






2. ENERGY - PURSUING CARBON NEUTRALITY

2.01 Objectives, performance and targets

What we said we would do	What we did	SDGs	Progress*
Promoting energy efficiency			
8.6% reduction in Group energy consumption by 2026 and 10% by 2030, compared to 2013.	7.6% reduction in energy consumption at the end of 2023, compared to 2013, thanks to the Group's interventions. (see page 43)	7, 13	
34% of customers by 2026 and 37% by 2030 with at least one energy savings offer for gas and electricity, such as the Consumption Log (27.1% in 2022).	35.7% of family free-market customers by 2023 with at least one energy savings offer for gas and electricity, such as the Consumption Log. (see page 46)		
Continue to promote energy efficiency solutions for condominiums, public administrations and industrial customers.	The offer of energy efficiency solutions for condominiums, public administrations and industrial customers continued in 2023, resulting in a saving of 14.6 thousand tonnes of greenhouse gases. (see page 48)	7, 13	
Continue with energy efficiency measures in public lighting, including replacement with LED light (59% 2026) bulbs (59% by 2026) (were 40.8% in 2022).	Energy efficiency measures in public lighting continued in 2023: 45.3% of light bulbs now LED. (see page 49)	7, 13	
Energy transition and renewables			
44% renewable electricity sold on the free market in 2026 and >50% by 2030 (40.5% in 2022).	42.8% renewable electricity sold on the free market in 2023. (see page 59)		
21% natural gas sold on the free market with CO ₂ offsetting by 2026 and 27% by 2030 (14.2% in 2022).	20.4% of natural gas sold on the free market with CO ₂ offsetting in 2023. (see page 59)	7, 9, 13	
Continue work on existing initiatives for developing hydrogen as an energy vector:	Initiatives to develop hydrogen as an energy vector continued:		
<ul style="list-style-type: none"> Complete the construction of a "power-to-gas" plant in Bologna. Start up, by 2026, the hydrogen production plant at the decommissioned landfill site in Modena, intended to power public transport and local production facilities. 	<ul style="list-style-type: none"> In Bologna, the authorisation process was finalised and authorisation was obtained for the construction of the power-to-gas plant at the wastewater treatment plant. (See page 56) In Modena and Trieste, planning of plants in disused industrial areas commenced and the start of authorisation procedures. (See page 57) 	7, 9, 11, 13	
12 million cubic metres of biomethane produced by 2026 and 30 million by 2030, in new anaerobic digestion plants for the organic fraction of sorted waste (7.7 million by 2022).	8.5 million cubic metres of biomethane produced from organic waste in 2023. (see page 56)	7, 8, 9, 11, 12, 13	
Internal and external development of photovoltaics:	Internal and external development of photovoltaics:		
<ul style="list-style-type: none"> Over 90 MW installed photovoltaic capacity by 2026. Over 2.3 thousand photovoltaic systems sold to Group customers by 2026 (1.5 thousand in 2022). Development of energy communities. 	<ul style="list-style-type: none"> 5.1 MW installed capacity by 2023, increasing by 3 MW also thanks to the plant installed at the Galliera landfill site. (See page 52) Over 2,400 thousand photovoltaic systems sold to Group customers by 2023 since the start of the offer (13.3 MW). (See page. 71) First pilot project of collective self-consumption in Bologna completed. (See page 58) 	7, 9, 13	

What we said we would do	What we did	SDGs	Progress*
Develop smart grids to encourage the electrification of consumption, and increase the capacity of Trieste's electricity grid to receive and manage energy from renewable sources.	Collaboration agreements developed for the digitisation of electricity grids and the development of future smart grids. In Trieste, the design and procurement of preparatory assets to enable increased electrification of consumption continued. (See page 350)	7, 9	
Climate change mitigation			
<ul style="list-style-type: none"> -28% Scope 1 and Scope 2; 100% electricity from renewable sources for domestic consumption (by 2023); -30% Scope 3 from downstream gas sales; -50% carbon intensity index of electricity sales. In brief: -37% reduction in greenhouse gas emissions by 2030 compared to 2019.	<ul style="list-style-type: none"> -17.3% Scope 1 and Scope 2; 100% electricity from renewable sources for domestic consumption; -15.3% Scope 3 from downstream gas sales (excluding services of last-resort gas) -23.8% carbon intensity index of electricity sales. In brief: -13.8% reduction in greenhouse gas emissions by 2030 compared to 2019 (excluding last-resort gas markets). (See page 70)	11, 13	
Launch the Hera Net Zero project in 2023.	Hera Net Zero project launched: scenarios and decarbonisation levers deepened.		

