plant engineering, space organisation and management choices aimed at limiting the impact with the surrounding environment to allow an organic integration of the planned works in the local and environmental context.

The main **plants/plant sites** for which AIA review applications have been activated in 2023 are:

- Landfill for non-hazardous waste located at Via Bocche no. 20, Municipality of Baricella (BO)
- Landfill for non-hazardous waste and incinerator slag located at 150 Via Caruso, Municipality of Modena (MO)
- Sorting and recovery plant located in Via del Frullo, Municipality of Granarolo dell'Emilia (BO)

From the evaluations carried out during the presentation of the AIA Review requests, **substantial compliance with the sector BATs emerged for all of them.**

The following **Impact Assessment Procedures (VINCA)** were submitted during 2023:

- Landfill for non-hazardous waste in Gaggio Montano (BO): an application for impact screening was submitted as part of the procedure for the issuance of the Single Regional Authorisation Measure for the project to optimise the existing plant site with construction of the 6th landfill sector;
- Landfill in Serravalle Pistoiese (PT): an impact screening application has been submitted as part of the procedure for the issuance of the Single Regional Authorisation Measure for the volumetric optimisation project by updating the landfill capacity with the same morphological profile.

Hestambiente has developed a project to modernise the Padua waste-to-energy plant by replacing Lines 1 and 2 with a line (Line 4) that is similar in configuration and capacity to the current Line 3.

The impact of the emissions in the project configuration, as verified through a diffusion study, is negligible and does not affect the state of air quality (largely compliant with the quality limits set forth in Legislative Decree 155/2010).

The environmental assessments regarding the sustainability of the plant, both for the plant configuration currently in operation and for the project configuration with line 4 operational, were carried out considering the plant at its originally authorised capacity, i.e. 245,000 t/y. The authorised capacity has been reduced in the new authorisation to 219,000 t/y with a further reduction of the stack emission limits specifically for the parameters NOx, PM10 and NH3; therefore, further improvements are to be expected

with respect to what was estimated in the diffusion study as well as with respect to the current state. These reductions refer to both Line 3 currently in operation and Line 4 with respect to what is proposed.

Sblocca Italia Decree and new waste disposal legislation

Article 35 of Decree-Law. 133/2014 converted with amendments into Law 164/2014 in the so-called "Sblocca Italia," is aimed at achieving on a national scale an adequate and integrated system of urban waste management as well as achieving separate collection and recycling targets.

This rule provided for the recovery plants that comply with the environmental limits, present in the environmental impact assessments (EIA) of the individual plants, the possibility of adapting the treatment capacity to the saturation of the thermal load of the plant and the possibility of treating urban waste coming from outside the basin subject to meeting the needs of the reference basin.

Following this legislation, an agreement was signed in 2015 between the Emilia-Romagna Region and the two managers of waste-to-energy plants for urban waste (Hera and Iren). This agreement limited the treatment of municipal waste from outside the region only in the event of a request for assistance in offering solidarity for justified and shareable needs posed for limited periods and with the assent of the local areas concerned.

Consistent with the principles and objectives defined in Art. 35, the Hera Group identifies the priority criteria for saturating the capacity of its waste-to-energy plants in the following hierarchical order:

- municipal waste from the local area;
- municipal waste from the regional area;
- any non-regional municipal waste based on decisions by the relevant authorities;
- non-hazardous special waste upon saturation of the residual thermal load (according to the provisions in the integrated authorisation of each plant).

Based on these principles, between the end of 2015 and during 2016, the Integrated Environmental Authorisations (AIA) were updated, and at the same time, program agreements were signed with the Local Authorities concerned for the waste-to-energy plants of Forlì, Rimini, Modena and Ferrara.

The Bologna, Padua and Trieste plants had already been authorised with a capacity at saturation of the thermal load. The authorisations of the two Padua and Trieste plants, in fact, do not allow the treatment of urban waste coming from outside the basin, since priority access to basin and regional waste must be guaranteed, both municipal waste as well as from treatment of municipal waste, saturating the treatment capacity.

The agreement on the Forlì waste-to-energy plant provides that only urban waste and special waste deriving from the treatment of municipal waste (e.g., waste from the treatment of sorted waste collected) coming solely from the regional basin in compliance with current planning will be destined for this plant and the new AIA released in December 2022. The agreement on the Ferrara waste-to-energy plant was passed in 2021 with the issue of the new Integrated Environmental Authorisation which sets the maximum authorised disposal capacity of 142,000 t/year of non-hazardous waste, with priority access to municipal waste produced in the region.

In 2023, in the eight Herambiente **waste-to-energy plants** destined for municipal waste (thus excluding the Ravenna plant), no municipal solid waste coming from other regions was treated on the basis of determinations by the relevant Authorities. Also as regards **landfills**, solid municipal waste coming from other regions was not treated on the basis of determinations by the relevant Authorities.

Circularity within the Hera Group

Waste produced by the Company
[306-1]

Waste generated by the Group in 2023 was **2,147 thousand tons, 31% more** than in 2022. 45% of the waste produced was sent for recycling, composting or other recovery operations such as the reuse of certain types of materials, while the remaining 55% was destined for disposal or waste-to-energy (assimilated to disposal as defined by the GRI standard).

[306-3]

MAIN WASTE PRODUCED BY THE COMPANY BY DESTINATION

Thousands of tonnes	2021	2022	2023
Non-disposal	747.2	681.2	970.3
Disposal	**1,005.3**	959.4	**1,176.9**
Total	**1,752.5**	**1,640.6**	**2,147.2**

Water discharges not classified as waste pursuant to Legislative Decree 152/2006 were not considered. 152/2006.

MAIN WASTE PRODUCED BY THE COMPANY BY DESTINATION (2023)

Thousands of tonnes	Non-disposal	Disposal	Total
Bio-stabilised	92.7	0	92.7
Compost leachate	0	31.1	31.1
Sewage sludge	107.5	47.9	155.4
Sludge from chemical-physical-biological treatment	8.2	30.5	38.7
Purification leachate	0	19.7	19.7
Leachate from landfills and composting	48.4	440.4	488.8
Dust from waste-to-energy electrofilters	49.8	5.3	55.1
Fuel production from waste	81.2	0	81.2
Liquid waste from purification	3.8	47.6	51.4
Liquid waste from inertisation	0	42.4	42.4
Solid waste from physicochemical treatment	7.8	13.4	21.2
Solid waste from inerisation	29.8	36.8	66.6
Purification sands	0.01	0.3	0.3
Slag from waste-to-energy	221.6	45.6	267.0
Non-reusable fractions from sorting plants	148.9	70.7	219.6
Other waste from Herambiente storage and plants	170.6	345.3	515.9
Total	**1,050.7**	**1,675.2**	**2,147.2**

Water discharges not classified as waste pursuant to Legislative Decree 152/2006 were not considered. 152/2006

In 2023, the waste produced by the Group, sent for recovery operations, amounted to 870,687 tonnes (of which 90% non-hazardous waste and 10% hazardous). Of the total waste sent for recovery, 31% was destined for **Group plants** and the remaining 69% for **third-party plants.** The waste categories that had a significant weight within the total waste generated and destined for recovery were: **leachate from landfills and composting** for 488 thousand tons (23%), **slag from waste-to-energy** for 267 thousand tons (12%), **sewage sludge** for 155 thousand tons (7%), and **other waste from Herambiente storage and facilities** for 515 thousand tons (24%).

[306-4]

MAIN WASTE NOT DESTINED FOR DISPOSAL BY OPERATION (2023, THOUSANDS OF TONNES)

Classification	Operation	Group plants	Third-party plants	Total
Hazardous	Recycling	0.2	30.2	30.4
	Other recovery operations	22.1	36.3	58.4
Total hazardous		*22.3*	*66.5*	*88.8*
Not hazardous	Recycling	108.2	172.8	281.0
	Composting	102.3	32.5	134.8
	Other recovery operations	33.6	332.4	366.0
Total non-hazardous		*244.1*	*537.7*	*781.8*

Classification	Operation	Group plants	Third-party plants	Total
Total		**266.4**	**604.2**	**870.6**

"Other recovery operations" include the reuse of bio-stabilised material to cover landfilled waste, the reuse of electro-filtered powder, and the shredding of waste used for the production of secondary solid fuel.

The refuse produced by the Group, subsequently sent for disposal, amounted to 870,687 tonnes (of which 90% non-hazardous waste and 11% hazardous), of which **69% was allocated to third-party plants** and the remaining **31% to Group plants.**

[306-5]

WASTE ALLOCATED TO DISPOSAL BY OPERATION (2023, THOUSANDS OF TONNES)

Classification	Operation	Group plants	Third-party plants	Total
Hazardous	Transfer to landfill	19.4	13.5	32.9
	Waste-to-energy	4.5	21.7	26.2
	Other disposal operations	27.2	20.0	47.2
Total hazardous		*51.1*	*55.2*	*106.3*
Not hazardous	Transfer to landfill	128.5	67.1	195.6
	Waste-to-energy	27.7	0.002	27.7
	Other disposal operations	1,230.5	115.0	**1,345.5**
Total non-hazardous		**1,386.7**	*182.1*	**1,568.8**
Total		**1,437.8**	**237.3**	**1,675.1**

The item "Other disposal operations" includes the physicochemical treatment of compost leachate, leachate, liquid waste and sludge.

Recovery of waste from waste-to-energy and main types of refuse
[306-2]

The development and renewal program for waste-to-energy plants carried out by Herambiente in recent years has had a positive effect on the production of combustion refuse. The new combustion systems and, above all, the "gondola" type "cooling" and extraction systems for scoria combustion, make it possible to have scoria with a very low content of unburnt products and a reduced water content. This determines a smaller quantity of scoria produced, with, above all, a more suitable quality for subsequent recovery.

In 2023, the eight waste-to-energy plants managed by Herambiente destined for urban waste (thus excluding the Ravenna plant) produced 266,9 tonnes of waste, equal to 20.9% of the waste treated in these plants. **83% of the scoria produced was sent to recovery plants**, for example in the production of cement and cement mixes, while the remainder was disposed of in landfills (this percentage was equal to 81% in 2022 and 97% in 2021).

In the Ferrara, Bologna and Rimini plants there is a **system for separating ferrous metals** which allows them to be sent for reuse in the metallurgical industry. In 2023, 4,972 tons of metals were recovered, a figure aligned to 2022 (there were 4,535).

Dust from fume filtration in waste-to-energy plants can be mainly recovered in two ways:

- the sodium powders are collected by Solvay Italia which treats them and recovers the residual bicarbonate they still contain;
- the calcium powders and electro-filter powders are sent to Germany where they allow them to be reused to restore the cavities of disused mines.

In 2023, a total of 55,153 tons of dust were produced, of which 49,629 sent for recovery and 5,638 sent for disposal.

As regards the **sludge produced by physicochemical biological plants**, this is sent abroad where it falls within a process for the production of cement granules which can subsequently be used as raw material for the production of composite mixtures for geoengineering, i.e. levelling, reclamation and surface shaping of areas, formation of embankments or for special applications in areas where mining waste from hard coal mining is found. Furthermore, the granulate can also be used in civil engineering for the construction of the lower layers of foundations, roads or for reclamation activities.

The **bio-stabilised** product is reused as a material for preparing the daily landfill covers and, in some cases, also for their final cover.

The **wastewater from the purifier** is all potentially reusable, as washing water for vehicles or yards.

Finally, through the shredding of waste from selection centres it is possible to produce **Refuse-derived fuel (RDF)** which is then used in boilers and cement factories.

Recovery of sewage sludge

Sewage sludge is considered special waste and must be managed according to the provisions of **Legislative Decree** 152/2006. **152/2006.** In 2023, the plants managed by the Group produced 34.2 kilograms of sludge per equivalent inhabitant served, 0.8 kilograms less than the previous year. At Group level, a portion of the sludge produced (47,949 tons) was disposed of through **dedicated incineration** (27,652 tons, 17.8% of the total), **landfilling** (9,067 tons, 5.8 percent of the total, stable compared to the previous year), and the remainder through other treatments, especially indirect reuse in agriculture (11,230 tons or 7.2%). The remainder was recovered (107,481 tons, about 70%) through **indirect agronomic reuse after composting** (100,069 tons, 64.4%), **direct recovery in agriculture** (7,412 tons, 4.8%). The Group aims to further reduce the transfer of sludge to landfills in the areas served. In particular, in Emilia-Romagna (area served by Hera Spa), the objective for 2030 is to reduce the transfer by up to 1.5%.

As far as the Triveneto area is concerned, it should be noted that in the Padua area, after the installation of the 900-square-metre solar greenhouse that took place in 2020 and the two biodessicators installed in 2022 in the Ca' Nordio wastewater treatment plant, the project to install two more biodessicators at the same site, one biodessicator in the Abano plant, and four more biodessicators in the Codevigo plant was approved. The seven new total biodryers were funded by NRRP funds and are to be tested by March 2026. In addition to this, an agreement was signed in the Trieste area between the main operators of the Friuli Venezia-Giulia region for a centralised drying project. Finally, the design of a 20,000-ton drying plant at the San Giorgio di Nogaro sewage treatment plant (CAFC management) using low-temperature belt technology was completed. All the necessary permits for construction have been obtained, and the bidding process has also been carried out for the contracting of the work, which will begin in the first quarter of 2024. This project was also funded by accessing NRRP funds and was also awarded as the first project in northern Italy. Testing is to take place by March 2026.

Waste management in the electricity distribution business
[306-1]
[306-2]

In 2021, from the analysis carried out for the Taxonomy, an in-depth analysis was carried out on the production and management of waste deriving from ordinary and extraordinary management and maintenance activities in the field of electricity distribution, with the aim of verifying compliance with the "Do No Significant Harm" principle in relation to the environmental objective of a "transition towards a circular economy".

Within the Group, the distribution of electricity is an activity carried out by the companies Inrete and AcegasApsAmga; in carrying out internalised activities, residues can be produced from processes such as: cables, metals, plastics, batteries, oils, packaging (wooden and metal), transformers and capacitors.

These are delivered by the shipyard to the company offices and then evaluated and, if unsuitable for subsequent reuse, classified as waste for recovery or disposal.

In 2023, Inrete produced around **70 tons of waste** including mixed metals, plastics, copper cables, aluminium cables and others. 95% was sent for material or energy recovery, and 59% was sent for recovery or disposal at Group plants. In the construction of new underground infrastructures for the development and renewal of the distribution network, excavations were carried out with restorations in recycled material for over 70% of the cases.

In the year 2023, AcegasApsAmga produced approximately **140 tonnes of waste** (of which 79% was sent for material or energy recovery), entirely sent for recovery or disposal at external supplier plants.

On the other hand, in the construction sites entrusted to suppliers, the waste produced mainly refers to excavated earth and rocks; in some construction sites in the Triveneto, from the replacement of old networks it is possible to find previous asbestos cement pipes which are sent for disposal through the Herambiente company. In these construction sites, waste monitoring takes place through periodic sample checks of the fourth copy of the waste form.

In 2022, the works to allow the circularity of the materials deriving from the massive replacement of the electricity meters in the Inrete and AcegasApsAmga area were completed. The massive replacement, starting in 2022 in the areas of Modena, Imola, Gorizia and Trieste, will therefore see the reuse of materials from the meters being decommissioned while the new meters are manufactured with recycled plastics.

As of 2022, companies working on behalf of InRete and AcegasApsAmga in the massive replacement campaign of electric meters are obliged to direct waste from the activities of this contract, with particular reference to disassembled electric meters, to facilities that can guarantee at least 85% recovery of the disposed product by weight.

With the aim of improving the circularity profile of the electricity distribution service, also in relation to the requirements of the EU Taxonomy, in view of the contractual renewals of supply contracts that will take place in the coming years, the introduction of the following aspects is being considered:

- for the purchase of incoming materials, the insertion of technical specifications or certifications regarding the packaging, the nature/derivation of the products to be supplied and the methods of transport;
- for the treatment of outgoing waste, the introduction of minimum recycling percentages and reports relating to the destination of waste sent for recovery or disposal.

Water circularity

Water leakage

The percentage of water losses compared to the water introduced into the network is due to physical or real losses (due to broken pipes or hydraulic parts, etc.) and to administrative or apparent losses (meter measurement errors, illegal consumption); the latter translate into water which is actually delivered to the final customer but which is not counted and therefore invoiced.

Until 2006, network losses were calculated as the difference between the water introduced into the aqueduct network over the year and the water accounted for as delivered to customers in the same period: the latter figure was estimated at 31 December of every year on the basis of customers' historical consumption as it is not possible to carry out a single reading of all the meters at 31 December. This estimate was then supplemented to take into account the correct accrual of sales to customers at 31 December of the previous year calculated after reading all the meters. Since 2007, network losses have been calculated by entering the adjustments deriving from the meter readings in the relevant year, thus ensuring the comparability between the water sold and the related data introduced into the network for each year. The method defined by ARERA in the technical quality regulation (Resolution 917/2017 and amendments Resolution 639/2021 Article 10) is used to calculate water losses; the volume of water lost is calculated as the difference between the volumes entering the aqueduct system and the volumes leaving the aqueduct system; this value is compared to the volumes entering the aqueduct system to calculate the percentage and to the length of the adduction and distribution pipelines to calculate the linear losses, also including the length of the connections. With this approach, however, it is only possible to calculate the final figure for the year approximately four to six months after the closing of the budget (after all meters have been read). For this reason, the following graph does not show the data for the year 2023. Based on the information available at the date of approval of these financial statements, there are no elements to affirm that the final figure for water losses referring to the year 2023 differs significantly from that relating to the year 2022.

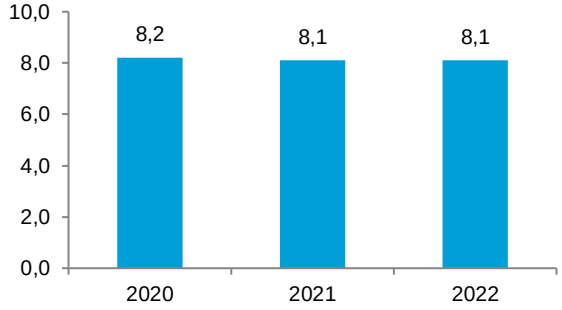
Losses are calculated according to the specifications of ARERA Resolution 917/2017. According to this resolution, **linear losses (M1a)** are defined as the amounts of unbilled water due to a water loss (physical or administrative) related to the length of the network (distribution adduction) also including the length of connections; **percentage losses (M1b)**, are the amounts of unbilled water due to a water loss (physical or administrative) related to the volumes sold pertaining to it. These changes were resolved through Resolution 639/2021/R/IDR dated 12/30/2021 regarding linear losses and Resolution 637/2023/R/IDR dated 12/28/2023 regarding percentage losses.

At Group level, the **percentage loss** figure **(M1b)** for 2022 was **29.6%**, a slight increase compared to 2021 (both figures calculated according to the ARERA resolution). The Group continued to be positioned at a **significantly lower** level **than the national average** of 41.8% in 2022, which was **also lower than the Northwest Territory average** of 32.6% in 2022, which is the best national performance (Source: ARERA, Annual Report 2023), as well as at 37.1% in 2022 **average of provincial capitals** (Source: Legambiente Ecosistema Urbano 2023).

The corresponding **linear loss** ratio (**M1a)** (2022 data) was **8.1 cu m/km/day**, stable compared to 2021. It is believed that the figure of water losses per kilometre of network is more representative of the effectiveness and efficiency of the distribution system. This value is even more significant when compared with the 17.9 cubic metres/km/day **national average** reported by ARERA for 2022 (Source: ARERA, Annual Report 2023). The figure is also lower than the **average for the Northeast region**,

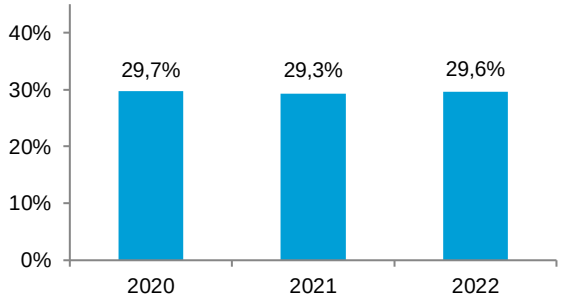
which shows the best performance nationwide, at 11.4 cu m/km/day in 2021 (Source: ARERA, Annual Report 2023). Compared to other water service operators at national level (ACEA, IREN, Acquedotto Pugliese, Metropolitana Milanese, SMAT Torino, Publiacqua, Acque Veronesi), the Group has a better performance with respect to the weighted average of percentage water losses (35.5% compared to 29.6% for the Group) as well as linear water losses (32.1 mc/km/day compared to 8.1 mc/km/day for the Group). This data was processed internally by retrieving data from the published sustainability reports of the aforementioned companies.

WATER LOSSES PER KILOMETRE OF MANAGED NETWORK (MC/KM/DAY) (PHYSICAL AND ADMINISTRATIVE LOSSES OF THE CIVIL AQUEDUCT CALCULATED WITH THE ARERA METHOD)



	2020	2021	2022
Hera	7.3	7.2	7.0
AcegasApsAmga	20.8	21.1	22.6
Marche Multiservizi	5.1	5.2	5.2

WATER LOSSES (PHYSICAL AND ADMINISTRATIVE LOSSES OF THE CIVIL AQUEDUCT CALCULATED WITH THE ARERA METHOD)



Average Italy: 41.8%

	2020	2021	2022
Hera	28.5%	27.8%	27.6%
AcegasApsAmga	33.0%	33.4%	35.0%
Marche Multiservizi	32.8%	34.0%	34.2%

The 2020 and 2021 data are calculated according to the method defined by ARERA in the regulation of technical quality (resolution 917/2017 and amendments to resolution 639/2021 Article 10). The 2022 figures were calculated according to the changes made through Resolution 639/2021/R/IDR dated 12/30/2021 regarding linear losses and Resolution 637/2023/R/IDR dated 12/28/2023 regarding percentage losses.

The recovery of purification water for the benefit of local areas

Water management must be increasingly conceived in a holistic vision, in which the point of returning the purified water to the environment is no longer the closure of a system, but rather a passage to another phase of the water cycle. In this vision, a transversal commitment is required to enhance and not risk wasting the resource. For this reason, Hera Spa, since 2018, has undertaken to sign program agreements with reclamation consortia with the aim of increasing the reuse of wastewater treatment. This commitment, albeit in different ways, has also been followed over the years by AcegasApsAmga and Marche Multiservizi.

A Program Agreement for the reuse of purified wastewater from the Sassuolo (MO) and Savignano sul Panaro (MO) plants was renewed in 2023 between **Hera Spa, the Emilia-Romagna region, Atersir and the Renana Reclamation Consortium**.

In 2023, a research agreement was also signed between Hera, the University of Bologna and the Consorzio Bonifica Renana aimed at defining the water requirements of the irrigation district managed by the Consortium and quantifying the contribution to these requirements guaranteed by purified wastewater. Also as part of the research project, a risk analysis will be prepared for the Castel San Pietro (BO) water treatment plant, developed in accordance with the transposing Reg. UE 741/2020 on direct irrigation reuse, one of the first cases in Italy and first in Emilia-Romagna. Both activities will end in 2024.

During 2023, timely monitoring of the volumes of wastewater reused for industrial uses began; these volumes were already being reused both internally in Group plants and externally; however, the contribution of these uses to the reuse of refined wastewater had not yet been measured organically.

In April 2018, a **three-year program agreement was signed between Hera Spa and the Emilia-Romagna Region, Arpae, Atersir and Consorzio Bonifica Renana** aimed at **recovering the wastewater** discharged from the Bologna purification plant (the total reuse potential is 7.5 million cubic metres). The three-year agreement was renewed in 2021, in continuity with the previous one, and made official in 2022 with the Regional Council Resolution of 11 April 2022, n. 534. The agreement provides for the consortium to withdraw around 2,160 cubic metres/h, equal to around 40% of the flow treated in the summer period. In particular, a part of the water purified by the plant is conveyed through a dedicated pipeline to the "Savena Abbandonato", letting the corresponding flow, coming from the Reno river, flow towards the "Canale Navile". This occurs through a modulated management of surface water flows by the Consorzio della Bonifica Renana, in relation to the requests and the degree of drought of the water bodies. Under the agreement, Hera and the Consorzio della Bonifica Renana have invested around 120,000 euro to bring the transfer system (sluice gate and lifting/adduction system) of part of the purified flow rates of the Bologna treatment plant to the network of canals managed by the same consortium. In the course of the activity, supplementary analyses are envisaged on the wastewater discharged from the Bologna treatment plant, to monitor additional parameters to those already envisaged in the authorisation.

This initiative, in addition to the primary objective of protecting the water bodies present in the area, also pursues the principle of reusing water as an asset to be preserved. In 2023, the total flow diverted to the Bonifica Renana plant from the Bologna treatment plant was more than **660 thousand cubic metres**. In 2022 (June-November) more than 2.2 million cubic metres were diverted while in 2021 the flow rate was 891 thousand cubic metres.

In 2019, a **Protocol and Memoranda of Understanding was signed between Hera and the Consorzio della Bonifica Renana** for some of the smaller purifiers in the Bologna area aimed at identifying the operating methods necessary so that the water treated by the purifiers located in the consortiums district can be reused downstream of the discharge, and eventually channelled into a basin, in order to improve the hydrological balance of the flow rates passing through the water bodies of the consortium district (the total reuse potential is approximately **2.5 million cubic metres**).

During 2023, **the Program Agreement for the reuse of wastewater** from the **Sassuolo and Savignano sul Panaro** treatment plants was renewed for an additional three years, and the collaboration with the **Municipality of Modena** continued; this involved diverting part of the flow of water treated by the treatment plant to one of their canals to hydraulically compensate for the water course. These activities aimed at reusing water for mixed use and preserving the ecological status of surface water bodies in the Modena area resulted in a potential reuse volume of about **4.2 million cubic metres**.

In 2022, the VALUE CE-IN research project ("Valorisation of wastewater and sludge from a circular economy and industrial symbiosis perspective") continued in the **Cesena area, and in August 2022 it was signed between Hera SpA and the Consorzio di Bonifica della Romagna** an agreement with experimental purposes, aimed at evaluating the effects of the use of purified waste water from the Cesena treatment plant on the main tree crops present in the irrigation area served by the same Consortium. This agreement, which saw the participation of the Emilia-Romagna Region, Arpae and Atersir, formalised the reuse of **6 million cubic metres** of purified wastewater for the purposes just described.

Also in 2022, discussions were initiated in Romagna with the Consorzio di Bonifica della Romagna for the finalisation of a reuse agreement to regulate the reuse of purified wastewater discharged by the **Ravenna**, **Russi and Cervia** plants for which the discharge of purified wastewater into consortium canals is already a regulated practice in the authorisations, as mixed use and hydraulic compensation of consortium drains. The formalisation of these agreements will enable additional volumes to be made available to the local area.

The technical discussion tables with the reclamation consortia will also continue for 2024 to share quantitative and qualitative monitoring methods of purified water for irrigation and possible prospects.

In Emilia-Romagna there are also two active contracts for the **external technical reuse** of the purified wastewater of the Ecoeridania (Fc) and Tecnogym (Fc) purifiers. In addition, the measurement and monitoring activity, started in 2022, has been completed, and this has also made it possible to value the contribution to reuse made by technical reuse at the same treatment plants and on other plants operated by the Hera Group. In 2023, **nearly 7 million cubic metres** of water was reused for industrial uses, of which **more than 3.1 million cubic metres** of water was used for technical process uses on purification plants

In the Triveneto area, in the province of Padua, initiatives are underway aimed at recovering the wastewater leaving the purification plants. In particular, although in general terms there are no formal

agreements, for three treatment plants **(Abano, Guizza** and **Cona),** the discharge of consortium water is expressly authorised by the Province of Padua and the Metropolitan City of Venice. Furthermore, in the Trieste area within the Servola treatment plant, process water is recovered and reused mainly for backwashing biological filters, for cooling users, and heat exchange for the office building air handling unit. The total volumes of water recovered by AcegasApsAmga in 2022 amounted to approximately **7.6 million cubic metres.**

In the Marche region there are small quantities of water reused in small-sized purification plants.

In summary, the reuse of purified wastewater is as follows:

- **indirect agricultural reuse:**
  - **Agreement with Emilia-Romagna Region. Arpae. Atersir and Consorzio Bonifica Renana** for recovery of wastewater, coming to 7.5 million m^3 (IDAR purifier, Bologna);
  - **Memorandum of Understanding between Hera and the Consorzio della Bonifica Renana**, coming to 2.9 million m^3;
  - **The Programme Agreement for reuse of wastewater between Emilia-Romagna Region, Arpae, Atersir and the Consorzio di Bonifica Burana**, coming to 2.5 million m^3;
  - **Operational agreement with the Municipality of Modena**, coming to 1.7 million m^3;
  - **Research Agreement with Consorzio di Bonifica della Romagna** (Cesena purifier), coming to 6 million m^3;
  - **Single Environmental Authorisation** in the Ravenna and Lido di Classe purifiers, coming to 3.1 million m^3;
  - **Indirect agricultural reuse in the Triveneto area without formalised agreements**, in 3 purifiers, coming to 7.6 million m^3;
- **Technical reuse** for a few companies, including **Ecoeridania**, **Technogym** and **Herambiente**, coming to 3.8 million m^3;
- **Internal reuse within the purifiers managed**, coming to 3 million m^3.

REUSABLE AND REUSED PURIFIED WASTEWATER (% OF TOTAL PURIFIED WASTEWATER)

	2021	2022	2023
Reusable and reused purified wastewater (millions of cubic meters)	20.7	30.5	38.3
Total purified wastewater (millions of cubic meters)	347.1	420.7	378.1
Reusable and reused purified wastewater (% of total purified wastewater)	**6.0%**	**7.3%**	**10.1%**

From 2022, the figure refers to Hera Spa, AcegasApsAmga and Marche Multiservizi.

The value relating to reusable and reused purified waste water, which in 2023 corresponds to 38.3 million cubic meters (+26% compared to 2022), is obtained by considering the reusable purified waste water indirectly allocated to agriculture (understood as potentially reusable purified wastewater leaving the Emilia-Romagna plants for which agreements have been signed with the authorities for the reuse and purified water discharged into canals for irrigation purposes in the Triveneto area) and the purified wastewater reused directly in industrial plants, inside or outside the Group. In particular, 27.4 million cubic meters were recovered for indirect use in agriculture, 7.1 for industrial reuse in Group plants and 3.8 for reuse in industrial plants not belonging to the Group. The total percentage value of reusable and reused purified wastewater (from 7.3 % to 10.1 %) was influenced by the values of Hera Spa (from 8.4 % to 11.1 %), the increase of which was due to the inclusion of industrial reuse contributions (internal and external), previously unmeasured (+2.5 %) and an increase in indirect irrigation flow on the Ravenna area (+0.2 %). Hera's goal is to continue to increase this share and reach 13,6% by 2027 and 18% by 2030.

The Group's commitment to reduce internal and customer water consumption

Internal water consumption

Water is a limited resource that must be protected and used sustainably, in terms of both quality and quantity. However, its use in a wide range of industrial sectors places pressure on the availability of this resource. The Group, in line with the long-term European vision aimed at guaranteeing an adequate water supply in terms of quality and quantity, has been engaged in initiatives to reduce and improve consumption efficiency for years.

The Group's water consumption reflects the multi-business nature of Hera and is mainly concentrated in waste treatment plants (70%) and purification plants (16%). 72% of total consumption comes from aqueduct.

In 2023, the Group's total water consumption, corresponding to the total volumes invoiced, amounted to approximately 4.9 million cubic metres of water.

TOTAL WATER CONSUMPTION BROKEN DOWN BY TYPE OF SOURCE

Thousands of cubic metres	2022	2023	%
Aqueduct	2,980.6	3,550.0	72%
Surface	605.1	597.5	12%
Aquifer	960.3	784.7	16%
Total	**4,546.0**	**4,932.2**	**100%**

The data refer to the consumption of water from the civil and industrial aqueducts, groundwater and rainwater of the most "water-demanding" Group business units served by Hera Spa in Emilia-Romagna, Herambiente's waste treatment plants (excluding the where the water resource does not represent a process consumption), the consumption of AcegasApsAmga (with the exception of Hera Luce, Ase, AresGas, and the Gorizia and Udine offices) and the consumptions of the purification service of Marche Multiservizi.

Reducing consumption within the Group

In 2018, the planning of actions aimed at **saving, reusing and recovering water** was launched ("water management project"). The objective set in 2018 was to **reduce by 10% in four years** (compared to the 2017 final balance) the consumption of water from the civil and industrial aqueducts of the most "water-demanding" Group business units served by Hera Spa in Emilia-Romagna, i.e.:

- the sewage and purification service;
- district heating;
- the Imola cogeneration plant;
- corporate offices;
- the Herambiente waste treatment plants in Emilia-Romagna.

Starting from 2020, the original scope of the project was extended to include all the Departments that use water for process purposes, regardless of their consumption incidence; the activities involved were those relating to managing vehicles, the waste collection service in Emilia-Romagna and the aqueduct service.

Moreover, starting from 2021, the consumption of AcegasApsAmga relating to sewerage and purification services, management of vehicles and consumption of the offices has also been included in the project's scope of analysis. Considering the substantial changes in the scope of analysis, attributable to M&A operations (sale of Padua gas networks) and start-up of new plants (Trieste purification plant) which took place between 2017 and 2018, it was decided to consider consumption as a baseline 2019, and not 2017 as in the case of the original project; for this reason the consumption of AcegasApsAmga is not included in the data shown below as it is reported separately.

The target outlined in the latest business plan is to reduce water volumes used, for headquarters and facilities operations, by 25% by 2030 compared to the 2017 actual (project baseline). The Group has also outlined an interim target to 2027 to reduce domestic consumption by 24 %.

The target outlined in the latest business plan envisages a 25% reduction in the volume of water used for site and plant operations by 2030 compared to the 2017 baseline This result is mainly due to the continuous work done on searching for areas of improvement in the use of water resources, optimisation of systems, and implementation of interventions to reuse and recover this resource.

More specifically, the main interventions that made it possible to achieve this result in 2023 were:

- for the purification service: the construction of filtration and ultrafiltration sections for the reuse of purified wastewater at the Imola Santerno, and Idar in Bologna, with the reuse of purified wastewater for the sludge thickening and dewatering sections at the Rimini plant, process adjustments to the purifier aimed at reducing the foams produced and consequent lower use of water for abatement at the Imola and Cesenatico plants, the replacement of a coarse screen with a new conveyor belt scouring system that reduces the consumption of drinking water to zero at Modena.
- for the waste collection service: the remodelling and optimisation of consumption for sweeping and dust suppression activities;
- For corporate offices: repairing leaks within facilities and installing pressure gauges on fire-fighting systems and introducing collection and recovery system for rainwater.
- on district heating networks: the reclamation, search and repair of leaks;

- for the Imola cogeneration plant: the recovery of water for the cooling towers deriving from the purging of the boilers, the modification of the irrigation frequency of the green areas of the site and the modification of the second rainwater transfer circuit for replenishment in cooling towers.
- for waste treatment plants: the management efficiency of some sectors and the reuse of process water for the irrigation of green areas or exhausted landfills and the construction of vats for recovering meteorological water and processing rainwater.

WATER MANAGEMENT PROJECT

Thousands of cubic metres	2017	Reductions related to specific interventions
Sewage and purification service and aqueduct	571.7	-192.9
Waste collection service	64.1	-20.0
District heating	208.5	-58.1
Imola cogeneration plant	272,5	-10.7
Company Locations	127.2	-2.6
Waste treatment plants	277.1	-46.7
Vehicle management	13.7	0.0
Total	**1,534.8**	**-331.0** Equal to 21.5% of 2017 consumption

Overall consumption is calculated on the basis of invoiced consumption using the difference between invoiced volumes and meter reading volumes as a driver for the correction. The correction is applied to prevent the mechanism of estimated readings, which is applied in billing whenever the meters are not read on time, leading to an overestimation or underestimation of the actual volumes used. Data refers to water consumption from civil and industrial aqueducts of the Group's most "water-demanding" business units served by Hera Spa in Emilia-Romagna.

For the most part, the planned measures to reduce water consumption have been implemented. The measures, identified already, that will allow the target of a 25% reduction in 2030 to be reached remain to be implemented. Major initiatives that have contributed and are contributing to the reduction of consumption include:

- Construction of treatment sections for recovery and reuse of purified wastewater;
- Preparation of rainwater collection and recovery tanks for process uses;
- Optimisation of irrigation systems of depleted landfills under management;
- Strengthening research and reducing losses on district heating networks.

The reduction in the operating hours of some plants and the cessation of some activities added to the water-saving measures implemented, generating a real reduction of 24% in 2023 consumption (equivalent to about 367 thousand cubic metres) compared to that of 2017.

In addition, starting from 2021, AcegasApsAmga's consumption related to sewerage and purification services, vehicle management and office consumption were also included in the project's scope of analysis. Considering the significant changes to the scope of analysis, attributable to M&A transactions (sale of gas networks in Padua) and the start-up of new plants (purification plant in Trieste) that took place between 2017 and 2018, it was decided to consider 2019 consumption as the baseline, and not 2017 as in the case of the original project; for this reason, the data shown in the table above do not include AcegasApsAmga consumption, since it is reported separately.

In 2023, AcegasApsAmga recorded a reduction of approximately 27.4% compared to 2019 (equal to 107 thousand cubic metres), mainly due to the restructuring works in progress on several of the company's premises, which caused the transfer of personnel, such as for the Trieste office, to other premises with a water contract not held by AcegasApsAmga, as well as the partial outsourcing of some activities, such as the washing of Via Orsera in Trieste.

Consumption monitoring will be proposed for 2024 without setting targets for reducing water consumption, as the above-mentioned renovation work will not be completed until 2025 and there are currently no plans to invest in water efficiency in the company's facilities.

Efforts to reduce household and business customer consumption
[303-1]

At the same time as the launch, in 2018, of the "water management" project within the Hera Group, the importance of extending this project to **external household and business customers** clearly emerged, in the awareness that habits, choices, culture in the use of water resources they evolve only if the company involves the area and the people in its sustainable development.

Consumption analysis campaigns and reduction support campaigns were therefore designed for **household and business customers**, with the aim of stimulating and increasing a virtuous and conscious behaviour in the use of water resources among our customers as well.

The tool introduced in 2019 to support the **reduction of household consumption**, similar to what has already been experimented in the energy field starting from Thalers behavioural theories, is the "**Consumption Log"**. It is an experimental project, developed in collaboration with the "Department of Management, Economics and Industrial Organization" of the Milan Polytechnic, which analyses the behavioural interactions of individuals trying to enhance positive and virtuous behaviours. In 2023, the service was extended to about 60 thousand additional customers and involves 325,046 household customers to date (about 37.5% of household customers, +2.5% over 2022). By 2027, it is believed to reach 560 thousand customers, accounting for 77 % of the total customers served by the Group.

A report is sent to them via e-mail which analyses their consumption methods in a timely manner, comparing the volumes of water used by the individual customer with respect to similar customers and the change in consumption of the customer over time. The report is also complete with tips that help to implement some good functional household practices to save water.

Over the next few years, the Consumption Log will involve all users who have communicated their e-mail address to the Hera Group.

For **business customers**, on the other hand, the "**water management portal"** was created, dedicated to water-intensive users, i.e., with water consumption greater than 50,000 cubic metres/year. The portal is an interface that allows companies to monitor, through trend analyses, the methods of using water and to be able to evaluate process optimisation strategies. Also in 2023, in continuation of the previous year, the portal involved companies and Public Administrations in the served area by analysing the consumption trend of more than 9,000 managed drinking water supply points.

3.03 Sustainable management of water resources

The quality of drinking water

The sources of water supply
[303-1]

The integrated water service makes the water available in nature usable for human consumption and returns it to the environment purified. Hera is present in **managing the water service** in 228 municipalities for a catchment area of over 3.6 million inhabitants. In this area, the Hera Group deals with the integrated management of all the phases necessary to make the water usable and available for civil and industrial use and consumption: from its drawing to it purification and to distribution to users, from management of the sewage systems to purification up to the return of water to the environment.

The management of all the water collection, purification and distribution systems up to the final customer constitutes the so-called **aqueduct service.** The Hera Group's sources of water supply consist of underground aquifers, surface water and, to a lesser extent, springs. In Romagna, the water distributed is purchased wholesale by Romagna Acque - Società delle Fonti.

The supply sources just mentioned refer to areas identified as high water stress areas according to the WWF Water Risk Filter database, with the exception of Triveneto, which is considered a medium-low risk area (average values between 2.6 and 4.2, WWF Water Risk Filter, Overall Risk Layer); the Acqueduct database, on the other hand, identifies the area served by Hera as moderate water stress with the exception of Bologna, Romagna, Pesaro and the province of Trieste, which are considered hig-risk.. For more information on how the Group addresses and mitigates these potential risks related to land drought, see "Resilient management of waterworks and water sources."

Potabilization processes are more or less complex, depending on the quality of the water at source: they range from strong chemical-physical processes, usually carried out on surface water, to simpler filtration and disinfection treatments on water from deep wells and springs with good characteristics from the moment it is drawn.

The treatments carried out guarantee that the water distributed has chemical-physical and microbiological characteristics that are suitable for human consumption, in constant compliance with the limits laid down by current legislation.

[303-3]

WATER DRAWN AND FED INTO THE NETWORK BY SUPPLY SOURCE

thousands of cubic metres	2021		2022		2023	
Aquifer	207,907	50.2%	210,150	51.4%	199,999	49.2%
Surface water	172,947	41.8%	165,672	40.6%	173,129	42.6%
Springs and minor sources	33,186	8.0%	32,499	8.0%	33,706	8.3%
Total	**414,041**	**100%**	**408,321**	**100%**	**406,834**	**100%**

All sources shown in the table are freshwater (≤1,000 mg/l total dissolved solids).

The data shown shows a total volume of water fed into the network is slightly down compared to 2022 (-0.4%). In 2023, withdrawals related to surface water and springs showed an overall year-on-year decrease of 4.4%, while withdrawals from groundwater increased (+5%), as did withdrawals from springs and minor sources (+4%). From a geographical point of view, the composition of the supply sources can be very differentiated: for instance, the importance of groundwater in terms of percentage is low in the Marche Multiservizi area (15.6%), it prevails in the Triveneto region (90.3%), while it stands at 42.5% in the Emilia-Romagna region where the most widely used source is surface water (51.2%).

WATER DRAWN AND FED INTO THE NETWORK BY SUPPLY SOURCE IN ZONES CLASSIFIED AS HAVING HIGH WATER STRESS

thousands of cubic metres	2021		2022		2023	
Aquifer	85,173	33.0%	87,377	34.8%	108,684	37.8%
Surface water	153,238	59.4%	144,755	57.6%	152,830	53.1%
Springs and minor sources	19,541	7.6%	19,199	7.6%	26,090	9.1%
Total	**257,953**	**100.0%**	**251,331**	**100.0%**	**287,605**	**100.0%**

thousands of cubic metres	2021	2022	2023
Incidence % of total water fed into the network	62.3%	61.6%	70.6%

All sources shown in the table are freshwater (≤1,000 mg/l total dissolved solids). Samples refer to the provinces of Bologna, Forlì-Cesena, Ravenna, Rimini, Pesaro and Trieste, which are classified as high water stress according to the Acqueduct database.