*  Result achieved or in line with planning;  Result with slight variance compared to planning;  Result with significant variance compared to planning;

What we will do	SDGs
Promoting energy efficiency	
9% reduction in Group energy consumption by 2027 and 10% by 2030, compared to 2013.	7, 13
42% of customers by 2027 and 43% by 2030 with at least one energy savings offer for gas and electricity, such as the Consumption Log.	7, 13
Continue to promote energy efficiency solutions for condominiums, public administrations and industrial customers.	
Continue with energy efficiency measures in public lighting, LED light bulbs 61% by 2027.	7, 13
Energy transition and renewables	
56% renewable electricity sold on the free market in in 2027.	7, 9, 13
184 GWh renewable gas produced by 2027 (200 GWh by 2030), through:	
<ul style="list-style-type: none"> 770 tonnes/year hydrogen production by 2027 thanks to the construction by 2026 of plants at the decommissioned landfill in Modena and the waste-to-energy plant in Trieste; Biomethane development: 17 million cubic metres by 2027 through new anaerobic digestion plants for the organic fraction of sorted waste collection and the power-to-gas plant at the Bologna Corticella purifier. 	7, 9, 11, 13
Internal and external development of photovoltaics: within 2027	
<ul style="list-style-type: none"> 152 MW installed photovoltaic capacity at Hera sites and other areas (closed landfills, water cycle facilities, agrivoltaic parks, Energy Parks, etc.); 150 MW of sold photovoltaic power, and development of energy communities. 	7, 9, 13
Development of smart grids to support the electrification of consumption, and increase of the capacity of electricity grids to receive and manage energy from renewable sources:	
<ul style="list-style-type: none"> build 4 primary cabins and 20 additional secondary cabins by 2027; robotise 1,260 secondary cabins by 2027. 	7, 9

Climate change mitigation

Reduction of the Group's greenhouse gas emissions to 2030 with SBTi method compared to 2019 emissions:

- -28% Scope 1 and Scope 2;
- -30% Scope 3 from downstream gas sales;
- -50% carbon intensity index of electricity sales;
- 100% electricity from renewable sources for domestic consumption.

11.13

In brief: -37% reduction in greenhouse gas emissions by 2030 compared to 2019.

Define the Net Zero commitment of the Hera Group and the Plan for 1.5° C climate transition.

2.02 Promoting energy efficiency

Hera Group's primary energy consumption

Hera's energy consumption reflects the multi-business nature of the Group. Hera mainly manages:

- **cogeneration plants** which produce thermal and electrical energy, to cover internal consumption and to power district heating service;
- **waste-to-energy plants** that dispose of waste resulting in electrical and thermal energy recovery;
- **turbo-expanders** that enhance the regulation of pressure in natural gas delivery cabins for distribution in managed local networks;
- enthalpy **geothermal heat recovery systems** in the Ferrara district heating system.

Through its continuous interventions, Hera pursues a policy aimed at **increasing energy efficiency** in all its activities. This energy policy has been made concrete by obtaining the **ISO 50001 energy** certification for Group companies with the highest energy consumption (98.2% of the Group's energy consumption occurs in companies with ISO 50001 energy certification).

[302-1]

The table below shows the **organisation's internal energy consumption**, calculated in terajoules according to the Global Reporting Initiative Sustainability Reporting Standard. The calculation is carried out from data collected mainly from measurements; in 2023 all conversion factors used to calculate energy consumption were updated, adopting the methodology defined by Eurostat ("Energy balance guide: Methodology guide for construction of energy balances & Operational guide for the energy balance builder tool" of 2019), used by the same body for drawing up national and EU energy balances.

The following items are taken into account in the calculation:

- energy consumption from purchased non-renewable fuels and sources (diesel, petrol, LPG, natural gas and waste-to-energy for the 49% non-renewable portion);
- consumption from purchased fuels and renewables (waste-to-energy for the 51% renewable portion);
- consumption of purchased energy vectors (grid electricity and solar thermal energy);
- self-produced energy not involving consumption of other energy sources (biogas from landfills, digesters and sewage treatment plants, biomethane from organic waste, thermal energy from geothermal, electricity from photovoltaics, thermal energy from solar thermal).