The Hera Group's distribution network extends for 35,454 kilometres and, where possible, is interconnected and connected in order to guarantee **supply continuity** even in the event of temporary interruptions on one or more pipelines.

COMPOSITION OF THE WATER NETWORK

%	2021	2022	2023
Plastic material	54.7%	54.9%	55.2%
Asbestos-cement	20.0%	19.9%	19.6%
Steel	15.8%	15.8%	15.8%
Cast iron	8.7%	8.8%	8.8%
Other materials	0.7%	0.7%	0.7%
Total	**100%**	**100%**	**100%**

The composition of the water network continues to point to a slightly decreasing trend of asbestos cement, whose share is 19.6% in 2023 at the Group level. The slight reduction is a consequence of the use of materials other than asbestos cement in the new networks or in those undergoing extraordinary maintenance. In the last three years, the Group has replaced approximately 81.7 kilometres of asbestos cement network. At the local area level, the asbestos cement network is mostly present in the areas of Ferrara, Padua and Ravenna.

Drinking water controls
[416-1]
[416-2]

In 2023, to ensure control over the quality of the water delivered, the Group's laboratories in Emilia-Romagna, Triveneto and Marche performed **438,208 analyses on drinking water**, including all analyses performed for the aqueduct process (tanks, networks, wells, power plants, etc.). Of these, 58% were carried out on samples taken from **distribution networks.** A substantial stability is confirmed in the ratio between the analyses performed on the distribution network and those performed on the plants, a ratio aimed at effective prevention of non-conformities.

On 16 December 2020, the **new Directive 2020/2184 on the quality of water intended for human consumption was published.** Within two years of entry into force, Member States must make the necessary changes to comply with the new directive. On 6 March 2023, Legislative Decree 18/2023 transposing EU Directive 2020/2184 into Italian law was published in the Official Gazette. This decree introduces several changes from the previous Legislative Decree No. 31/2001, including some changes to the nature and parameter values and the development of Water Safety Management Plans placed in the charge of water utilities for all water supply systems, expiring in January 2029. Regarding checking activities, the Decree provides for the analysis of a series of analytical parameters to which it assigns different sanitary-hygienic significance, distinguishing between those that are mandatory and those that are indicators. Cogents include microbiological and chemical parameters. Indicator parameters include those whose determination enables a chemical and physical characterisation of water. There are two types of checks, namely those carried out by the water service operator and those in charge of the USLs, and they are carried out at source sampling points, at drinking water treatment and storage plants, and along the abduction and distribution networks.

The checks are carried out by the water service manager and by the Local Health Authorities and are carried out at the **sampling points of the sources**, at the purification and accumulation plants, along the **abduction and distribution networks**.

Hera has consolidated a Group control plan which shows the **sampling points** and the **checking methods applied** (analytical parameters and frequencies). The control plan provides for the checking of chemical, physical and bacteriological parameters of water to safeguard full compliance with legal requirements and to ensure the supply of the highest quality product.

Water quality also means checking the effectiveness of **treatment processes.** By way of example, the research of chlorites and trihalomethanes are cited, substances resulting respectively from the use of chlorine dioxide and sodium hypochlorite as disinfectant agents. The **concentration of chlorite** and trihalomethanes in the distribution network is kept under constant control within the **legal limits**.

Since 2008, the average data recorded for the **parameters pH, hardness, dry residue at 180°C, chloride, fluoride, sodium, nitrate, nitrite and ammonium** are published on the Group's website for each municipality and updated every six months. Since 2012 this set of parameters has been expanded with four more: **calcium, magnesium, sulphate and total alkalinity.** These 13 parameters are considered representative of the quality of **the drinking water distributed** and allow a comparison with the quality of bottled water on the market. Starting from the second half of 2014, the set of parameters was further expanded with a further 6 parameters as ordered by ARERA: **conductivity, potassium, arsenic, bicarbonate, residual chlorine and manganese**. The parameters to be published are therefore 19, one more than that set by the Authority. It is also confirmed for 2023 that the average water data is comparable with that of commercial mineral water and that no exemptions have been granted to comply with the limits set out by Legislative Decrees 31/2001 and 18/2023. The communication concerns 162 municipalities in Emilia-Romagna in which Hera manages the water distribution service.

Also, for the municipalities served in the areas of Padua, Trieste and Pesaro Urbino, data on water quality are available, and constantly updated, on the AcegasApsAmga and Marche Multiservizi websites.

Since January 2009 all the drinking water production plants in Romagna have been managed by **Romagna Acque - Società delle Fonti**, the company set up for this purpose by the local administrations of Romagna. Therefore, the water distributed in the areas of Forlì-Cesena, Ravenna and Rimini is largely purchased wholesale by this company and Heras intervention on its quality is limited to **managing networks and supplementary disinfection stations** along the networks of distribution.

[417-1]

Since 2012, the l**abelling of the tap water** has been present in Heras bills and was subsequently also included in those of AcegasApsAmga. In this way, through the bill, customers can consult the data on the quality of the water distributed in their municipality (data updated every six months).

Furthermore, the water quality parameters are also published on the Hera, AcegasApsAmga and Marche Multiservizi websites through the thematic report "In buone acque"(In good waters), so that each customer can easily find the data on the quality of the water distributed by the Hera Group.

Evaluations on the quality of the distributed drinking water, compared to the quality of the mineral water, are carried out on the basis of the values of analytical parameters commonly sought at the representative sampling points of the aqueduct networks: pH, hardness, dry residue at 180°C, sodium, fluorides, nitrates, chlorides. The parameters chosen are largely indicative of the saline components with which drinking water should be equipped.

The application of the new water features of the "Water Safety Plan"

European legislation (Directive 2020/2184) has brought about a substantial change in approach for the purpose of human health protection on the issue of drinking water, marking a shift from a monitoring regime based on retrospective monitoring of a set of analytical parameters to a **preventive risk assessment**. The risk-based approach involves the control of emerging contaminants, currently not subject to systematic monitoring, and the verification of the degree of vulnerability of drinking water systems with respect to the direct and indirect impacts induced by climate change.

Hera has always provided for structured prevention and control plans that guarantee its customers good water to drink, in compliance with regulatory requirements, with a constant surveillance carried out through the planning of well-targeted controls on the entire drinking water production chain from supply sources to distribution. In this regard, the analytical control plan of the integrated water service is drafted annually, substantially in accordance with the risk assessment criteria contained in Directive 2015/1787.

COVERAGE OF WATER SAFETY MANAGEMENT PLANS

Number	2021	2022	2023
End users served (including indirect users) with a water safety management plan (technically closed)	504,898	1,383,360	1,429,880
Final users served by the manager for the aqueduct service	2,238,343	2,235,110	2,172.962
Users served in areas with a water safety management plan (% of total users served by the aqueduct)	**22.6%**	**61.9%**	**65.8%**

Indirect users: final recipients of the service provided to condominium users and coincide with the property units underlying the supply contract for one or more services of the integrated water system.
Technically closed water safety management plans: plans for which site inspections, checklists, risk analyses have been carried out, improvement actions defined and the risk matrix elaborated and for which ongoing meetings and in-depth analyses have been held with governmental Authorities, in particular Local Healthcare Units and Regional Environmental Protection Agencies a plan can be defined as formally closed when it is sent to the Ministry of Health and the National Institute of Health.

At the end of 2023, there are 115 supply zones that are served for which a water safety management plan for an aqueduct present in the municipal area has been technically closed. The users in these areas are equal to 65.8% of the total users served in areas in which the Hera Group manages the aqueduct service.

In Emilia-Romagna in 2023, Water Security Management Plans covering a supply zone of the Emilia area (Plain former SAT) and a supply zone of the Romagna area (Cesena, Rubicon Valley, Poggio Torriana) have been developed, finalised and shared with the relevant entities.

In the Triveneto region, activities related to assessments on water plants and the distribution network of the entire drinking water supply chain aimed at compiling risk matrices for the definition of Water Safety Management Plans continued. The Padua, Saccisica and Trieste Supply Zone Plans have been technically closed.

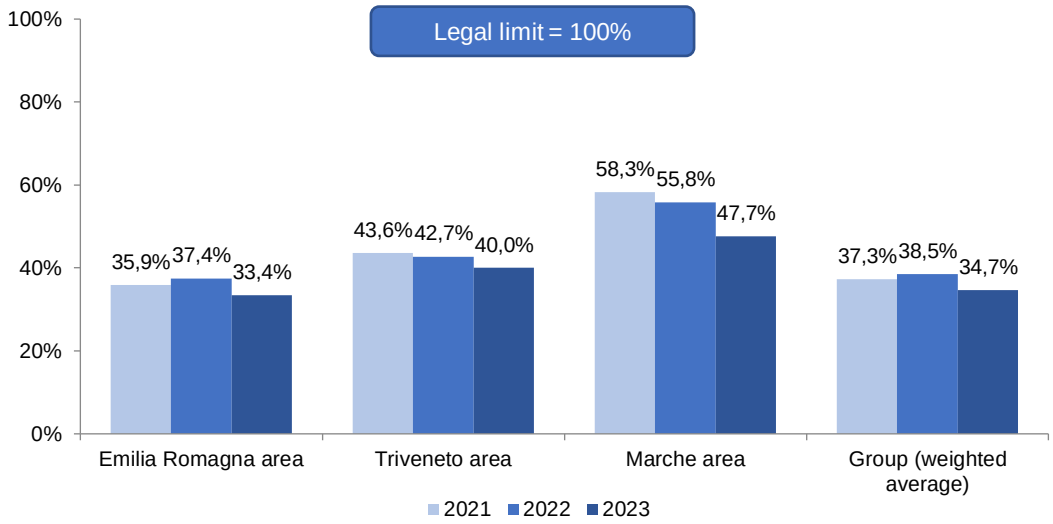
In the Marche region, during 2023, the first pilot Water Safety Management Plan for the supply area relating to the Mercatello sul Metauro aqueduct was brought into a state of “technical closure”.

The quality of purification

In 2023, the Hera Group managed the sewerage and purification service in 228 municipalities, of which 47 through Marche Multiservizi and 16 through AcegasApsAmga.

In 2023, Hera Group treated a total of **378.1 million cubic metres of wastewater**, up from 2022 figures (about 337 million cubic metres). It should be noted that this figure is influenced by the amount of rainfall, which was higher in 2023 than in the previous year, as the sewerage network (amounting to 19,286 km) is mainly mixed (56% of the total).

PURIFIED WATER QUALITY COMPARED TO THE LEGAL LIMITS (OPTIMAL VALUES: <100%)



The indicator relates to plants with more than ten thousand population equivalent (the volumes treated in these plants are 93% of the total effluent treated) and is calculated on the basis of the ratio between the measured concentration of Bod5, Cod, Sst, ammoniacal nitrogen, phosphorus and total nitrogen and the relevant maximum concentrations permitted by Legislative Decree. 152/2006 or by the authorisations in force for the individual plants.

The pollutant removal efficiency with respect to legal limits, summarised by the indicator shown in the graph, is related to the purification capacity of the plant and the technologies adopted. Low values of the indicator indicate a better quality of purified water. At Group level, this indicator averaged 34.7% (38.5% in 2022) of the legal limits if Bod5, Cod, Sst, ammonia nitrogen, phosphorus, and total nitrogen are considered, and 24.0% (26.4% in 2022) if phosphorus and total nitrogen are excluded. Therefore, there was a significant improvement in the indicator for purified water quality compared to 2022.

For the area related to Emilia-Romagna, there was evidence of improved purification performance across all provinces managed by the Hera Group. Values were well below the 100% limit value, outgoing water quality continued to fully comply with regulatory limits, and values were in accordance with historical data.

As far as the Triveneto territory is concerned, the indicator showed an improvement in line with the improvement path started three years ago with the commissioning of the new biological section in Servola (Ts), the optimisation of the methanol dosing system in the same plant, and the refinement of the Oscar system at the Zaule (Ts) purification plant.

In the Marches area, the 2023 result improved over 2022 in relevant terms: indeed, a value of the indicator of 47.7% was noted, compared with 55.8% in the previous year.

[303-2]

The water leaving the sewage treatment plants must comply with the current regulations, Legislative Decree No. 152/2006 and authorisation requirements. For discharges of municipal wastewater in agglomerations of more than 2,000 population equivalents, required to comply with the tables in attachment 5 of Legislative Decree 152/2006, a Protocol for the correct performance of control activities is stipulated between the operator and Arpae/Arpat, aimed at planning the number of annual controls on the discharge, useful for assessing the conformity of the discharge, while for discharges in smaller agglomerations (less than 2,000 population equivalents) limits of acceptability and appropriate treatments are set by the Regions. The controls, anomalies and non-conformities deriving from the legislation and regulations about the integrated water service are managed and planned through Group procedures, at community, national, regional level, of the individual provinces and municipalities of the area under the jurisdiction of the Hera Group.

The following table shows the main interventions to upgrade and modernise the treatment plants completed during the year, and which are in progress.

THE MAIN INTERVENTIONS FOR THE ENLARGEMENT AND IMPROVEMENT OF THE PURIFICATION PLANTS

Plant	Population Equivalent (no.)	Progress (end of 2023)	Type of intervention	Post-intervention situation
Ca' Nordio (Pd)	197,000	In progress (expected completion 2024)	Ca' Nordio treatment plant expansion.	Upgrading of the purification sewage system in the Padua area also in critical weather conditions and optimisation of the purification capacity. When completed, the purification capacity will increase from 197,000 p.e. to 230,400 p.e.
Savignano sul Rubicone (Fc)	139,000	Terminated	Savignano treatment plant - Total Nitrogen and discharges upgrading	Bringing the plant into compliance with the limit for nitrogen
Ferrara (Fe)	120,000	In progress	Revamping of the Gramicia purifier anaerobic digester	Better management of sewage sludge through the reclamation of anaerobic digesters
Massa Lombarda (Ra)	80,000	Terminated	Bringing the Massa Lombarda purifier into compliance with the nitrogen limits	Bringing the plant into compliance with the limit for nitrogen
Lido di Classe facility in the municipality of Ravenna (Ra)	30,000	Terminated	Upgrading of class Lido purification plant - 1st phase	The intervention includes a major revamping of the plant and is part of the regulatory adjustments of Decree of the Regional Government 201/2016. Work on meeting the nitrogen limit concluded
San Giovanni in Persiceto (BO)	16,000	Terminated	Recovery of ex-sugar refinery purifier 3rd round of interventions	Bringing the plant into compliance with the nitrogen limit, also in view of future expansions
Calcinelli (Pu)	9,000	In progress	Upgrading of the Calcinelli purifier	The intervention involves the adoption of the biological membrane process

Plant	Population Equivalent (no.)	Progress (end of 2023)	Type of intervention	Post-intervention situation
Tavullia (Pu)	3,000	In progress	Upgrading of the Tavullia purification plant	The intervention will include the review of the entire purification process with the construction of entire compartments. This intervention will thus make it possible to satisfy the new discharge limits, which are more restrictive than the current ones. Planning phase completed.
Vergato (Bo)	2,000	In progress	Expansion of the Tolè purification plant	Greater plant efficiency
Pioppe plant in the municipality of Marzabotto (Bo)	1,300	In progress	Upgrading of the Pioppe agglomeration	The intervention is part of the regulatory adjustments of Decree of the Regional Government 201/2016 and will allow the rehabilitation of the Pioppe agglomeration
Grizzana (Bo)	1,100	In progress	Construction of a new purification plant and collection systems of inadequately purified wastewater	Renovation of the agglomeration of Grizzana
Guiglia (Mo)	1,100	In progress	Modernisation and upgrading of the Guiglia Lama purification plant	The intervention is part of the regulatory modernisations pursuant to Deliberation of the Regional Government 201/2016 and within it we will proceed with the modernisation and upgrading of the Guiglia Lama purifier
Bruscoli (Bo)	1,100	In progress	Work on the treatment system in Bruscoli Locality and Moghidoro chief town	The intervention is part of the regulatory adjustments of DGR 201/2016 and within it, the Bruscoli and Moghidoro agglomeration will be adjusted
Pavullo nel Frignano (Mo)	650	In progress	Construction of collectors and appropriate treatment system	The intervention is part of the regulatory adjustments of Decree of the Regional Government 201/2016 and within it, the Verica agglomeration will be adjusted
Palagano (Mo)	500	In progress	Monchio Ca' Grande agglomeration adjustment	The intervention is part of the regulatory adjustments of the Deliberation of the Regional Government 201/2016 and within it, an appropriate treatment system will be implemented in the agglomerations of Monchio, Grande and Savoniero
Poggio Suvizzano (Bo)	350	In progress	Monteacuto Vallese treatment plant construction	The intervention is part of the regulatory adjustments of Decree of the Regional Government 201/2016, and within it the Monteacuto Vallese agglomeration will be adjusted

PERCENTAGE OF ANALYSES ON THE WATER LEAVING THE PURIFICATION PLANTS IN COMPLIANCE WITH THE LAW

%	2021	2022	2023
Plants with more than 10,000 population equivalent	99.3%	99.6%	99.7%
Plants with less than 10,000 population equivalent	99.3%	99.6%	99.8%
Weighted average	**99.3%**	**99.6%**	**99.8%**

Considering the 10,061 analyses carried out in 2023 in the 225 managed treatment plants, in 99.8% of the cases the results were found to comply with the legal limits. The final values in 2023 for this indicator represent a very satisfactory situation, with excellent percentages of conformity controls compared to the total monitoring. The only data relating to checks that have confirmed that the authorisation limits have been exceeded refer to entirely sporadic situations and substantially compatible with the variability of incoming loads, operating conditions and the structural state of the plants.

The quality of purification can also be represented by monitoring the trend of adaptation of urban agglomerations, understood as local areas in which populations and productive activities are concentrated to such an extent as to make the creation of an autonomous purification sewage system technically and economically permissible. As established by Directive 91/271/EEC, Legislative Decree No. 152/2006 and Water Protection Plan of the Emilia-Romagna Region to declare an urban agglomeration in compliance, the following two conditions must be met:

- the collection of wastewater at least equal to 95%;
- the capacity of the purification plants must be greater than the population equivalent of the agglomeration itself with secondary or tertiary treatment (whenever necessary).

MODERNISATION OF THE SEWAGE-PURIFICATION SYSTEM, URBAN AGGLOMERATIONS

	2021	2022	2023	2027
Agglomerations upgraded in order to bring them into compliance with regulations >2,000 p.e. (no.)	132:	133	135	135
Agglomerations upgraded in order to bring them into compliance with regulations for purification >2,000 p.e. (% population equivalent)	99.6%	99.6%	99.8%	100%
Agglomerations upgraded in order to bring them into compliance with regulations for purification <2,000 p.e. (n.)	180	194:	186:	229
Agglomerations upgraded in order to bring them into compliance with regulations for purification <2,000 p.e. (% population equivalent)	81.1%	85.0%	85.0%	100%
Total agglomerations upgraded in order to bring them into compliance with regulations for purification (no.)	**312**	**327**	**321**	**364**
Total agglomerations upgraded in order to bring them into compliance with regulations for purification (% population equivalent)	**99.0%**	**99.1%**	**99.3%**	**100%**

The numbers shown in the table refer to agglomerations within the size range of 200 to 2,000 p.e. and >2,000 p.e. in the areas where the Group provides sewerage and purification service, i.e., Emilia-Romagna, Triveneto and Marche. It should be noted that there are no agglomerations <2,000 p.e. in the areas served in the province of Padua; while agglomerations <2,000 p.e. related to the Marche region are not counted because the Marche region has not yet issued provisions in this regard.

At the Group level, at 2023, **agglomerations with more than 2,000 population equivalent** (p.e.) adjusted to Legislative Decree No. 152/2006 were 135 out of 137 and corresponded to **99.8% of the total population equivalent**.

As regards the **Triveneto** and **Emilia-Romagna Regions**, 100% of agglomerations > 2,000 p.e. served in the area are compliant with the regulations on purification.

In the Marche Region, in 2020, the perimeters, the loads generated, and the compliance of the agglomerations with at least 2000 p.e. were updated through a regional decree (Decree 173, 30 December 2020); this regulatory update led to a slight change in the number of population equivalent in the agglomerations managed by Marche Multiservizi, while the overall number of agglomerations remained unchanged. Interventions to achieve compliance of the Montecchio agglomeration >2,000 p.e. and the 1st batch of the San Costanzo agglomeration >2,000 p.e. were completed in 2022, resolving the 2014/2059 infraction. Regarding to the Gallo-Cappone agglomeration and the second lot of the San Costanzo agglomeration, works are in the authorisation and works-awarding phase to make all the agglomerations compliant with the dictates of EU and national regulations by 2025, as established by the Marche Region Territorial Ambit Authority planning approved in December 2020. By 2025, therefore, all urban agglomerations with a population greater than 2,000 population equivalent in the areas served by the Hera Group will be in compliance with the legislation.

The **Emilia-Romagna** Region, through Resolutions 2153/2021, 2388/2022 and 2201/2023 on the upgrading of municipal wastewater discharges, has provided for the implementation of some additional interventions in agglomerations with **more than 10,000 p.e.** These are structural modernisations related, for example, to the upgrading of network spillways or more stringent treatment for nitrogen removal, which, while not affecting agglomeration compliance under Legislative Decree 152/2006 may, however, locally undermine the achievement of quality objectives for water bodies. In 2023, all interventions related to more stringent treatment for nitrogen removal in the managed treatment plants (Massa Lombarda, Savignano sul Rubicone, and San Giovanni in Persiceto) were completed. In particular, it should be noted that with the latest resolution 2201/2023, the total number of agglomerations and priorities and timing of interventions were redefined. There were 101 agglomerations > 2,000 p.e. managed by the Group in Emilia-Romagna, to which are added 3 more in Tuscany, for a total of 104. Indeed, during 2023, agglomerations pertaining to the municipality of Montese entered the perimeter managed by Hera Spa.

A total of 12 interventions have already been carried out (Riccione treatment plant in 2017, Cattolica treatment plant in 2018, Castel San Pietro and Lugo treatment plants in 2019, Budrio, Medicina, and Alfonsine treatment plants in 2020, Lido di Classe and Misano treatment plants in 2021, and San Giovanni in Persiceto, Savignano sul Rubicone, and Massa Lombarda treatment plants in 2023) for a total of 12 nitrogen upgrades in 11 agglomerations. In addition to these, one intervention is planned in 2025, 4 in 2026, 3 in 2027, and 16 in 2030.

As regards **agglomerations of less than 2,000 p.e.** (between 200 and 2,000 for the Emilia-Romagna Region), on which there remain critical elements for subjecting final discharges to the appropriate treatments, the Emilia-Romagna Region by resolution 2153/2021 and subsequent resolution 2338/2022 identified and defined new timelines for compliance. As of 2023, 150 agglomerations out of 192 have been upgraded, totalling 112,000 population equivalent. The modernisation by 2027 of 42 agglomerations in Emilia-Romagna totalling approximately 22,000 population equivalent is expected, effectively completing the modernisation of all agglomerations of less than 2,000 p.e. It should be noted that the 4 interventions completed in 2023 (2 ATO5 Bologna, 1 ATO6 Ferrara, and 1 ATO8 Forlì) resulted in the elimination of 2 agglomerations as a result of collection in another agglomeration (ABO014 - Boschi di Baricella collected to ABO0064 - Malalbergo and AFE0054 - Focomorto collected to AFE0050 Ferrara). In the Triveneto area served, there are 37 agglomerations with a size of less than 2,000 p.e., of which 35 have already been upgraded in order to be brought into compliance with the legislation in 2019, one upgraded in 2021 (Trieste Duino Aurisina with a size of 1,689 p.e.) and one that will be upgraded by 2026.

In summary, considering Emilia-Romagna and the Triveneto there are 229 agglomerations of less than 2,000 p.e. and of which 186 were upgraded in order to be brought into compliance with the legislation at the end of 2023 equal to 81.2% of the population equivalent. By 2026, agglomerations of less than 2,000 p.e. will all be brought into line with the regulations. As regards the agglomerations of less than 2,000 p.e. in the Marche region, the Region has not yet issued provisions on the matter.

At Group level, the total of agglomerations >2,000 and <2,000 which have brought their plants into compliance with the legislation governing purification stand at 321 out of 366 and corresponds to 99.3% of the total population equivalent.

Phytodepuration

Phytodepuration is a natural process for treating polluted water based on taking advantage of the soil-vegetation system as a natural filter for water purification and is made up of biological ponds and macrophyte vegetation. The purification process, which already occurs spontaneously in nature (e.g. lagoons, ponds and vegetated streams), is entirely ecological and does not involve the use of chemicals. The incoming wastewater flows into a bed of gravel and aquatic plants: here microorganisms come into play that eliminate the polluting substances that are present. The action of plants is fundamental because microorganisms necessary for the entire system are developed in their roots; they absorb the oxygen produced by the plant species and trigger the processes necessary to purify wastewater.

There are various types of phytodepuration using either different plant essences, e.g., algae or floating plants such as water lilies, or rooted plants such as cattails, or swamp reed, and depending on the hydraulic flow they are distinguished into FWS (Free Water Surface) or SFS (Sub-Surface Flow System) systems.

This type of treatment also contributes to the recovery of marginal areas, creating aesthetically pleasing natural environments and landscapes, often chosen as a refuge for various species of birds, amphibians and reptiles.

At the state of the art, phytodepuration is a mature treatment, but in Italy it is not widely used owing to the surface areas required (2-4 square meters/p.e.), although it does find a place as a treatment in small agglomerations (<200 p.e.).

Hera Spa manages seventeen phytodepuration plants of small to medium capacity located in the provinces of Bologna, Florence, Forlì-Cesena, Rimini and Ravenna. These mainly carry out secondary biological treatments, and are placed downstream of a primary sedimentation, or tertiary treatments used as final refinement of the wastewater before final discharge. Marche Multiservizi operates five phytodepurators with a capacity of between 80 and 180 population equivalents.

3.04 Protection of air, soil, and biodiversity

Atmospheric emissions from waste-to-energy plants

Every waste-to-energy plant of the Hera Group is equipped with **fume purification** and **process and emission control systems**, designed, and built with the aim of obtaining:

- high flue gas purification performance in all process conditions;
- high managerial versatility;
- high reliability of emission control systems.

In order to pursue these objectives, the **plant engineering standards** adopted in the Group's plants are characterised by:

- **double reaction and filtration system** for reducing concentrations of dust, hydrochloric acid, hydrofluoric acid, sulphur dioxide, heavy metals, dioxins and furans, and polycyclic aromatic hydrocarbons (with the exception of the Pozzilli plant, which is equipped with a single reaction and filtration system);
- **double reaction system** (non-catalytic and catalytic) for the reduction of nitrogen oxide concentrations (with the exception of the Pozzilli plant, which is equipped with a single non-catalytic reaction system);
- **dual fume monitoring system** for process control (with the sole exception of the Padua, Trieste and Pozzilli plants equipped with a single system) to measure the concentrations of the main pollutants leaving the furnace and downstream of the first reaction and filtration stage. Based on these concentrations, the amount of reagents required to achieve purification performance that ensures not only compliance with regulatory emission limits, but values that are on average 80-90% lower than them, is adjusted;
- **double continuous monitoring system** of chimney emissions: one in reserve to the other in order to guarantee the continuity of analysis of the concentrations in the emissions into the atmosphere.

The possibility of having dual purification and monitoring systems in series (or in parallel, as regards chimney monitoring) makes it possible to effectively pursue the objectives described above.

Furthermore, in terms of **emissions and environmental impact control,** the following are performed annually:

- **spot checks on stacks** for parameters that cannot be detected continuously, with frequencies defined in the Integrated Environmental Authorisation and using certified laboratories;
- **controls on the impact of pollutants on the ground**: through external monitoring programs prescribed in the individual authorisations, analyses are carried out on the deposits on the ground (on soil, plants, etc.) in collaboration with universities and research bodies in order to ascertain that the emissions, although within the restrictive limits of the law, they do not have any significant impact on the surrounding environment.

Plant renewal has led to significant improvements in pollutant emission abatement rates: since the beginning of 2008, the two new lines of the Ferrara waste-to-energy plant have been in full operation, since the beginning of 2009 the new plant in Forli has been in full operation, in April 2010 the new Line 4 of the Modena waste-to-energy plant came into operation, and since October 2010 the new Line 4 of the Rimini waste-to-energy plant has been in full operation, and in 2022 the revamping of Line 2 of the Trieste waste-to-energy plant was completed. During 2023, the revamping of Furnace F3 of the Ravenna industrial waste incinerator was completed. At the end of 2023, the construction site was opened for Line 4 in the Padua waste-to-energy plant, which will replace the existing Lines 1 and 2 and will be equipped with a dual flue gas monitoring system.

This paragraph reports data on the nine waste-to-energy plants managed (Bologna, Ferrara, Forlì, Modena, Padua, Pozzilli, Ravenna, Rimini, Trieste) as well as data on the biomass plant in Faenza (managed by the company Enomondo, 50% owned by Herambiente and not consolidated on a line-by-line basis), equipped with a dual reaction system (non-catalytic and catalytic) for the reduction of nitrogen oxide concentrations.

The, Legislative Decree No. 152/2006 requires **continuous monitoring of stack emissions** for seven parameters: dust, hydrochloric acid, nitrogen oxides, sulphur oxides, carbon monoxide, hydrofluoric acid, and total organic carbon. Mercury is also continuously monitored in the Ferrara, Forlì, Modena, and Rimini plants.

[305-7]

ATMOSPHERIC EMISSIONS FROM WASTE-TO-ENERGY PLANTS, PARAMETERS MONITORED CONTINUOUSLY

tonnes	2021	2022	2023
Dust	5.3	5.9	5.7
Hydrochloric acid	20.7	20.7	22.6
Nitrogen oxides	663.8	667.3	752.0
Sulphur oxides	19.1	19.5	22.1
Carbon monoxide	75.1	82.2	87.3
Hydrofluoric acid	0.6	0.7	0.8
Total organic carbon	7.8	9.5	10.4
Waste treated in plants (thousands of tonnes)	1,304	1,263	1,359
Gross electricity produced (MWh)	852,379	880,884	941,723
Thermal energy produced (MWh)	244,182	226,872	184,077

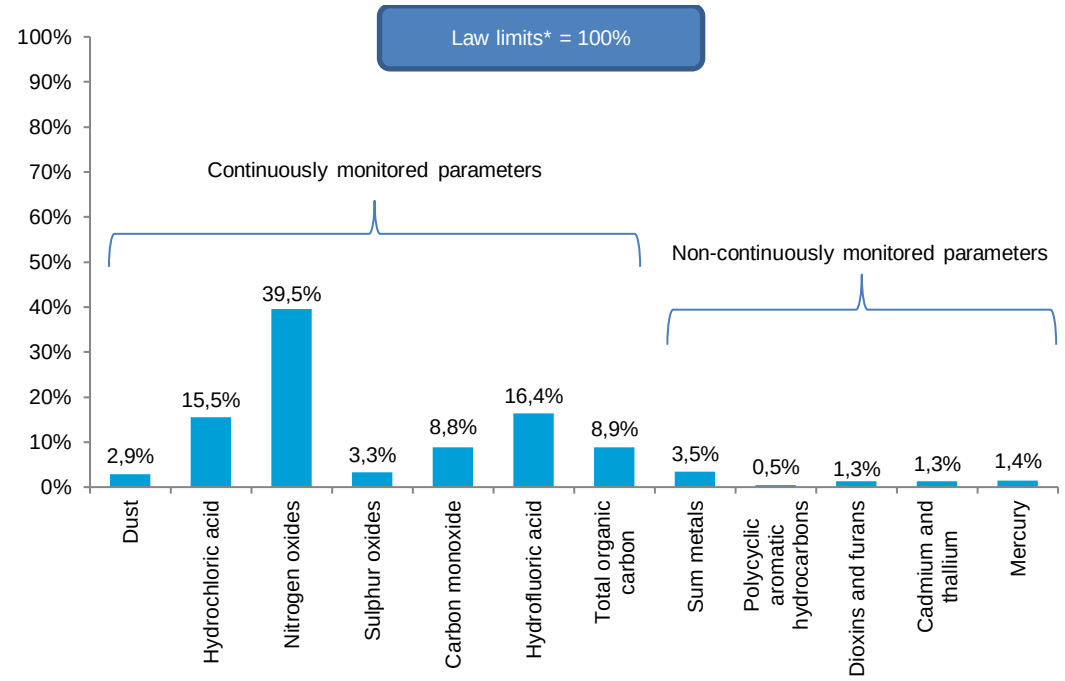
The data are calculated using the continuous measurement systems approved by the control bodies at the time of authorisation for plant operation. The systems of the individual plants use collection and calculation procedures for the partially non-uniform emitted substances.

The analysis of mass flows over the last two years shows a worsening in reference to almost all emissions from waste-to-energy plants (with the exception of dust and hydrofluoric acid, which remains substantially stable), consistent with the greater volumes of waste treated (+8%) and the restart of the Ravenna special waste treatment plant. However, these are limited deviations which depend on the composition of the waste treated.

As regards the **pollutants that are not continuously monitored** (sum metals, polycyclic aromatic hydrocarbons, dioxins and furans) from the results of the analysis conducted in the year, total emissions can be estimated: 147 kg of metals were emitted in 2023 (183 kg in 2022), 0.5 kg of polycyclic aromatic hydrocarbons (same as in 2022) and 10.8 mg of dioxins (10.9 in 2022).

The results of the measurements carried out on the emissions of the Hera Group's waste-to-energy plants confirm also in 2023 that, being equipped with the best technologies available and operated at their best, they record emissions **that are much lower than the limit values permitted by law.**

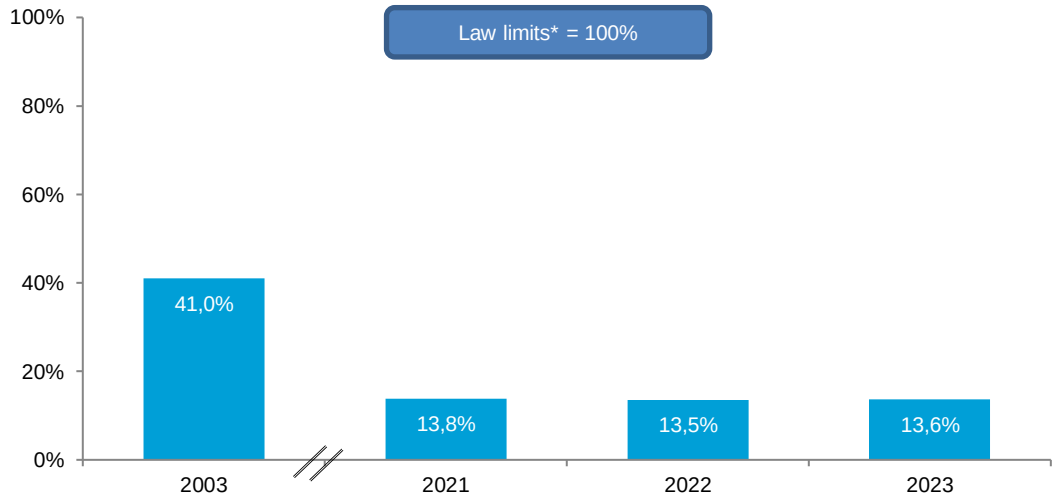
ATMOSPHERIC EMISSIONS FROM WASTE-TO-ENERGY PLANTS COMPARED WITH LEGAL LIMITS (OPTIMAL VALUES: < 100%) (2023)



Including the Enomondo waste-to-energy plant. *Law limits refer to Legislative Decree 152/2006.

For all pollutants that are **monitored continuously**, average stack concentrations were **below limits by at least 60.5%** (nitrogen oxides data) **up to 97.1%** (dust). Even for the **non-continuously monitored parameters**, all values are well below the legal limits **by at least 99.5%** (polycyclic aromatic hydrocarbons), **up to 96.5%** (sum metals).

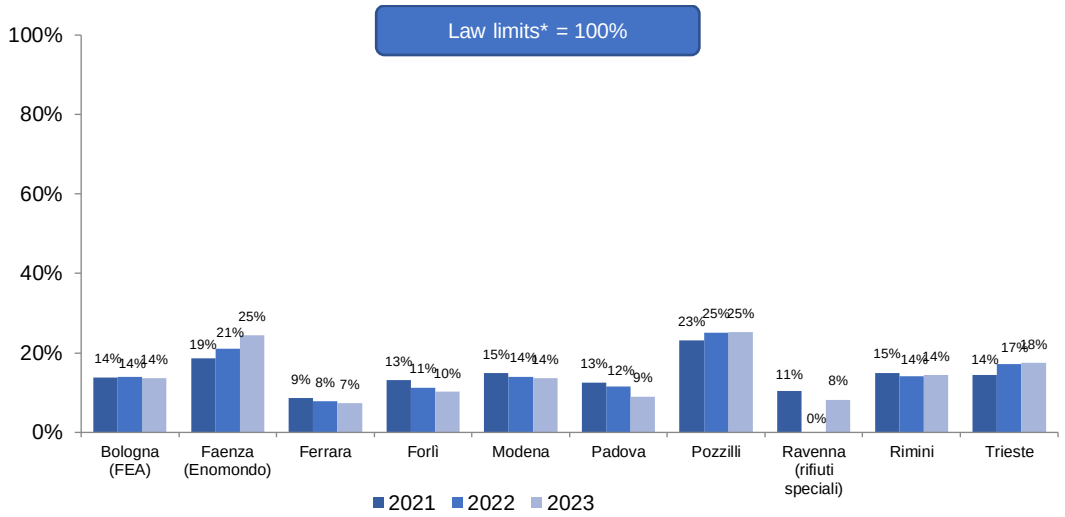
ATMOSPHERIC EMISSIONS FROM WASTE-TO-ENERGY PLANTS WITH RESPECT TO THE LEGAL LIMITS - CONTINUOUSLY MONITORED PARAMETERS (OPTIMUM VALUES: < 100%), WEIGHTED AVERAGE ON THE VOLUMES OF WASTE TREATED BY THE PLANTS MANAGED



Including the Enomondo waste-to-energy plant. *Law limits refer to Legislative Decree 152/2006.

Considering all the pollutants that were monitored continuously, in 2023 the concentrations of emissions into the atmosphere from the waste-to-energy plants were on average **86.4% lower than the permitted limit** (13.6% of the legal limits), when in 2003 this percentage was 59%.

EMISSIONS INTO THE ATMOSPHERE FROM WASTE-TO-ENERGY PLANTS COMPARED TO LEGAL LIMITS - CONTINUOUSLY MONITORED PARAMETERS (OPTIMUM VALUES: < 100%), DETAILS BY PLANT



*Law limits refer to Legislative Decree No. 152/2006.

The same indicator was calculated for the six plants with more stringent authorisation limits than those set by Italian law for the year 2023 (for the seven parameters monitored continuously, the limits set in the authorisations correspond on average to 70% of the limits in Legislative Decree 152/2006); the data is shown in the table below.

EMISSIONS INTO THE ATMOSPHERE FROM WASTE-TO-ENERGY PLANTS COMPARED TO THE AUTHORISATION LIMITS - CONTINUOUSLY MONITORED PARAMETERS (OPTIMUM VALUES: < 100%)

%	2021	2022	2023
Bologna waste-to-energy plant	21.9%	21.1%	23.1%
Ferrara waste-to-energy plant	8.9%	11.4%	10.5%
Forlì waste-to-energy plant	49.5%	43.6%	39.0%
Modena waste-to-energy plant	17.5%	17.7%	17.5%
Padua waste-to-energy plant	19.3%	17.2%	13.7%
Ravenna waste-to-energy plant (special waste)	10.8%	-	14.3%
Rimini waste-to-energy plant	-	-	15.0%
Faenza waste-to-energy plant (Enomondo)	21.4%	24.2%	26.4%
Average compared to authorisation limits	**21.2%**	**19.3%**	**19.9%**

The integrated environmental authorisations relating to the Ferrara, Forlì, Modena, Padua and Faenza (Enomondo) plants also provide for the continuous monitoring of mercury.

In this case as well, the results were **excellent**: the concentrations were on average **80.1% lower than the most restrictive limits.** Note that the limits set by the individual authorisations differ from plant to plant, which does not allow for comparability. It should also be noted that new Authorisations were approved in 2023 for the Bologna (mercury limits lowered by 60%), Ravenna special waste (all limits lowered, on average by 45%) and Rimini (limits lowered, on average by 25% for all parameters except carbon monoxide, hydrofluoric acid and total organic carbon) plants.

Transparency on emissions from waste-to-energy plants

Since 2008, the average values of the previous day and the “semi-hourly averages” of emissions from the Group’s waste-to-energy plants **can be consulted** on the Group’s website (the online data is updated every half hour with the average values recorded over the last 30 minutes). The data is transmitted automatically by the detection systems, operating 24 hours a day on all the plants, located in the provinces of Bologna, Ferrara, Forlì-Cesena, Modena, Ravenna, Rimini, and Isernia.

Furthermore, as a further **guarantee of transparency,** Hera ensures:

- the daily or weekly transmission to the control body (ARPA) of reports containing the semi-hourly and daily averages;
- the annual transmission to the competent Authority of the report on the operation of the plant, by 30 April of each year;
- in the case of EMAS registered plants, the publication of the results of the checks in the "Environmental Declaration";
- the publication of the annual data in the Group's sustainability report, compared with the legal limits and the limits established by the authorisations.

Since 2015, data from the Padua and Trieste plants have also been available on the Group's website, according to the methods provided (semi-hourly average updated in real time).

Finally, since 2018, the average annual data of the periodic self-monitoring relating to metals and organic micro-pollutants have also been available for all plants.