The **portion of produced energy sold or transferred to third parties** (electricity fed into the grid, thermal energy sold through district heating and energy services transferred to third parties, biomethane from organic waste sold) is then deducted from these items, to obtain the **net energy consumed within the organisation**.

ENERGY CONSUMPTION WITHIN THE ORGANISATION

Terajoule	2021	2022	2023
Waste (non-renewable share 49%)	6,338	6,136	6,638
Natural gas	6,602	6,324	5,803
Diesel	90	59	83
LPG	4	4	6
Diesel for motor vehicles	394	392	402
Petrol for motor vehicles	14	20	21
Natural gas (CNG) for motor vehicles	17	15	41
LPG for motor vehicles	8	8	7
Non-renewable fuels purchased for consumption	(+) 13,467	(+) 12,957	(+) 13,000
Waste (renewable share 51%)	6,196	6,387	6,849
Renewable fuels purchased for consumption	(+) 6,196	(+) 6,387	(+) 6,849

Terajoule	2021	2022	2023
Electricity from the grid	2,654	2,619	2,572
Solar thermal energy	2	1	1
Energy vectors purchased for consumption	(+) 2,655	(+) 2,620	(+) 2,573
Biogas from sewage treatment plants, digesters and landfills	1,156	1087	909
Thermal energy from geothermal energy	309	328	313
Biomethane from organic waste	277	264	294
Electricity from photovoltaics	8	8	13
Solar thermal energy	0	0	0
Self-generated energy not involving consumption of other energy sources	(+) 1,750	(+) 1,687	(+) 1,529
Electricity fed into the grid	3,573	3,709	3,660
Thermal energy sold	2,267	1,974	2442
Biomethane from organic waste sold	277	264	294
Biogas sold to third parties	168	158	-
Self-produced energy sold/transferred to third parties	(-) 6,285	(-) 6,105	(-) 6,395
Total energy consumption within the organisation	17,784	17,546	17,555

Data does not include Tri-Generazione, Aliplast's foreign subsidiaries and, with regard to fuel consumption, Vallortigara Servizi Ambientali, Recycla and Macero Maceratese. In 2023, the conversion factors used to calculate energy consumption were updated, adopting the methodology defined by Eurostat for drawing up national and EU energy balances.

Net energy consumed within the organisation in 2023 came to **17,555 Terajoules**, this remained stable compared to the previous year (+0.1%). On a like-for-like basis with the previous year, therefore excluding the consumption of the company A.C.R. acquired in 2023, consumption would decrease by 0.5%.

There was an increase in consumption of waste in waste-to-energy plants (+8%, also due to the restart of the special waste plant in Ravenna, which will be shut down for the whole of 2022), diesel for industrial purposes (+39%; on a like-for-like basis, consumption would decrease by 14%) and LPG for industrial purposes (+42%), as well as gasoline (+6%), diesel (+3%) and CNG (+171%) in vehicles (on a like-for-like basis, the difference would be +5%, -4% and -8%, respectively). Electricity consumption from the grid decreased by 2% (the acquisition of A.C.R. is residual in this case). Self-consumption from photovoltaics increased (+67%). Finally, thermal energy sold increased by 24%, especially from HSE plants serving industrial customers, public administration and condominiums.

The share of internally consumed energy from **renewable sources** (renewable share from waste, biogas, geothermal energy, solar thermal energy, grid electricity and photovoltaics) in 2023 was **48.2% of the total** (it was 46.1% in 2022).

Taking into account the reporting obligation E1-5 - Energy Consumption and Energy Mix, as required by the new European ESRS standard, the total energy consumption for the year 2023 is 6,571,376 MWh, this was up by 2% compared to 2022 (+1% on a like-for-like basis). Of this, 43.8% comes from renewable sources (42.8% in 2022). This indicator does not consider self-produced energy sold or transferred to third parties and biomethane produced from organic waste.

[302-2]

Considering the energy that is not consumed within the organisation, but is related to products or services provided by the Group, allows **energy consumed outside the organisation** to be quantified. This calculation includes the consumption of natural gas by customers, the consumption of electricity by customers, in public lighting and in services provided by HSE, the consumption of fuel in vehicles operated by suppliers for waste collection and transport, and the consumption of natural gas in power generation plants in which the Group has a minority interest.