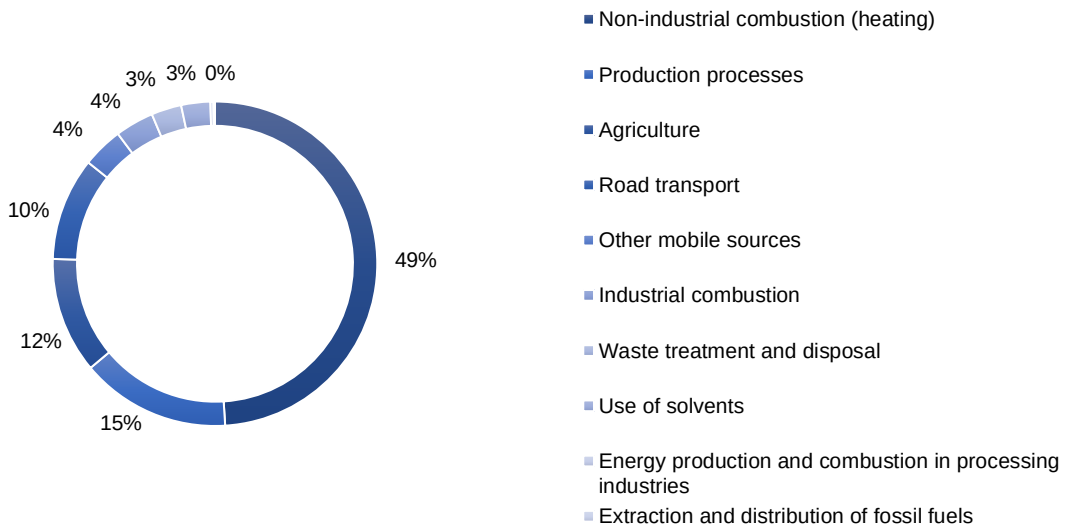
Studies on the environmental impacts of waste-to-energy plants

The activity linked to waste-to-energy has, for many years, been the subject of numerous **studies and monitoring** as well as important **technological improvements** also linked to the definition of **increasingly stringent** plant engineering and management criteria by Community and national legislation. The technology has achieved very high performance in terms of **containing emissions and impacts on the environment.**

If we consider the **total annual emissions of dioxins** into the atmosphere as the sum of all the waste incineration plants present on the national area from 1990 to 2021, it can be seen that following the regulatory and technological evolution there has been a 9**9% reduction of emissions** (Source: ISPRA - Historial series of national emissions). By contextualising the analysis to the various production sectors, it can be seen that since 2001 waste incineration has been the least representative source in terms of dioxin and furan emissions, contrary to the iron and steel industry and the entire residential sector (such as home heating).

With regard to **PM10** emissions from waste incineration plants throughout the national area these stand at values of approximately **three orders of magnitude lower** than those from non-industrial combustion (heating). The main sources of PM10 at a national level are in fact represented by the residential sector, contact combustion processes (for example foundries), agriculture and vehicular traffic, as shown in the graph below.

PM10 EMISSIONS BY SECTOR



Source: ISPRA, Italian emission inventory 1990 - 2021, Report 2023, PM10 emission trend from 1990 to 2021

Air quality surveillance and monitoring projects

The authorisations of the **waste-to-energy plants of Ferrara, Modena, Forlì, Rimini, Bologna, Padua, and Isernia** require the Hera Group to carry out studies on the potential impact that these plants have on the surrounding environment. A description of the studies underway in 2023 is provided below and

reference is made to the previous sustainability reports for those already completed relating to the Bologna, Ferrara, Modena, Padua, Pozzilli and Rimini plants.

In the industrial area where the **Forlì** plant is located, Hera has installed an air quality monitoring station, which has been active since 2009 and managed by Arpae Forlì. The station provides continuous data validated by Arpae and published on the institution's website. In addition to this, periodic campaigns are carried out at the control unit for the **search for micro-pollutants and metals in the particulate matter.** The findings show no substantial difference between an urban site and the area surrounding the plant, indicating the presence of a homogeneous background significantly influenced by urban realities rather than the presence of the plant. With the reconsideration of the Integrated Environmental Permit, the monitoring protocol has been updated and includes, in addition to the presence of the control unit, the **study of atmospheric depositions** at two points (one of maximum fallout from the waste-to-energy plant emissions and one of control in the area of the city's biological treatment plant). The results of the 2023 analysis will be available in 2024.

For over a decade, environmental monitoring has been conducted on the **Modena** plant relating to **various matrices**: air quality, soils, biomonitoring, and total deposition. Since 2013, the monitoring network has been managed by the territorial Arpae which has therefore been entrusted with all the investigations envisaged by the requirements of The Hague for the waste-to-energy plant.

Environmental and health surveillance protocols are also conducted on the **Ferrara** waste-to-energy plant, defined by Arpae, Ausl and the Province and coordinated by CNR and the university. Studies have confirmed on several occasions that the contribution of the plant, in terms of air quality and accumulation in the soil, cannot be differentiated from the environmental background. A collaboration with CNR-IIA and La Sapienza University is still active, to ensure the continuity of the **air quality** study, which is carried out by scheduling four monitoring campaigns each year (winter, spring, summer and autumn). All available data confirms the absence of impacts attributable to the operation of the plant. In addition, the **three-year soil monitoring**, the last of which will be in 2022, is also continuing: as in the previous ones, no correlations between the presence of the plant and the characteristics of the monitored soils were found.

Consistent with the provisions of the "Agreement for monitoring the fallout of the San Lazzaro waste-to-energy plant" signed by Arpav, the Province of Padua, the Municipality of Padua and the Municipality of Noventa Padovana, and financed by Hestambiente, **air quality monitoring** is carried out in the area of the **Padua** waste-to-energy plant through two fixed stations (APS). The results are then compared with the values measured by several stations belonging to Arpav's regional air quality monitoring network. Furthermore, in 2022, the Veneto Region published Decree no. 11 03/03/2022 of the Director of the Land Protection and Safety Area, by which it issues the Single Regional Authorisation Measure (Paur), which includes, among other acts, the Integrated Environmental Authorisation and a series of environmental conditions to be complied with, which are currently being implemented. In particular, before the construction work, work in-progress and after the construction work **environmental monitoring** plans are envisaged for Line 4, as well as the execution of an **epidemiological survey** to be carried out in agreement with ULSS 6 Euganea with the support of the University of Padua and taking into account the indications of the Municipality of Padua. During 2023, the planned ante-operam monitoring campaigns were carried out at four locations represented by the two APS stations and, by mobile means, at a maximum fallout point and a blank point. The results obtained will serve as a comparison scenario for subsequent monitoring related to the course-operam and post-operam phases. With regard to the epidemiological survey, a specific agreement was signed in 2023, which envisages the implementation of a study in two phases: a retrospective one (which will cover two years prior to the start-up of the new Line 4) and a prospective one which will analyse, over the long term, the health outcomes in the period following the activation of the new Line 4.

The area surrounding the waste-to-energy plant site in **Granarolo dellEmilia** (Bo) is subject to **air quality monitoring** by means of two fixed monitoring stations that measure particulate matter (PM10 and PM2.5), polycyclic aromatic hydrocarbons (PAH) and metals. In 2023, the plant's Integrated Environmental Permit underwent a review procedure to **verify compliance with the European BAT Conclusions** establishing Best Available Techniques conclusions regarding waste-to-energy plants. The analysis conducted by the competent Authority revealed substantial alignment of the plant with the new technical standards. In the new permit act, issued in October 2023, some additional monitoring is required for the fixed monitoring station, which is considered significant because it is located at the point of maximum fallout. Specifically, one nitrogen oxides analyser, one mercury analyser, and one analyser for hourly measurement of PM1, PM2.5, and PM10 are required to be installed. The installation will be shared with Arpae.

District heating: a response to protect air quality

Hera manages **district heating systems** in the areas of Bologna, Cesena, Ferrara, Forlì, Imola and Modena.

District heating is a service which consists in the sale to the customer of heat for heating and household hot water. It is an **alternative system to the traditional autonomous or condominium boilers**, which allows the generation of heat to be **concentrated** in **more efficient and better controlled** production centres compared to household boilers. From these plants, the heat, in the form of hot water, is brought to the customers homes through a distribution network made with insulated pipes. The heat then feeds the heating system of the houses through heat exchangers, without emissions of pollutants.

The advantage for the customer is having **greater safety** and **lower** operating and maintenance **costs**, while maintaining the possibility of independently regulating the temperature in the home. From an environmental perspective, district heating is a **response to the problems of air pollution** in the city in as much as it makes it possible to replace the more numerous household boilers distributed throughout the city (sometimes even oil-fired ones) and to use high-efficiency centralised forms of production for heat generation,

renewable energy or recovered energy from other processes. New initiatives took shape in 2023, the main ones being:

- Ferrara: replacement of the pumps serving the geothermal well **with better performing ones**;
- Ferrara: the campaign to **connect to the main grid** along the via Bologna axis continues with the first connection of the shopping centre;
- Modena: **Complete replacement** of the second cogeneration engine of the Giardino power plant, and extraordinary maintenance performed on the third cogeneration engine;
- Casalecchio di Reno: **revamping of both** Ecocity power plant **cogeneration engines** that power the system;
- Implementation of **214 substations from a smart point of view**; confirming the results obtained thanks to the experimentation on the lowering of climate curves throughout the Bologna area, for the Barca and Pilastro cogeneration systems it was possible to free thermal power for 8.1 MW that can now be committed to other potential customers, as well as important financial savings.

A number of techno-financial efficiency and technological innovation initiatives have been identified in the 2024-2027 plan arc that will **reduce atmospheric emissions** in terms of greenhouse gases and pollutants, while achieving growth in shared value and maximising the economic viability of existing assets. Among the main initiatives are:

- **Further development of systems** that already meet the “efficient district heating system” condition and **evolution** of those that currently still do not;
- **Doubling the capacity of the** Ferrara **geothermal plant** with simultaneous extension of the city’s district heating network. This project will benefit from NRRP funds and must be implemented by 2026;
- **Interconnection of the city systems of Bologna** CAAB-Pilastro, Sede Berti, Fiera and Navile. This project will benefit from national funds and must be implemented by 2026.
- **Interconnection of the city systems of Forlì** waste-to-energy plant and Centre-Campus; This project will benefit from NRRP funds and must be implemented by 2026.
- **Smart district heating**: the multi-year technology evolution project aimed at achieving operational efficiencies and intercepting customers’ digitalisation needs will continue. For example, it will be possible to free up committed power quotas to connect new users, and to set up more advanced reporting. In this context, **smart grids** will be developed to manage and monitor the distribution of heat from all production sources and to meet the needs of connected users more efficiently and rationally. **Smart sub-stations**, remote reading systems capable of monitoring and regulating temperature, instantaneous power and pressure, will also be developed to improve the commercial offer and optimise consumption profiles.
- Various **commercial development** initiatives in Bologna (new connections University district and in the Lazzaretto area), Ferrara (extension of the via Bologna axis network and connection of several utilities including the shopping centre), Forlì (connection and start of supply to the Bonfiglioli plant) and Cesena (interconnection of the Bufalini and Ippodromo systems in order to increase the resilience of the entire system, also in light of the flooding in Romagna in May 2023).

ENERGY SOLD AND VOLUME SERVED WITH DISTRICT HEATING

	2021	2022	2023
Thermal energy sold (MWh)	510,040	442,137	406,634
Volume served (thousands of cubic meters)	21,938	23,238	23,312
Equivalent residential units served (no.)	91,410	96,825	97,135

The equivalent residential units were calculated considering an apartment with an average volume of 240 m3.

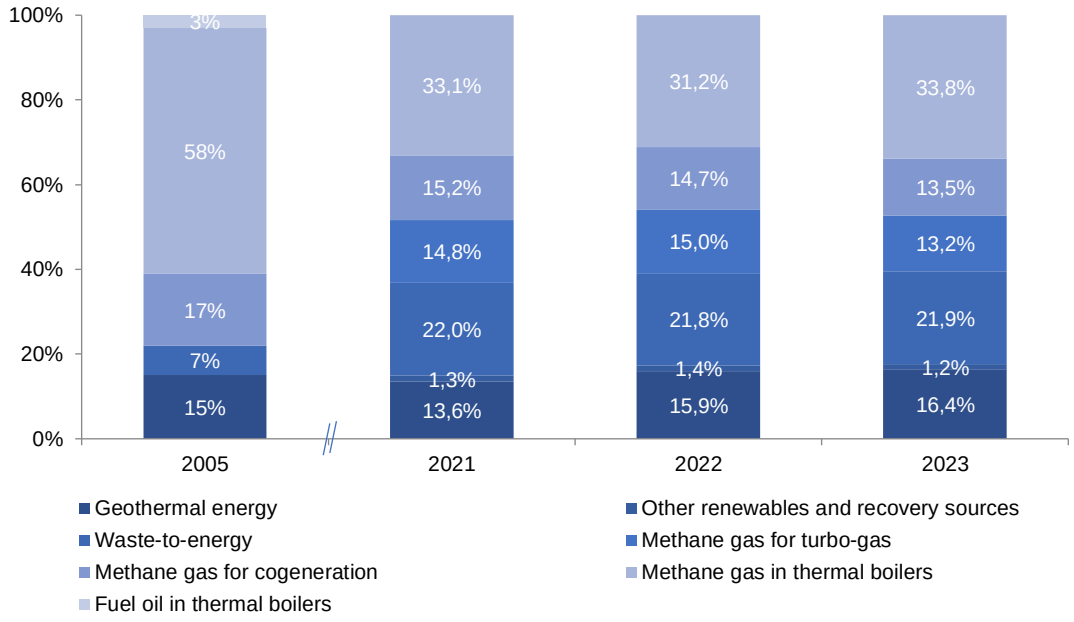
Thermal energy sold in 2023 was **406,634 MWh**, down 8% from 2022 due to less heat during the year, building efficiency upgrades in recent years, and extraordinary breakdowns and maintenance. The volume and equivalent dwelling units served, on the other hand, remained stable.

Systems that in 2023 met the definition of **efficient district heating** (systems that employed, alternatively, at least: 50% renewable energy, 50% waste heat, 75% cogenerated heat, or 50% of a combination of the above) were Bologna Frullo-CAAB-Pilastro, Castelmaggiore, Ferrara, and Forlì waste-to-energy plants. Compared to 2022, the Imola Casalegno and Casalecchio San Biagio systems did not appear to be more efficient due to less reliance on cogenerators. Overall, these systems sold 167,814 MWh (**41.3% of the total**) and served 36,817 equivalent units (**37.9% of the total**).

The **areas most covered by the district heating service** are the areas of Bologna (34.6% of the volumes served), Ferrara (29.6%) and Imola-Faenza (19.2%).

By 2027, the goal is to increase the volumes served by 2% compared to 2022.

SOURCES USED FOR DISTRICT HEATING



In terms of the **sources used for district heating**, the percentage of thermal energy produced **from renewable, recovery or high-efficiency sources** is declining slightly: **66.2% in 2023** compared with 68.8% in 2022 and 66.9% in 2021.

By 2027, the goal is to produce 79% of energy from renewable sources, cogeneration or recovery.

[302-5]

ENVIRONMENTAL BENEFITS OF DISTRICT HEATING

	2021	2022	2023
Primary energy saved (toe)	31,663	29,888	25,608
Greenhouse gases avoided (t)	46,509	41,352	36,284
Nitrogen oxides avoided (t)	102	108	99

Calculated as the difference between the energy production (thermal and electric) of Hera's district heating systems and the equivalent energy requirements of a traditional system (electric fleet with national average emissions and domestic boiler fleet consisting of 90% natural gas boilers, 6% LPG boilers, and 4% oil boilers with efficiencies of 90%, 85%, and 85%, respectively).

Thanks to district heating systems, compared to a traditional system in 2023 **over 25,000 tonnes of oil equivalent, 36,000 tonnes of greenhouse gases, and 99 tonnes of nitrogen oxides were saved.**

Furthermore, in 2023 the Ferrara district heating plant again obtained **ISO 14067:2018 certification on carbon footprint** (the first was in 2020), which expresses in CO_2 equivalent the total greenhouse gas emissions associated directly or indirectly with the service. According to this certification, based on 2022 data, the Ferrara system had a carbon footprint of **0.099 kg CO_2 per thermal kWh sold** to the end user. Making an estimate using the same methodology, this value is 64% lower than the calculation referring to a conventional domestic boiler. The figure is of absolute importance and has led to the estimation of an **annual saving of over 26 thousand tons of CO_2 equivalent** by the district heating of Ferrara.

Cogeneration serving district heating

Cogeneration consists in the **combined production of electricity and heat** in a single integrated system, using a single fossil or renewable source. It is made in particular thermoelectric plants which recover heat from the fumes produced by an engine, obtaining **significant energy savings** (about 40%) compared to the separate production of electricity and heat.

Hera Group's cogeneration plants also contribute to the **improvement of air quality** in the urban centres where they are located, thanks to their connection with **district heating networks**: in fact, they replace numerous boilers with **modern and efficient systems** for heating and supplying hot water to buildings. With district heating, control is continuous, both in the combustion processes and in relation to emissions into the atmosphere.

Hera Spa manages 12 cogeneration plants, four of which are trigeneration, for a total nominal electrical power of around 114 MW which in 2023 produced **approximately 142 thousand MWh of thermal energy** for district heating in all the areas served, half of which (69,858 MWh) from the Imola cogeneration plant.

Emissions into the atmosphere from district heating

In 2023, the district heating systems produced a total of 793,6 MWh of electricity and thermal energy, an increase of 12% compared to 2022. In relation to this production, a total of 100.1 tons of nitrogen oxides were generated, an improvement over the previous year as a result of lower production. These emissions, in relation to the energy produced, result in 2023 in approximately **126.1 grams per megawatt hour**, a ratio that is decreasing by 15%.

[305-7]

EMISSIONS INTO THE ATMOSPHERE FROM DISTRICT HEATING

	2021	2022	2023
Nitrogen oxides (t)	145.6	133.3	100.1
Electricity and thermal energy produced (GWh)	952.2	899.1	793.6
Specific emissions (g NOx / MWh)	**152.9**	**148.3**	**126.1**

The nitrogen oxide data were calculated with the following sources: data from manufacturers for the cogenerators, Eu-Ets calculation method for the Imola gas turbine, Emep/Eea inventory for the boilers.

Emissions from the Imola cogeneration plant

The **Imola** cogeneration plant, serving the **city's district heating**, is characterised not only by high-yield performance from the point of view of energy production but also from an environmental point of view as it combines significant energy savings with low levels of emissions into the atmosphere.

In 2023, the power plant generated **194,110 MWh of electricity** (188,335 MWh that fed into the grid) and **97,178 MWh of thermal energy** from an installed capacity of 82 MW electric and 65 MW thermal. Compared with the previous year, electricity production was down 15.5% due to a long period of summer plant downtime, while thermal production was 13% higher, in line with historical production.

170,000 cubic metres of industrial water was consumed, including 96,000 cubic metres for replenishment to the cooling tower, in compliance with the 210,000 cubic metres authorised by the AIA.

[305-7]

EMISSIONS INTO THE ATMOSPHERE FROM THE IMOLA COGENERATION PLANT

mg/Nmc	National limit value	Authorised limit value	2021	2022	2023
Nitrogen oxides (NO_X)	60	14.5	8.6	8.4	8.7
Carbon monoxide (CO)	50	9.5	0.6	0.7	0.9
Ammonia slip (NH3)	not foreseen	2.0	0.0	0.1	0.2
Total suspended particulates (TSP)	not foreseen	4.0	0.01	0.01	0.01
PM10	not foreseen	1.0	0.01	0.01	0.02

The authorised emissions limits of the Imola cogeneration plant refer to the Integrated Environmental Authorisation and subsequent amendments and additions (with more stringent limits than set out in the Legislative Decree 152/06). The CO, NO_X, NH_3 and PTS values correspond to the annual average values recorded continuously by the continuous monitoring system. The PM10 values are derived from the average of the values detected during the self-monitoring checks (quarterly). All authorised limit values correspond to the daily average.

In 2023 as well, the **absolute specific emissions** of the Imola cogeneration plant will remain at **extremely low levels.** The environmental authorisation of the Imola plant foresees limits for the most common pollutants in the flue gas (NOx and CO) that are 75-80% lower than the national standard. Since 2019, the AIA has changed the limits on emissions channelled into the atmosphere by introducing compliance with the daily limit instead of the hourly limit for continuously monitored pollutants.

The corporate vehicle fleet and sustainable mobility

Company vehicles

The strategy of rationalising and optimising the use of vehicles was also confirmed in 2023, including, when possible, through the purchase of technologically advanced vehicles **with lower environmental impact** to replace obsolete vehicles.

NUMBER OF VEHICLES

Number	2021	2022	2023
Euro 6 electric	16	22	23
Euro 6 non-electric	1,710	1,974	2,053
Euro 5	1,296	1,268	1,207
Euro 4	674	576	485
Euro 3	241	181:	140
Euro 2	74	69	57
Euro 1 or earlier	41	29	25
Total	**4,052**	**4,119**	**3,990**

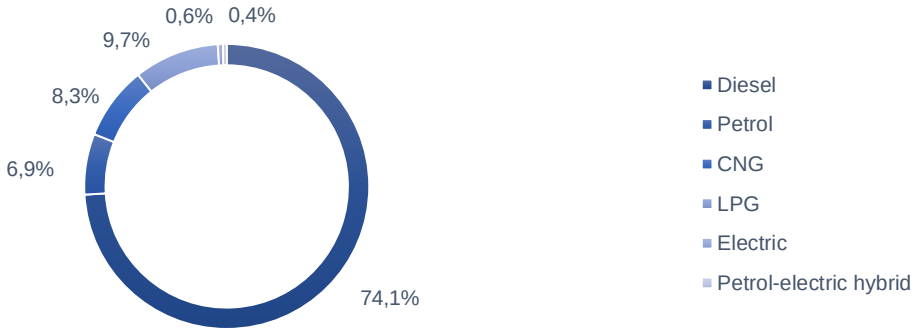
As of 2022, the data refers to all vehicles owned by Uniflotte, Marche Multiservizi and Marche Multiservizi Falconara and vehicles owned by other companies whose maintenance or management is under Uniflotte. Non-circulating vehicles expected to be disposed of are excluded from the calculation.

As of 2023, there were 3,990 vehicles in the Group (129 less than the previous year). **Newer anti-pollution vehicles** (Euro 5, Euro 6 and electric vehicles) accounted for **82.3% of the total**, up 3 percentage points from the previous year.

There were 688 vehicles used in **waste collection and transportation** activities, and **83.4% of them were Euro 5, 6 or electric type**.

Of the total number of vehicles, 3,146 were light, and 83.4% were Euro 5, 6 or electric.

VEHICLES BY FUEL TYPE (2023)



759 of the Group's vehicles were powered by **fuels with lower environmental impact** (CNG, LPG, electric or petrol-electric hybrid power), 19.0% of the total (it was 787 in 2022, 19.1%).

The goal by 2027 is to reach 547 electric vehicles in the company car fleet (14.1% of the total).

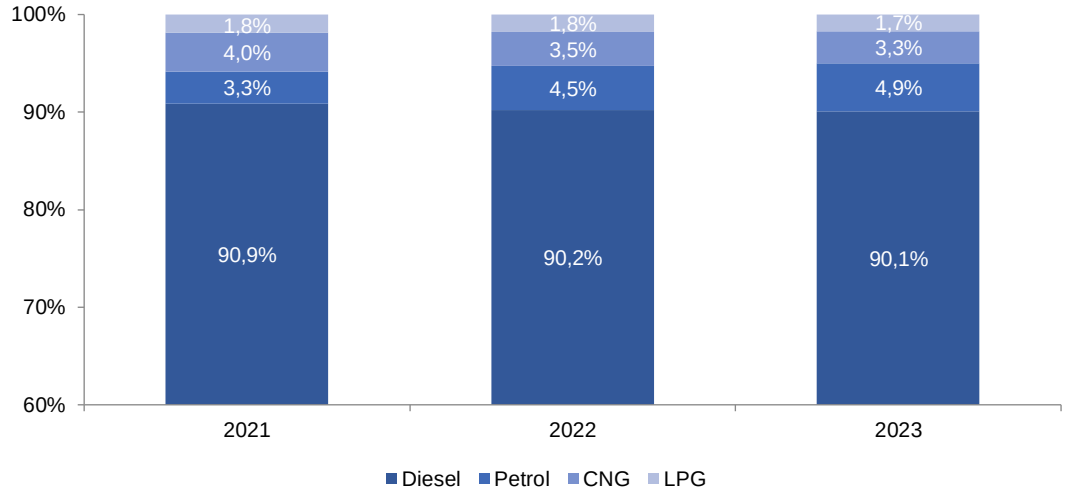
Light vehicles fuelled with these fuels accounted for 22.0% (stable compared to 2022), while waste service vehicles accounted for 6.5% (6.2% in 2022).

FUEL CONSUMED BY VEHICLES

tep	2021	2022	2023
Diesel	9,405	9,354	8,995
Petrol	337	467	491
CNG	416	360	332
LPG	190	186:	170:
Total	**10,348**	**10,368**	**9,989**

As of 2022, the data refers to all vehicles owned by Uniflotte, Marche Multiservizi and Marche Multiservizi Falconara and vehicles owned by other companies whose maintenance or management is under Uniflotte.

FUEL CONSUMED BY VEHICLES (%)



The comparison between the various types of fuels was carried out considering the primary energy present in the individual fuels.

At the Group level, fuel consumption in 2023 amounted to 9,989 toe and decreased by 4% compared to 2022. Petrol consumption increased (+5%), while consumption of LPG (-9%), CNG (-8%) and diesel (-4%) decreased.

The **average age of the Group's vehicle fleet** in 2023 was **8.4 years**, up from 8.0 years in 2022.

Added to the fleet of company vehicles were **leased cars** assigned to salespeople and executives of Group companies. In 2023, this car fleet consisted of 338 cars, of which 161 assigned to executives and 115 used by salespeople.

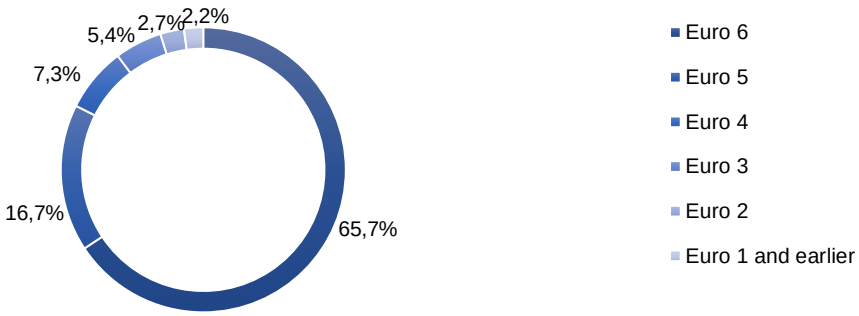
The number of cars assigned to the executives were: 78 diesel, 8 gasoline, and 75 hybrid-powered (42 in 2022), all registered after 2011 and of **Euro 6** type. The other leased cars, however, numbered 2 diesel-powered and 113 hybrid-powered, registered after 2011, and **Euro 6** type. In total, **hybrid-powered** leased vehicles account for **68.1%** (66.7% in 2022).

Supplier vehicles

Heras commitment to sustainability and energy efficiency also has repercussions on the **supply chain** and in particular on the **criteria for choosing suppliers.** In view of the high environmental impact of urban hygiene services, especially in terms of atmospheric emissions, the Group has decided to **reward the most virtuous suppliers** in this respect by giving preference to those who use **vehicles with a reduced environmental impact**, and also giving a preference to such vehicles in the environmental services tenders it announces. For example, under the Atersir concessions, it is planned that vehicles will be gradually replaced with smaller capacity and lower environmental impact vehicles.

In 2023, the fleet of Hera Spa, AcegasApsAmga and Marche Multiservizi contractors consisted of 2,752 vehicles; **light vehicles** accounted for **60.4% of the total** (58.9% in 2022).

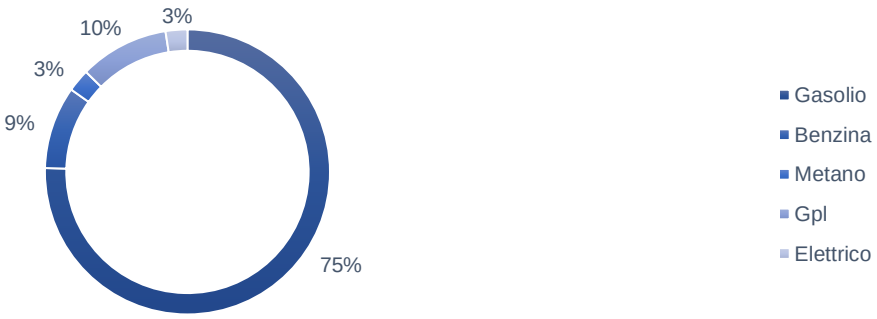
SUPPLIERS' VEHICLES BY ANTI-POLLUTION DIRECTIVE (%)



The data include the vehicles of the temporary groupings of companies for managing environmental services in which Hera Spa is the agent.

The most recently registered vehicles (**Euro 5 and 6, including electric vehicles**) make up **82.4% of the total**, thus continuing the process of modernisation of the contractors' fleet in 2023 (the figure was 75.1% in 2022).

SUPPLIERS' VEHICLES BY FUEL TYPE (%)



The data include the vehicles of the temporary groupings of companies for managing environmental services in which Hera Spa is the agent.

From the point of view of fuel sources, in 2023 natural gas, LPG or electric vehicles accounted for **15.2% of the total** (16.2% in 2022).

Mobility management

In 2023, actions aimed at raising employees' awareness of reducing the environmental impact of **home-to-work travel**, to help them experiment with commuting by less polluting means, and to engage them in challenges to reduce private car use, continued.

Among these, continuity was given to the **shuttle service** in the Bologna area, which connects the railway station with the Viale Berti Pichat and via del Frullo / via Cristina Campo offices, and in the Imola area, which connects the station with the via Molino Rosso and via Casalegno. In view of the transformation of the Municipality of Bologna into 'City 30' in January 2024, monitoring was undertaken to investigate the impact on transport and define possible changes to the timetable.

Awareness campaigns have been activated for the replacement of individual means of transport for home-work trips towards more sustainable choices of **public transport**. For example, the **additional portion for sustainable mobility** available in the welfare plan of all employees to cover part of the cost of public transport season tickets was also used and appreciated in 2023: 229 employees have in fact taken advantage of it (up from 2022).

Sustainable Mobility Week was also organised in September 2023 to involve all employees in using non-polluting vehicles. This year, in order to be more widespread across all territories, an inter-office challenge was organised: each team nominated one person in charge, taking a group photo and coordinating moves to get the most points given by sustainable moves.

Finally, in December, **Home-Work Travel Plans** for the main municipalities where the Hera Group operates were drafted and sent out, containing information on locations, employee travel habits, major initiatives and future challenges.

Hera for electric mobility

The Hera Group, through the company Hera Comm, is active in the development of the **electric charging infrastructure network**.

More than 60 new public charging points were installed by 2023, including 24 with a capacity of 50 kW or more for DC fast charging. As a result, **560 public charging points** (about 280 columns) are **currently installed**, of which 36 are at least 50 kW in power (18 columns); in total they delivered about 1.3 GWh in 2023. The energy delivered by Hera Comm's public charging stations comes **entirely from renewable sources certified** through a Guarantee of Origin, not only for Hera Comm customers but also for customers of other operators enabled to charge at other infrastructures.

Through the awarding of new tenders and the signing of additional Protocols and Memoranda of Understanding, investments will be supported which will contribute to achieving **the goal of 750 public electric charging points installed by 2027.** In particular, in 2024 there are plans to install more than 35 high power points (50-100 kW).

In the installation of public infrastructure, Hera Comm is **supported by Hera Luce** in activities such as executive design, drafting of technical documentation, technical assistance for connections and authorisations, commissioning and maintenance of infrastructure.

Hera's activities in the field of electric mobility are not limited to public charging, but also involve **private charging**: these solutions are particularly appreciated by customers, as evidenced by the more than 260 private charging points sold during the year, for a total of more than **1,600 by 2023** (of which about 900 at business and top business customers; energy from certified renewable sources is also guaranteed for these).

The consumer experience related to public charging has always played a major role for the Hera Group: in addition to the installation of charging points, new **interoperability agreements** have been signed **with other market operators**, which have made it possible to increase the charging network available to Hera customers to **more than 30 thousand charging points** throughout Italy.

CHARGING POINTS INSTALLED AT THE END OF THE YEAR

Number	2021	2022	2023
Public charging points	388	500	560
Private charging points	864	1,386	1,610
Total	**1,252**	**1,886**	**2,170**

Taking installations as a whole, **more than 2,100** public and private **charging points** were **active** in 2023. The goal for 2027 is **to exceed 5,100.**

Hera for soil protection and biodiversity

Reuse of soil in the construction of infrastructures and reuse of excavated earth

Starting right from the preliminary analyses to the design of works, the Hera Group identifies technical solutions aimed at the **reutilisation of formerly urbanised areas** and/or the preservation of the natural context of the areas to be worked on, in line with the objectives set out in the UN Agenda 2030. Among the main design criteria, we can mention:

- in the area of networks: extensions realised by taking advantage of existing roadways and/or urban fabric, improvement of the network layout by upgrading or reclaiming existing pipelines, laying new pipelines adjacent to already existing services;
- in the area of plant systems: the re-use of already existing/occupied infrastructures and areas; decommissioning of the infrastructure and rehabilitation/restoration of the area at the end of its lifecycle; use of technological solutions to reduce the footprint of the infrastructure.

SOIL REUSE IN DESIGNS

Square metres	2021	2022	2023
Area of designs on already-occupied soils	29,766	19,520	58,124
Total design area	48,672	26,785	99,313
Soil reuse in designs (%)	**61.1%**	**72.9%**	**58.5%**
Area of designs on already-occupied soils (cumulated from 2018)	584,699	604,219	662,343
Total design area (cumulated from 2018)	749,342	776,127	875,440
Land reuse in designs (cumulated from 2018) (%)	**78.0%**	**77.9%**	**75.7%**

Continuing the path of sustainability begun in previous years, the infrastructure (networks and facilities) implementations completed in 2023 involved **land use** of about 99 thousand square metres, of which **58.5% involved land already occupied** by existing infrastructure (about 58 thousand square metres). Considering the period from **2018 to 2023, 75.7%** (equal to approximately 662,000 m2) **of the total surface area involved** in the construction of infrastructure, concerned land that was already occupied. This concerns the construction of infrastructures whose design was provided by HeraTech.

Among the achievements completed in 2023, the **best results in terms of soil reuse** were obtained in the following interventions: upgrading of the San Giovanni in Persiceto wastewater treatment plant in Bologna (100% of soil reused, 10 thousand sq. m.), revamping of the special and hazardous waste-to-energy plant in Ravenna (100%, 9.7 thousand sq. m.), revamping of the anaerobic sludge digestion section of the Gramicia wastewater treatment plant in Ferrara (100%, 6.5 thousand sq. m.), upgrading of the Villa Vezzano sewerage system in Ravenna (100%, 3.5 thousand sq. m.). The reason for the indicator's decline in 2023 was a consequence of the completion and expansion of the Ca' Nordio treatment plant in Padua, where out of 30.5 thousand square metres of soil involved, only 4.0% could be reused.

In the 2024-2027 period, it is foreseen that most of the infrastructure projects will be constructed on land that is already occupied, while continuing to limit the use of virgin soil: in fact, it is estimated that a further 166,000 square metres of land will be reused, bringing to 72% (or about 828,000 square metres) the amount of land reused in projects completed from 2018 to 2027 with plans drawn up by HeraTech.

In particular, in the Padua area, work will be carried out to make the Roncajette site of AcegasApsAmga in Ponte San Nicolò safer, for a total of 250 thousand square metres reused (100%). In Modena, 69.4 thousand sq m of land (92%) is planned to be reused in the works for the construction of the new Hydrogen valley. In Ravenna, Castel Maggiore (Bo), and Ferrara, the construction and installation of photovoltaic systems at depleted landfills will allow 100% of the land involved in the works to be reused (104,000, 52,000, and 28.4,000 sq m, respectively).

Biodiversity

With respect to the protection and **conservation of wild habitats and species**, the European Union has enacted two pieces of legislation: Directive 2009/147/EC (known as the **Birds Directive**), which came into force in February 2010 and relates to the conservation of wild birds, and Council Directive 43/92 (known as the **Habitats Directive**), adopted in May 1992 and relating to the conservation of natural habitats and of wild fauna and flora. These directives have created a coherent ecological network of protected spaces located throughout the area of the European Union, called **Natura 2000.**

The two largest catchment plants in the province of Ferrara (Pontelagoscuro and Stellata) are located on the Po River within the special protection zone called the **Po River from Stellata to Mesola and Cavo Napoleonico**. The purification plant situated in the area of Ravenna (Marina di Ravenna) is located within the site of community interest called "**Piallassa Piombone"** and discharges the purified effluent within the "**Piallassa Baiona"** special protection area.

The Hera Group carries out **acute toxicity tests** on purification plants in order to safeguard biodiversity.

An agreement was renewed in 2023 between Hera Spa, the Burana Land Reclamation Consortium and the Emilia-Romagna Region for the **recovery of wastewater purified** by the Sassuolo-Fiorano and Savignano sul Panaro treatment plants in the Modena area. In particular, a detour of discharges to the Modena Canal and the Torbido Canal was provided for in the agreement, which would allow for better management of the available water resource as well as the achievement of the **quality objectives of**

the Secchia and Panaro **rivers**, consistent with the guidelines given by EU policies on the protection of water resources.

In addition, the permits for the Ravenna and Lido di Classe plants provided for release into specific consortium canals to allow hydraulic compensation during the driest summer period, as indirect agricultural reuse and to protect aquatic environments further downstream.

In relation to actions to protect biodiversity in the context of activated **authorisation procedures**, Herambiente proposes (particularly for projects of greater significance) the initiation of **mitigation and/or compensation actions** oriented towards the enhancement of the local area, landscape and natural environment. Each proposed intervention is specifically tailored to the local situation, so as to be in tune with the peculiarities of local habitats.

By way of example, the following 2023 activities are noted:

- Aliplast, in the single authorisation issued for the new rigid plastics recovery plant in Modena, required the company to carry out interventions such as:
  - **Construction, planting and maintenance of green areas** for carbon dioxide absorption and enhancement of park areas usable by residents;
  - preventive or reductive interventions on greenhouse gas emissions and pollutants;
  - **mitigation of nutrient input into the discharge** into the Naviglio Canal in order to reduce algal growth and contribute to the improvement of the hydraulic function. This mitigation must be quantified in terms of maintenance charges, which the company will have to bear through a binding commitment;
  - road surface maintenance for roads subject to greater and faster wear and tear due to the considerable traffic of vehicles heading to the plant;
  - interventions on vehicular traffic aimed at optimising the flow in access to the plant and minimising its impact in terms of noise, traffic, and emissions.

  The planned interventions will be the subject of a special agreement with the Municipality of Modena, which will define their priorities and modalities, giving priority to compensatory interventions referred to the area affected by the plant.
- **Environmental redevelopment project** of a waste treatment plant compartment in the Municipality of Ravenna, with Landscape Permit, Po Delta Regional Park Clearance and Impact Assessment.
- The company HEA (a joint venture between Herambiente and Eni Rewind), as part of the procedure for the issuance of authorisations for the project “Ponticelle development compartment: HEA multipurpose platform and Eni Rewind bio-recovery platform” located in the Ponticelle (Ra) area between the chemical hub and the Bassette artisanal complex, has planned the implementation of an environmental enhancement and naturalistic restoration project in the Classe Pinewood in the municipality of Ravenna, defined together with the municipality. The project, located within the Po Delta Regional Park “Classe Pinewood Station and Cervia Salt Pan” and in the Special Area of Conservation (SAC)/Special Protection Zone (SPA) “Classe Pinewood” of the Natura 2000 Network, envisages the **planting of more than two thousand** trees and shrubs and an environmental requalification of the entire area involved, which is now in a state of degradation.

Since 2020, Herambiente has also embarked on an **innovative biomonitoring** project to further pursue activities to study the environment around some of its facilities and any impacts exerted on it. The project aims to **use bees as bioindicators** to assess the quality status of the environment surrounding some plants and landfills of the type operated by the Group. See the case study “Bee understand: environmental biomonitoring with bees“ for details.

Land reclamation activities to protect soil and biodiversity

Since 2009 the Hera Group has been involved in **environmental reclamation**. As of July 2023, following the acquisition of 60% of A.C.R., the “environmental remediation operations” business unit was transferred to A.C.R., which thus saw its business offerings extended to include remediation **and reclamation services** aimed at securing and recovering municipal areas and contaminated industrial sites, decommissioning.

The service is offered to a varied type of public and private clientele including oil companies, chemical and pharmaceutical industries, steel mills, real estate and insurance consultancy firms, reclamation consortia, and port authorities.

An all-inclusive service is offered that encompasses all environmental activities related to the technical-administrative management accompanying the reclamation of an abandoned urban and/or industrial

area: from the design of the fact-finding survey to the economic feasibility study related to environmental liabilities, to environmental consultancy with regard to the purchase and sale, to the execution of environmental remediation and reclamation of degraded areas for regeneration.

The first and most important step in the reclamation process of an area is the **characterisation**, i.e., the in-depth study that allows the history of the contamination of the place to be reconstructed, provides all the elements to construct the planning phase of the intervention with full awareness, and estimates the costs of the intervention. The technicians use state-of-the-art investigative technologies and equipment to carry out direct and indirect investigations and assist their customers in all phases of the authorisation process required by current legislation. The reclamation and safety measures are the most delicate in terms of treatment of the processed materials and the impact that the activity can have on the productive life of a company or public organization. Over the years, particular attention has been paid to **increasingly more sustainable and low environmental impact approaches**, such as those that exploit the natural attenuation potential of the contaminated site to destroy polluting substances and/or reduce their relative hazardousness. Among the main sustainability requirements there is low energy consumption, minimisation of the use of chemical amendments and finally the applicability directly in situ, i.e., without the prior removal of the contaminated environmental matrix (soil or groundwater). Such processes are effectively applied to the treatment of contaminated groundwater, soils and sediments. In parallel to the in-situ treatment, on-site and off-site technologies have also been developed which respectively provide for:

- the excavation of the contaminated soil and its subsequent treatment on site (soil washing, biological treatment of soil through biopile, treatment of soil through Soil Vapor Extraction (SVE), groundwater treatment through pump & treat) for the recovery of the matrix and its reuse;
- the excavation of the contaminated soil and its subsequent treatment outside the construction site in order to send the contaminated matrix to authorised treatment plants or to landfills.

Previous or ongoing industrial activities are in fact often the cause of important alterations of the qualitative characteristics of the soil, subsoil and groundwater environmental matrices, such as to represent a potential risk for human health and natural ecosystems and therefore require remediation and/or depollution. In Italy, the remediation of contaminated sites is a problem of extraordinary importance not only on a health level but also on a social and economic level: suffice it to say that contaminated sites of national interest alone cover an area that reaches 0.6% of the entire national area. In principle, reclaiming contaminated sites makes it possible to preserve the natural capital and reduce the impact on biodiversity, representing in fact an important resource for the country's economic development.

The remediation activity is carried out by A.C.R. on a national level with certificates of qualification. Furthermore, the activities on the construction sites are carried out **in compliance with the international standards** ISO 9001, ISO14001 and ISO 14001, as also proven by the certifications held issued by the accredited bodies.

ENVIRONMENTAL RECLMATIONS CONCLUDED AND ONGOING

n. sites	2023	%
In situ treatment	114	77%
On-site treatment	0	0%
Off-site treatment	34	23%
Total	**148**	**100%**

At the end of 2023, the number of active (i.e. not including 'dormant' ones, where the activity carried out is merely surveillance)remediation works completed or in progress amounted to 148, three of which are Sites of National Interest (SIN), i.e. Bussi sul Tirino (Pe), the Mantua petrolchemical plant and the Val del Rio landfill in Chioggia (Ve).

Respect for environmental materials is clear both from the high percentage of reclaimed land and the high percentage of remediation with in-situ treatment.

TOTAL WASTE TREATED RECLAMATION PROCEDURES

tonnes	2023	%

Lands from reclamation treatments for material disposal	76,249	66.3%
Lands from reclamation treatments for material recovery	38,801	33.7%
Total lands treated	**115,050**	**100%**
Other waste for disposal (water, carbon, construction and demolition materials (MCD), other minor waste)	31,695	
Total	**146,745**	

Environment - Regenerating resources and closing the circle

Transition to a circular economy

European package on circular economy: Hera anticipates the steps

Hera has confirmed its targets on packaging recycling and landfill reduction, showing that it is **ahead of both European targets for municipal waste.**

In the areas served by the Group, in fact, all 3 main European targets have been met, including those for: landfills (2.7% in 2023, against a target of a maximum of 10% by 2035), packaging (66% in 2022, against a target of 65% by 2025 and 70% by 2030) and the overall recycling rate (61% in 2022, against a target of 55% by 2025, 60% by 2030 and 65% by 2035). Data on the latter two targets will be updated to 2023 in the coming months and as usual published in the report "Tracking waste".

The report "Tracking waste", whose fourteenth edition was published in 2023, transparently and comprehensively certifies that the percentage of sorted waste actually recovered by the Group came to 89%, broken down into 78% of material recycling and 11% of energy recovery, the latter only in the plastic and green sectors. This project covered all main materials collected separately: compostable, paper, organic, glass, plastic, wood, iron and metals (aluminium, steel and tinplate packaging).

This report, which covers the entire area served by the Group, indicates a 95% recovery rate for compostable waste and 71% for plastic, as well as 89% material recycling for paper, 87% for organic waste, 93% for glass, 93% for wood, 99% for iron and 93% for metal.

Meeting and exceeding the European municipal waste targets contributes to achieving **UN 2030 Agenda goals 12.2, 12.4, 12.5.** Publishing the report "Tracking Waste" contributes to achieving **UN 2030 Agenda goal 12.8**.

The Hera Group's commitment to the new plastics economy

Hera is one of the 250 companies worldwide, and the only Italian multiutility company, that in 2018 signed the **New Plastics Economy Global Commitment**, launched by the Ellen MacArthur Foundation in collaboration with the UN Environment Programme (UNEP). The Foundation's initiative is ultimately aimed at tackling the problem of plastic pollution at its source and making the entire supply chain more circular: eliminating disposable products as much as possible, producing and using only recyclable, reusable or compostable packaging and promoting the use of recycled plastic. To this end, the Foundation has created a global movement, involving all players in the supply chain, such as plastic packaging manufacturers and companies that use them to pack their products, large-scale retailers and recycling companies, as well as governments and investors.

In March 2022, in light of the important commitments undertaken by the members of the Foundation, as well as the importance of the topic in the context of the introduction of a new business model based on the circular economy, the United Nations, and in particular UNEP (United Nations Environment Programme), started a process aimed at drafting an international treaty binding member states in order to reduce the use of plastic and contribute to the creation of an economic system based on circular production. Three plenary sessions have been held so far; in the last session, a draft of the final treaty was drawn up, which is set to be promulgated in 2025. Two further sessions have already been scheduled and will be held in 2024.

The Hera Group has committed **to increase by 2025** (compared to 2017):

- plastics collected in the municipalities served by 30%;
- plastics sorted and sent to be recycled by the Group's plants by 50%;
- plastic recycled by Aliplast by 70%.

To date, the Global Commitment has gathered more than 500 signatories around the world, including companies active in the different phases of the plastic packaging value chain (around 20% of the global packaging market), governments (over 1 billion people represented) and over 200 associations and institutions including National Geographic, WWF, the World Economic Forum, the Consumer Goods Forum, the International Union for Conservation of Nature (IUCN), universities and research bodies and financial institutions.

On 31 October 2023, the fifth Progress Report was published, containing data from 123 companies (out of 134 that set their own target when joining the Network) and 17 governments/administrations (out of 24 eligible for reporting). The momentum created around the circular economy of plastics was unprecedented and the early progress made by signatories is significant. Despite this, efforts to eliminate the problem of plastic waste pollution at source must progress to a more ambitious level. The data reported on this occasion by the Hera Group referred to 2022.

The Hera Group's data at the end of 2023 indicate that the path undertaken is the right one. With regard to the **plastics collected** in the municipalities served, the Group has reached the target set for 2025 three years in advance, partially thanks to the contribution made by residents who, in recent years, have been engaged and incentivised to improve collection in a rationale oriented towards recycling. With respect to the **plastics sorted and sent for recycling** in the Group's plants, there has also been progressive and positive progress compared to the target. However, as of 2023, the performance linked to this indicator will undergo a significant reduction due to the effect of Emilia-Romagna regional law no. 16 of 18 July 2017, which establishes that an amount coming to no less than 30% of municipal waste collected and sorted by type must be managed by an economic operator selected through a competitive procedure in which companies controlled by or connected to the concessionaire (in this case, the Group) cannot participate. In this regulatory context, the Group may only be responsible for managing 70% of the municipal waste collected and sorted by type by the Group itself, which will jeopardise achieving the target within 2025. With regard to **recycled plastic**, an increase in sales was recorded in 2023, with further growth forecast in the 2022-2027 industrial plan.

The same targets were presented by Hera in the context of the "**EU-wide pledging campaign for the uptake of recycled plastics**", the campaign promoted by the European Commission to accelerate the uptake of recycled plastics and reach the European target of ten million tonnes of recycled plastics used for new products by 2025.

Achieving the targets on the plastics supply chain contributes to achieving **UN 2030 Agenda goals 12.2, 12.4, 12.5.**

Aliplast for Hera Group: recycled plastic products

In November 2019, an experimental circular economy project was launched by Hera and Aliplast, to increasing the reuse of reels made from post-consumer recycled plastic in the production of bags intended for sorted waste collection.

The ultimate goal was to "close the circle" of the lifecycle of these products, increasing their recycling and reuse, so as to increase economic sustainability and reduce their environmental impact as much as possible.

In October 2020, the experimental phase of the project ended and from November 2020 the actual industrialisation of the process began in all the regions managed by the Group with important results: between 2020 and 2023, 6,418 tonnes of reels were produced for bag production.

In addition to the figures, the "HERA Plastic Bags" project has achieved other results with a positive impact on the system itself:

- the quality of the bags is significantly improved as Aliplast itself guarantees technical requirements are met, except in the case of manipulation by the third-party supplier;
- the issue of disputes with third-party suppliers who did not respect product specifications was removed;
- the issue of traceable bags has been resolved;
- the service offered to Hera users has improved, with considerable return in terms of image.

The use of recycled plastic bags for waste collection contributes to **UN 2030 Agenda goals 9.4, 11.6, 12.2, 12.4 and 12.5.**

Innovative Carbon Fibre Recycling Plant

An agreement has been reached for the construction of the **first plant in Italy**, and among the first in Europe, to use an innovative pyrogasification process to produce recovered carbon fibre. It will be carried out by Herambiente and the project is the result of a collaboration with the Department of Industrial Chemistry of the University of Bologna and Curti Costruzioni Meccaniche.

Currently, carbon fibre waste is almost exclusively destined for landfills or energy recovery. The challenge involved in the project for the plant make it pioneering, because it aims to recover carbon through an innovative pyrogasification process while maintaining the lightness and strength of this fibre, a material that can potentially be recycled countless times.

The advantages of this new technological solution are clear, with a 75% saving on the environmental impact associated with the life cycle (LCA – Life Cycle Assessment) compared to traditional methods of carbon fibre treatment and disposal. In addition, it will result in **approximately 160 tonnes of recycled carbon fibre** with a 90% energy saving compared to virgin fibre production and a reduction in CO_2 emissions into the atmosphere coming to approximately 7,000 tonnes per year

The plant will be built in Imola (BO) and will operate through a complex process guaranteeing a completely clean and reusable outgoing product, ready to be rewoven and impregnated for reuse in the

sectors from which the waste comes: automotive, aerospace, nautical and wind energy, to name but a few, but more generally from a market that now shows a 9% annual increase in demand for carbon fibre, which today is almost entirely a virgin raw material.

Construction began in 2023 and will be fully operational in mid-2024. It will have a maximum overall treatment potential (on two lines) of 320 tonnes per year and will operate for approximately 7,000 hours per year; it is also designed to recover syngas from resins and additives: this gas will be reused to generate part of the thermal energy needed for the process in order to maximise energy recovery as well.

The carbon fibre recycling plant contributes achieving UN 2030 Agenda **goals 9.1, 9.2, 9.4, 11.6, 12.2, 12.4 and 12.5**, as well as - thanks to the partnership developed - to achieving **goal 17.17.**

Hera and Eni: partnership to turn cooking oil into biofuel

As part of the transition to a circular economy promoted by the Group, the **collection of waste oils** has become increasingly visible and important, also leading to significant economic returns. A street collection service for cooking oils started in 2018, using attractive bins specifically designed to collect residual household cooking oil.

The results of this collection feed into a **virtuous circular economy project.** In fact, under a framework agreement stipulated with Eni, all discarded cooking oil collected by Hera, once processed in affiliated plants, is transported to the Eni bio-refinery in Porto Marghera (VE) where it is transformed into hydrogenated biofuel. Hera then uses this biofuel, by purchasing approximately 600,000 litres/year of ENI Diesel+ (containing 15% bio component) which is used to power 33 compactors for waste collection in the areas served. Starting from 2024, based on the new agreement, Hera will purchase the new HVOlution biofuel made up of 100% bio components to replace Diesel+.

The total number of bins for street collection of discarded vegetable oils in the area served by Hera Spa amounted to 868, distributed over 128 municipalities for a served population of roughly 2.4 million inhabitants. In 2023, used vegetable oils collected by the collection service reached 1,128 tonnes, a slight decrease compared to previous years. This data refers to the amount collected in the areas served by Hera Spa, Marche Multiservizi and AcegasApsAmga.

In addition to the volume from municipal collections, in 2023 Hera increased its collection of vegetable oils from commercial users in the area, which started in 2021. Over the years, in addition to restaurants and companies operating in the food sector, the project also contracted important groups in the catering sector such as Camst, Cirfood, Elior, Road House and Chef Express. More than 1,380 catering outlets were involved in the project. The extension of the project made it possible, in 2023, to start producing hydrogenated biofuel at the ENI Bio-Refinery in Porto Marghera (VE) from an additional 1,236 tonnes of vegetable oils.

In total, the oil collected during 2023 amounted to 2,364 tonnes. This generated **significant positive environmental impacts**, as shown in the table below.

ENVIRONMENTAL BENEFITS PRODUCED BY THIS PROJECT

	2022	2023
Quantity of waste cooking oils collected (tonnes)	1,540	2,364
Quantity of hydrogenated biofuel produced (thousand litres)	1,700	2,435
Greenhouse gas emissions avoided (tonnes of Co2eq)	4,930	6,700
Primary energy saved (toe)	1,500	2,040

In 2023, Hera was re-certified by Bureau Veritas Italia for AFNOR XP X30-901 for its circular economy projects, already obtained in 2022. The French AFNOR standard is now the main international reference for implementing a management system for circular economy projects. More specifically, the waste cooking oil management project was selected and verified in accordance with the requirements of this standard, which includes, among others, a risk/opportunity analysis. This allowed the foundations of the project to be strengthened by assessments of possible criticalities, such as the risk of spillage and the maintenance of road containers, but also of the important benefits of the initiative, which push for its extension and promotion in the area, as well as on the possible future actions to be introduced in order to reduce risks and broaden opportunities.

AFNOR certification thus confirms that the reorganisation of the exhausted cooking oil recovery process in the areas served by the Hera Group has taken place in full respect of the circular economy, yielding important environmental and economic benefits.

The partnership between Hera and Eni contributes to achieving **UN 2030 Agenda goals 9.4, 11.6, 12.2, 12.4 and 12.5**, as well as - thanks to the partnership developed - to achieving **target 17.17.**

Important new partnerships signed to "close the circle"

In 2023, another two new strategic circular economy partnership agreements were signed with important national entities which, in addition to those signed in past years, make up a total framework of 10 active partnerships aimed at implementing environmental sustainability initiatives and projects.

The first of these two new partnership agreements was signed in January 2023 with **Sacmi Imola**, the company at the head of the Sacmi Group, world leader in the production and marketing of complete machines and systems for the ceramic, metal, packaging, food and beverage industry and for the production of plastic containers and advanced materials. In 2023, the first projects to exploit materials from a circular economy perspective were launched, including the recovery of used vegetable oil produced by the company canteen intended for the production of hydrogenated biofuel in partnership with Eni, in addition to the collection of glasses from vending machines for the specific recycling of polystyrene in partnership with Corepla through the RiVending project. Analyses aimed at optimising water resources and increasing energy efficiency have also been launched.

The partnership with Autogrill also began in June 2023, a national leader in catering for people on the road, with a dense and widespread network of points of sale located on motorways, stations, airports and also in urban centres throughout Italy. The objective of the agreement is the sharing and implementation of projects in the field of sustainable mobility, circular economy, sustainability and environmental communication, through innovative Business to Community to Consumer - B2C2C approaches, in line with the Sustainable Development Goals (SDGs) defined by the UN 2030 Agenda. The first area of intervention launched involves the identification of solutions to improve the efficiency of waste management, from the collection phase to the treatment phase.

During 2023, as part of the partnership with the **Italian Exhibition Group** signed in March 2022, the Hera Group's support continued in activities pivotal to maintaining the ISO 20121 Integrated System certification, relating to the implementation of sustainable event management systems. The certification had already been obtained in 2022 for the Rimini and Vicenza exhibition centres as well as for the organisation of the Ecomondo trade fair event. In addition, the Group provided its support to another IEG site, Palacongressi di Rimini, which also obtained ISO 20121 certification in December 2023.

The partnership with **Aeroporti di Roma** continues, also signed in April 2022. The Hera Group provides technical support to this company both in the waste sector, to guarantee traceability and increasingly sustainable management of all waste flows produced in the Fiumicino airport hubs and Ciampino, and in the field of the optimisation of water resources, to maximise reuse and make sure they are used efficiently.

In addition, the partnerships with the catering companies **Camst Group, Elior and Cirfood** continue, by virtue of which the results of the project for the exploitation of used vegetable oils have been boosted and consolidated: from the cumulative collections of the three partners, over 144 thousand litres of biofuel have been produced with a saving of 410 tons of CO_2e. In addition, new areas for the exploitation of waste materials are being studied, including in an experimental form, with the aim of increasing the results already achieved in terms of environmental sustainability and circularity, starting with plastic packaging.

In 2023, the collaboration with **Aeroporto di Bologna** also continued with significant results. Thanks to the ongoing partnership between the Airport and Hera, the results already achieved in 2022 for the separation of waste produced at the airport have improved even more, consolidating the results to over 50% for separate collection, with an increase of more than double compared to the data from 2021, the period prior to the signing of the specific partnership. In the environmental information and awareness process aimed at everyone who produces waste at the airport, the last mile was created in 2023, actively involving passengers too, through little tabs placed near the catering points and in other sensitive points of the airport, in order to remind people to correctly separate waste when placing it in the appropriate containers.

Aimed at developing new paths featuring higher circularity, an ambitious experimental project for regenerating household appliance waste was launched together with **Dismeco**, which is active in the WEEE recovery sector, with a plant located in Marzabotto, in the province of Bologna. The project aims to test the feasibility of a new way of managing this waste, which allows the washing machines brought as waste to the Group's ecological stations to be regenerated; in practice, the best preserved washing machines are intercepted in this WEEE flow, in order to experiment with a repair process so they can be used again. The project, developed in agreement with the WEEE Coordination Centre (a consortium that

brings together the Collective Systems of electrical and electronic equipment manufacturers) and Dismeco, saw the collaboration of CNA Bologna with the innovative Academy launched at Cna Formazione in Marzabotto, a professional training course for those working in household appliance maintenance. At the same time, the project will therefore be a great opportunity for professional training and preparation and an opportunity to create potential new jobs to support and develop local communities in the Bologna area. In 2023, 109 washing machines were regenerated and donated to organisations and associations in the Bologna Metropolitan City area committed to supporting vulnerable segments of the population.

The project launched in 2019 between Herambiente and **Coprob** (Beetroot Producers Cooperatives), the only sugar producer in Italy based in Minerbio (BO), continues thanks to the supply of compost from the six Herambiente plants in Emilia-Romagna with quality certification. The compost, obtained exclusively from the separate collection of the organic portion combined with cuttings and pruning, is used in the fertilisation plans for the associated farms, to restore the organic content of soil, which is essential for maximum fertility. The flows managed in 2023 equalled 5,210 tonnes. Unfortunately, the figure decreased compared to 2022 due to the flood in May 2023 which made it impossible to harvest the crops and subsequently work the COPROB members' land, affected by the events, in time to use the compost.

The agreement between different production sectors with concrete experience in the circular economy offers a comprehensive response to environmental and production issues both in Herambiente plants, with biogas and biomethane production, and in the agricultural sector, confirming the production levels of crops, the quality of agricultural production and a significant improvement in the soil both from a biological and chemical-physical point of view.

In 2023, the Hera Group also continued to partner with **Federdistribuzione**, the federation representing Modern Distribution companies. Two partnership agreements are in the process of being drawn up, one relating to the circular economy and a second aimed at promoting energy efficiency actions among its own associated.

The partnership with **McDonald's** also continued, which, at the end of 2023, saw the creation of a new monitoring system for the separate collection of urban waste in the restaurants included in the scope of the project. The partnership agreement, which expires at the end of the year, has also been renewed for 2024, with plans to expand the partnership to areas relating to waste prevention, the identification of optimal solutions for the and traceability of waste from a circular economy perspective, as well as environmental awareness and communication initiatives aimed at McDonald's internal staff and customers, with the aim of promoting environmental sustainability and correct waste management.

The projects described here contribute to achieving **UN 2030 Agenda goals 12.2, 12.4, 12.5**, as well as - thanks to the partnerships developed - to achieving **goal 17.17.**

Production and use of compost from Herambiente plants

Herambiente's **compost** is an organic biofertiliser obtained by treating separately collected organic waste at six of its own facilities:

- 1 traditional aerobic composting plant with static heaps at Ostellato (FE), in which only mixed composted soil improver is produced;
- 4 anaerobic digestion plants with final composting of mixed composted soil improver (S. Agata Bolognese (BO), Voltana (RA), Rimini and Cesena plants);
- 1 traditional aerobic composting plant with static heaps at Ostellato (Fe), in which green composted soil improver is produced.

To summarise, the process used in all Herambiente plants involves processing and recovering the organic portion of sorted waste from which **soil improver** and **biogas** are produced; in the particular case of S. Agata alone, biomethane is produced, which is fed directly into the Snam network for use in motor vehicles.

In 2023 these plants produced approximately **35.9 thousand tonnes of mixed composted soil improver** (77.3% for extensive agriculture and fruit growing on **local farms**, 22.0% for the pellet and soil industry, 0.5% for small local gardeners and the remaining 0.2% for field experiments) and approximately **4.5 thousand tonnes of green composted soil improver** (98.5% for the **potting soil production** industry and the remainder for small local gardeners)

For years, Herambiente has carried out significant on-field trial activities aimed at researching and evaluating the performance of its biofertilisers. The study carried out with the University of Bologna and the Navarra Foundation, located in Ferrara, compares the organic fertilisers produced by the Group, both directly (soil improvers) and indirectly (liming materials), not only in terms of quantitative and qualitative production performance in extensive and specialised crops (fruit and floriculture), but also the impact that organic fertilisers have on the soil's microbiological composition and the soil/plant ratio. Following

the flood events that hit Romagna in May 2023, as part of the ongoing experiments, a specific experiment was included with the Cooperativa Agricola di Conselice to evaluate the possibility of recovering the land with the use of compost.

The results confirm **production equal to or higher than the one obtained with chemical fertilisation**, but with a significant increase in the organic substances present, leading to a qualitative improvement in production as well as significant resilience of the soil to climatic stress (drought) and other physiopathologies.

Producing compost through aerobic digestion, anaerobic digestion and composting processes in Herambiente's facilities contributes to achieving **UN 2030 Agenda goals 9.4, 11.6, 12.2, 12.4, 12.5.**

Evaluation and measurement of "circularity" in Hera Luce, Ase, Hse and in new water and gas connections

In 2017, Hera Luce developed a system for measuring the circularity of public lighting systems, considering their lifecycle based on an analysis of material flows (materials used in relation to their origin and end-of-life destination) and economic flows (costs/revenues at the beginning and end of the lifecycle).

This approach to measuring circularity was already aligned with the indications provided by the Ministry of the Environment (MATTM) at the time, and was later confirmed to be consistent with the most recent international methodological approaches, such as the Circulytics tool developed by the Ellen MacArthur Foundation. Hera Luce's circularity measurement system also anticipated the requirements of the Minimum environmental criteria (MEC) for the public lighting service, approved in March 2018, which introduce an obligation for the bidder to carry out a material analysis.

The measurement system designed acts as a fundamental strategic lever and, along with the awareness-raising process with suppliers, allows the Group to obtain higher scores in tenders and thus gain an advantage over its competitors.

Hera Luce, in order to proceed with measuring its material circularity, has prepared a measurement tool intended both for the actual calculation of material balances and for gathering the input data, providing access to the manufacturers/suppliers of the components used so that they can enter the material data of their products.

This activity made it possible to create a database containing the material data of all products used in the redevelopment projects, and to start raising awareness among suppliers with the aim of directing them towards more sustainable supply chains. The material balance measurement and reporting system was developed in accordance with the requirements set out in a specification for the creation of management systems for the implementation of material balances and was certified by a third party in 2022.

Hera Luce is the first public lighting service company to have obtained this certification at a national level.

The project was also extended to the companies HSE and ASE, which provide energy efficiency services for public administrations and private entities, in line with the Group's objectives with a view to sustainability and achieving the targets of the UN 2030 Agenda.

In 2020-2021, a circularity assessment model was applied to some simpler and more repetitive assets, in order to optimise them in terms of sustainability by redefining Standards and Procedures. This process consisted of the following steps:

- **Project circularity evaluation system**: implementation of calculation tools for evaluating the material circularity of networks and plants throughout their lifecycle, as previously foreseen for public lighting with the introduction of Minimum Environmental Criteria (MEC);
- **Process optimisation**: application of the previously codified analysis system to certain types of assets, with the objective of optimising processes in terms of choice of materials, construction technologies and maintenance methods, aimed at minimising the impact on material consumption and maximising the use of secondary raw materials;
- **Creation of new standards and procedures**: the results of the analyses developed will be transformed into new standards and procedures for the design, construction, operation and maintenance of the evaluated infrastructures.

During 2020, the material and economic circularity calculation tool was implemented, which was subsequently applied to the water connection typology (2020) and the polyethylene gas network typology in 2021.

In 2022, the analysis aimed at maximising circularity and minimising waste production was applied to the plant revamping typology with demolition of the existing one.

The assessment and measurement of "circularity" in Hera Luce, Ase, Hse and in new water and gas connections contributes to achieving **UN 2030 Agenda goals 12.2, 12.4 and 12.5**.

SCART®: the beautiful and useful side of waste

SCART® is the **Hera Group's art and communication project** that has been developing a combination of art and waste for twenty-five years. It is a corporate waste art project, created within one of Herambiente's industrial waste treatment and disposal plants. Today, SCART® is a trademark registered throughout the European Community, designed to **breathe new life into some of those many industrial waste products** that are disposed of as waste on a daily basis and, thanks to the creativity of the artists collaborating in the project, are transformed into unique, exclusive pieces of art in full respect of the circular economy. The aim is to encourage environmentally responsible behaviour, offering new stimuli to create artistic, design, fashion and performance objects using only and exclusively waste as a raw material. This has led to the creation of furniture, games, musical instruments, clothes, paintings, statues, as well as sets for shows and stage costumes. SCART® is an invitation to think about new intelligent, creative and above all sustainable lifestyles.

The numerous national and international initiatives include, for example, important conventions with the Fine Arts Academies in Florence, Bologna and Ravenna, Brera Milan, the Free Academy of Fine Arts of Rimini, and the Academy of Design of San Marino. A collaboration with the young people at the Sanpatrignano Rehabilitation Community is also important in terms of social profile. The Scart Project, during 2023, involved over 100 students in seminars and workshops held at the SCART® laboratories located within the Herambiente plant complex in Santa Croce sull'Arno e Pisa. These artistic and educational initiatives focus on experimenting with the artistic use of industrial waste and involve not only enrolled students but also many artists specialised in trash art.

Since 2012, the SCART® project has been the exclusive partner for the production of costumes and stage components for Andrea Bocelli's concert at the Teatro del Silenzio in Lajatico (PI), the small Tuscan town where this great tenor was born. For the 2023 edition, around 150 stage costumes were created which were worn by performers, dancers, extras and the 80 members of the choir. In addition, six statues from the "Business man and woman" collection were permanently positioned on the stage where Bocelli duetted with internationally renowned singers, in front of over 20,000 people who came to Lajatico from all over the world over two evenings in July.

Over the years SCART® has also participated in numerous national exhibitions - Venice Film Festival, Rome at Palazzo Montecitorio and at the Colosseum, Pescara, Verona, Padua, Pisa, Florence, Milan to name a few - and international exhibitions (Berlin 2016 and Hong Kong 2021, Doha in Qatar in 2022).

A big event for the SCART Project, which took place in 2023, was the appearance on the "Viva Rai2" television programme hosted by Fiorello. On 18 March, for world Recycling day, all the sets as well as all the costumes worn by the dancers were taken from the Scart collection. The host mentioned and thanked the Scart Project several times for participating in the broadcast.

Also in 2023, several portraits of famous people were created and handed to them during events organised by the Project. Particularly memorable were those given to the singers Elisa and Emma, the actor Stefano Accorsi, the maestro Andrea Bocelli and the host Rosario Fiorello.

Finally, a Scart exhibition has been underway since the beginning of December in Pontedera (PI) in an exclusive location where 65 Scart works have been displayed. The exhibition is being met with enormous success mainly from schools throughout the province of Pisa and beyond. To date, over 1000 children have visited the exhibition on guided and organised tours, and it has received 4000 visitors during the exhibition's standard opening hours.

Not only does Scart continue to amaze, it's also an effective tool to raise awareness of recycling times, sustainability and the circular economy. These are yet more emotions offered by Scart, which after many years of searching for beauty, continues to offer interesting projects.

The SCART® project contributes to **UN 2030 Agenda goals 12.2, 12.4, 12.5 and 12.8.**

Sustainable management of water resources

All the quality of tap water in one report: In good water

In 2023 Hera published the fifteenth edition of the **In buone acque** (in good waters report), dedicated to tap water. This report is still the first and only example of a specific report on tap water in Italy and its environmental and economic benefits. The report contains, region by region, analysis data on 29 parameters and non-standard parameters, such as emerging contaminants and asbestos fibres.

The report shows that drinking tap water is an environmentally sustainable choice and is also good for your wallet. In fact, tap water avoids the production, transport and disposal of 305 million plastic bottles and saves 480 euro per year for a family of three.+

In Buone Acque contributes to the achievement of targets 6.b and 12.8 of the UN 2030 Agenda.

For the full contents of the report: http://www.gruppohera.it/report.

Convention with the University of Bologna for the aqueduct

In 2023, the consultancy contract with the Department of Civil, Chemical, Environmental and Materials Engineering of the University of Bologna (UniBo) remained in place, with the aim of analysing the environmental impacts linked to the drinking water supply chain through the Life Cycle Assessment (LCA) methodology. . Through this collaboration with UniBo, the positive environmental contributions coming from the Group's various project initiatives will be measured, with efficiency and innovation as the primary targets, and which, based on the LCA analysis results, may be enhanced and extended to other Group companies. Indeed, the choice of materials with which to carry out renovations has strategic importance, and an awareness of the mechanical and environmental performance of different materials is increasingly becoming a lever to orient choices in planning.

In particular, the project initiatives falling under this collaboration that have already been launched include:

- An analysis for the selection of **different materials in the aqueduct** used for the construction, maintenance and renewal of pipelines. The LCA analysis will identify which materials have the greatest impact on the environment, considering their entire life cycle, from production to operation and maintenance. The analysis carried out revealed that, despite the type of material, the production phase has the biggest impact on the environment, while the maintenance phase has a very small impact.
- Project for the use of **ultrasound platforms for the prevention of algae** (first project in Italy) in the lagoon basins of the Pontelagoscuro plant. This technology, by inhibiting chlorophyll photosynthesis, makes it possible to reduce the subsequent use of chemical additives to remove algae, which, especially with the increase in temperature, tend to form in increasing quantities. The plant, active since spring 2023, saw positive results during the temperature increases detected during the year. In 2024, the positive environmental impact brought about by the reduction in the use of chemicals for algae removal will be evaluated in more depth, again in partnership with UniBo.
- Installation of **smart water metering**, a project under development within the Group, aimed not only at acquiring consumption data remotely but also at providing remote users with comparative information on their daily consumption trends and alerts relating, for example, to leakage in the internal system. The rapidity of these alerts and the availability of real consumption data will lead to savings in water resources, which the collaboration with UniBo will quantify. Metering through smart meters could lead to offers of value-added services, which from a LCA perspective can lead to benefits on consumed or lost volumes of water resources.
- Installation at the Pontelagoscuro water purification plant of an **experimental plant for the removal of potential emerging pollutants based on nanomaterials (graphene oxide)** and valuable membranes recovered from the biomedical sector. The plant, studied and designed as part of the partnership between **Hera, CNR and Medica**, was financed as a European LIFE project and was an important action following the development of the Water Safety Plan for the Pontelagoscuro supply area: in fact, it allows the potential risk of a possible presence of emerging microcontaminants in the raw water of the Po to be managed preventively, another element that strengthens the multi-barrier treatment approach that the water purification plant already has in place.

The partnership described above between Hera and Unibo contributes to achieving **UN 2030 Agenda goals 6.3, 9.1, 9.4 and 17.17.**

The Rimini seawater protection plan continues

The Rimini seawater protection plan was created in 2013 to eliminate bans on bathing following intense rainfall, by implementing structural measures on the sewage-purification system of the City of Rimini. Intense rainfall, in fact, causes the flow rate manageable by the sewage system to be exceeded, making an emergency discharge of untreated water into the environment necessary. The gradual implementation of the measures set out in the Plan will lead to a gradual reduction of critical elements and up to a 90% reduction of the polluting impact, measured in terms of COD not discharged into the environment, compared to the initial state of the system.

From the very beginning of the Plan, mathematical modelling of the sewage and purification system has played an essential role in identifying possible synergies between the interventions and systemically optimising works and management criteria. The modelling activities, in fact, since they can rely on an ever-increasing amount of data and the management feedback of the works as they were built, were able to significantly change the system structure as initially planned.

The evolution of the Plan, from its implementation start-up to the present, has made it possible to pursue not only the environmental protection of the coastline as initially foreseen, but also the hydraulic

protection of urban areas in the municipality of Rimini that were subject to flooding. More specifically, in 2014, the Plan included interventions referred to as “Mavone spillway”, “Via Santa Chiara pumping station”, “Ausa dorsal sewerage collector” (the latter financed with 8.5 million euro as part of the public investments related to hydrogeological instability in the initiative known as “Italia Sicura”), as well as the modification of rainwater management in the plant system serving the Fossa Ausa. Subsequently, in 2019 and 2020, the plant engineering systems serving the Colonnella and Rodella Ditches were further optimised, taking advantage of the possible synergies with the sewerage system, which reduced the storage volumes of the tanks, thus also reducing both the investment required and the implementation timeframe, while at the same time strengthening the hydraulic control of the area.

In particular, the construction of the Dorsale Sud was completed in 2022, which, with the implementation of the plant and the laying of new collectors, allows for a considerable improvement in the capacity to collect wastewater from southern Rimini to the purification plant. The completion of this intervention, in addition to improving the overall efficiency of an important sewage infrastructure of the city, introduces a further environmental improvement, essentially due to the increase in the volume of waste water that, in the event of rainfall, can be sent to purification, proportionally reducing the number of activations of the emergency drains of the Ausa and Colonnella I Ditches.

The Plan essentially consists of the ten measures originally planned, to which additional measures due to optimisations introduced have been added, **making a total of 14 measures.**

The ongoing optimisation of the Plan, with the design improvements made and the indispensable permitting steps required, has meant that achieving the environmental objectives initially planned for 2020 has been postponed to 2026. Note that by that year, the works necessary to reduce the city’s hydraulic risk will also be completed. The postponement in the Plan’s implementation schedule is strictly related to a substantial improvement in its impact on the city, which, as mentioned above, will benefit from a significant improvement in both hydraulic and environmental aspects compared not only to the pre-operational state of the sewage-depuration system, but especially compared to the one expected at the outset of the Plan.

The state of progress of the interventions does not reveal any major criticalities and allows the quality objectives fixed to be achieved.

The situation of the 14 measures is as follows:

Intervention	Status at 31 December 2023	Planned / actual year of completion	Motivations/benefits
1. Doubling the Santa Giustina purification plant	Concluded	2016	Improving the purification process
2. Conversion of the Rimini Marecchiese purification plant into a storage tank	Concluded	2018	Improving the purification process
3. Construction of the northern backbone to connect the Bellaria purification plant to the S. Giustina purification plant	Concluded	2016	Improving the purification process
4. Completion of sewer network separation in northern Rimini	First section concluded. Second Section divided into 7 Lots. Lots 1,2,4 and 7 completed. Lot 3 nearing completion. The works on Lots 5 and 6 have been awarded.	2025	Conversion of five sea outlets to white water discharge
5. Construction of the southern backbone	Concluded	2022	Reducing the number of openings of the Ausa and Colonnella I sea outlets
6. Completion of separation in the Roncasso and Pradella basins	Network separation completed. The works for the water-supply plant serving Pradella reservoir have been awarded	2025	Conversion of two sea outlets to white water discharge

Intervention	Status at 31 December 2023	Planned / actual year of completion	Motivations/benefits
7. Construction of submarine pipeline and hydro-swelling plant for Ausa basin and reservoirs	Concluded	2020	Reducing the number of openings of the Ausa sea outlets
8. Construction of hospital lamination tank	Concluded	2016	Reducing the number of openings of sea outlets Colonnella I
9. Construction of connection pipeline between Fossa Colonnella I and Fossa Colonnella II; Colonnella II tank and Rodella tank and submarine discharge pipeline	Tender for Section I published. Tender for Section II scheduled for 2024	2026	Reduction in the number of openings of the sea outlets Colonnella I, Colonnella II and Rodella
10. Sewerage rehabilitation island	Concluded	2014	Optimisation of the sewerage system
11. Ausa beach section	Concluded	2016	Improving the usability of the area and environmental conditions
12. Ausa backbone sewer	In progress	2025	Hydraulic risk reduction
13. Mavone spillway	Concluded	2018	Hydraulic risk reduction
14. Drainage of Via Santa Chiara	Concluded	2020	Hydraulic risk reduction

The interventions completed so far have resulted in significant environmental benefits, reducing the quantities of organic substances (COD/BOD) discharged into the sea during intense meteorological events. The intervention concluded in 2020 for the AUSA reservoir led to a considerable reduction in the pollutant load discharged near the shore, with benefits for the water quality of the coastline. This means that the bathing bans that occur if discharges are opened along a wide strip of the city's coastline, including both areas where the separation of the sewerage networks has been completed and the stretch of sea adjacent to Fossa Ausa, will no longer apply. From this point of view, to date, 7,000 metres of beach have been "released" from bathing bans, corresponding to almost 65% of the city's coastline.

Moreover, as a further proof of the Plan's strong links with the City of Rimini, note that a significant part of the planned works are being integrated with the urban redevelopment project promoted by the Municipality called Parco del Mare (Sea Park), so as to pursue synergies that can provide an overall improvement of the urban structure.

The Rimini seawater protection plan was included among the best practices in the SDG Industry Matrix report published by Global Compact and KPMG in 2017, which reports on business opportunities linked to the goals of the UN 2030 Agenda.

The RSPP, through its interventions to improve the water-sewerage system, reduce marine pollution, upgrade infrastructures and involve municipalities and residents in the project, contributes to achieving **UN 2030 Agenda goals 6.2, 6.3, 6.b, 9.1, 9.4 and 14.1.**

Protection of air, land and biodiversity

More than 24,000 trees planted by 2024

The Hera Group has carried out, and continues to carry out **tree planting projects** in various areas of the regions in which it operates, confirming its commitment to protecting biodiversity and air quality. **Since 2012, 23,057 trees have been donated** to the area between Emilia-Romagna, Veneto and Friuli-Venezia Giulia thanks to numerous initiatives involving employees, Hera Group customers and the residents served, equalling a total of **2,300 tonnes of carbon dioxide absorbed every year**. The plantings were the result of reward mechanisms associated with specific **virtuous behaviour,** such as delivering sorted waste to ecological stations or requesting electronic bills instead of paper bills.

For example, with the "**ECO Trees**" initiative, the Hera Group has joined the Emilia-Romagna Region's project "Planting roots for the future" aimed at planting 4.5 million trees (one per inhabitant of the region). In particular, in 2023 Hera **achieved the objective of 10,000 trees planted** by 2024 thanks to the partnership with municipalities and other entities participating in the project, by making resources, skills

and areas of the region available, and thanks to a financial commitment of 250 thousand euro. In this context, the **participation of residents** was key as it was their choices of efficient energy consumption and sustainable mobility that supported the initiative. In fact, Hera Comm offers its customers a wide range of services and products that allow them to reduce consumption and the related environmental impact, and by opting for these solutions they contribute to implementing the project: every four products purchased, including LED light bulb kits or smart thermostats, for example, corresponds to planting and care of one tree. The same applies to two boilers, two air conditioners or one boiler and one air conditioner, or two means of sustainable mobility such as scooters or electric bicycles.

Finally, the completed projects "**Let's green Madagascar**" by Treedom through HeraSolidale, "**La Fabbrica dell'Aria**" {the creation of air) in the Triveneto area, "**Più alberi in città**" (more trees in cities) in the municipalities of Modena, Ferrara, Sassuolo and Rimini, "**Operazione più alberi**" (operation more trees) in Padua , and "**Regala un albero**" (gift a tree) in Emilia-Romagna, also thanks the active involvement of residents and customers, resulted in 12,870 trees being planted.

The Hera Group's commitment to the environment does not end here: in fact, other projects to plant trees in the area are being drawn up.

Further details of the tree-planting initiatives are available at alberi.gruppohera.it/hera-per- patrimonio-naturale-e-la-biodiversita.

The reported projects contribute to achieving UN 2030 Agenda **goals 7.3, 11.3, 11.2, 11.6, 12.2, 12.4, 12.5 and 12.8**, as well as - thanks to the involvement of residents, municipalities and institutions - to achieving **goal 17.17.**

Environmental biomonitoring with bees

The "**Capiamo - To Bee Understanding**" project **uses bees as bio-indicators of environmental quality** near industrial facilities. These insects are particularly sensitive to environmental changes caused by pollutants, and are therefore able to signal the onset of any imbalances in biodiversity, the ecosystem and human health in general at an early stage, thus enabling corrective actions to be rapidly planned.

Bees are particularly well-suited for biomonitoring. They are, in fact, social insects that live in large colonies and are easy to breed. In addition, their hairy bodies and regular foraging activity (collecting nectar and pollen) allow individual colonies to take about **10,000 samples per day** from the air, water and soil with which they come into contact A single bee normally moves over an area of 7 km^2 in the course of a day. Substances present in the environment thus accumulate within the hive, on the bees and their products (honey, propolis, wax, pollen and royal jelly), making it easy to recover **highly representative samples** for analysis. Bees, as bio-indicators, offers a lot of useful information in both the short and long term: honey, for example, can be used to assess pollution in the short term, since it is the first product in which contaminants can accumulate. Wax, on the other hand, can be used to assess pollution levels in the long term, since due to its lipidic nature it can absorb and retain non-volatile, lipophilic and persistent contaminants.

In spring 2020, **three beehives** were installed at the facilities of the **waste-to-energy plant in Pozzilli**, in order to monitor the area consisting of the eastern part of the Venafro Plain, between the Meta and Matese mountains, where, in addition to the waste-to-energy plant, chemical industries, private health companies, abandoned construction sites and small inhabited agricultural centres are found. This initiative includes two sampling and analysis campaigns per year concerning the bee population, the three hives and their products, as well as medical-veterinary checks to verify their health and productivity, to limit swarming, and to position and remove the honeycombs. Samples collected from the hives (bees, honey and wax) are **subjected to chemical analyses** at accredited laboratories using certified methods. The information obtained makes it possible to know and quantify the possible effects of the impact of human activities on the environment.

The results obtained show an overall good state of environmental quality. Investigations on honey samples showed an **overall absence** of dioxins, PCBs and pesticides, while as far as anions (chlorides, sulphates and nitrates) are concerned, their presence is **in line with the average values** for Italian honey. Analyses on polycyclic aromatic hydrocarbons (PAHs), whose main source is the combustion of fossil fuels, waste incineration, energy production or asphalt and chemical products, show an environmental condition to which several emission sources contribute, such as traffic, industry, and biomass household heating, typical of the anthropisation of this area, **without a significant impact** from the waste-to-energy plant. The metals present are also due to the presence of abandoned construction sites, industry and infrastructure.

In 2021-2022, the project was also extended to the composting plant with biomethane production in **Sant'Agata Bolognese** (Bo). In spring 2021, three beehives were installed in the plant's facilities, with the aim of monitoring a larger and more complex area, located in the Bolognese plain bordering with the province of Modena, where large and small scale industrial and agricultural activities are located. This

project was carried out in the same way as in Pozzilli: **two sampling and analysis campaigns** were carried out on the bee population and their products (honey and wax), in addition to medical-veterinary checks on their health and productivity. The samples collected from the hives were then subjected to chemical analyses. The results obtained confirm a **state of environmental quality**: the honey produced is **free of heavy metals** such as cadmium and lead, polycyclic aromatic hydrocarbons and pesticides, and its pollen profile is typical of the lower Emilian Apennines.

In 2022, the project was launched with the same model at the **Serravalle Pistoiese landfill**, the results of which highlighted **good environmental quality** with the production of honey free from heavy metals and lead and free from pesticides. Activities continued in 2023 and the results of the analyses will be available in 2024.

In 2023 the project was also extended to the Padua **waste-to-energy plant** and the **Cordenons landfill**, in the province of Pordenone. At the moment the results are not yet available, but significant quantities of honey were produced at the Cordenons landfill.

This biomonitoring project contributes to achieving **UN 2030 Agenda goals 11.6 and 12.4.**