Energy consumed outside the organisation in 2023 amounted to 158,505 Terajoules, 97.5% of which was energy consumed by customers as a result of the sale of natural gas and electricity.

Energy efficiency within the Hera Group

Energy intensity indices

[302-3]

The Group's energy performance can be represented by a number of indicators that show its evolution and prospective targets and illustrate the company's energy saving strategies. Comparing energy consumption with certain production and management indicators can provide **consumption intensity indices** that reflect the improvements achieved by efficiency measures and corporate energy management.

ENERGY CONSUMPTION INTENSITY AND EFFICIENCY INDICES

	2021	2022	2023
Aqueduct: electricity consumption (kWh) / volumes of water fed into the network (m3)	0.46	0.45	0.43
Purification: electricity consumption (kWh) / Volumes of water treated (m3)	0.40	0.43	0.38
District heating: energy consumption (toe) / equivalent energy produced (toe)	1.29	1.32	1.30
Waste-to-energy plants: energy consumption (toe) / equivalent energy produced (toe)	4.6	4.4	4.5
Venue management: energy consumption (toe) / (site volumes x degree days) (m3)	2.4	2.2	2.1
Public lighting: electricity consumption (kWh) / lighting points (no.)	272.3	248.7	217.7
Company fleet: fuel consumption (ktoe eq) / fleet route (km travelled)	0.12	0.13	0.15

This data refers to consumption of electricity, natural gas, diesel, LPG, petrol and waste. For public lighting, consumption takes place in plants and lighting points owned or managed by public administrations. In 2023, the conversion factors used to calculate energy consumption were updated, adopting the methodology defined by Eurostat for drawing up national and EU energy balances. Data does not include Aresgas. 2023 figures do not include A.C.R..

The energy intensity indicator related to the **aqueduct** had improved compared to previous years (-5%): against substantially stable (-0.5%) volumes fed into the grid, electricity consumption was up by 5%.

There was also an improvement in **wastewater treatment** (-11.5%): despite an increase in purified volumes (+10%), electricity consumption fell (-3%).

The **district heating and waste-to-energy sectors** showed an energy intensity in line with previous years (-1% and +0.7% respectively). In district heating, consumption was down by 14% and production was down by 13%. In waste-to-energy, waste consumption was up by 8%, and 7% more energy was produced.

The indicator for the Hera Spa **facilities** (which relates total energy consumption to volume and climate, expressed by degree days (-6%)) in 2023 showed further improvement over previous years, as a result of an increasingly mild climate.

Public lighting also showed an improvement during this year (-13%), thanks to the constant energy efficiency measures carried out on the lighting points managed: despite an increase of 10% in the number of lighting points managed, energy consumption was up by only 3%.

Finally, fuel consumption per km travelled by the **company fleet** increased (+15%): vehicles travelled 16% less distance, but fuel consumption was up by only 4%.

Energy improvement plans

[302-4]

The Group's focus on energy efficiency is evidenced by the **ISO 50001** certification of energy management systems for **11 Group companies**: Hera Spa, AcegasApsAmga, AresGas, Frullo Energia Ambiente, Hera Luce, Hera Servizi Energia, Herambiente, Herambiente Servizi Industriali, Hestambiente, Inrete Distribuzione Energia, and Marche Multiservizi. Overall, **ISO 50001-certified companies recorded a primary energy consumption equal to 98.2 of the Group's total in 2023** (this was up from 97.5% in 2022 due to Herambiente Servizi Industriali also obtaining certification in 2023).

The energy improvement plans drawn up since 2014 as part of the **ISO 50001 energy management systems** envisaged the achievement of the objective of reducing energy consumption by 3% (compared to 2013 consumption) by 2017. By virtue of the positive results obtained, Hera has set increasingly challenging objectives; in fact, the Group's industrial plan envisages that **by 2030** interventions will be implemented, to include the achievement of **savings equal to 10% of consumption** compared to the base year of the Plan (9% as of 2027). The objective is calculated as the average of the objectives that

Hera Spa, Inrete Distribuzione Energia, AcegasApsAmga, Marche Multiservizi, Herambiente, Herambiente Servizi Industriali, Hestambiente and Frullo Energia Ambiente have defined as part of their certification schemes.

To date, significant energy savings have been achieved in the **water cycle**, attesting to the great attention paid by the Group to the sector; in several cases it is a question of optimising purification plants, which have been the focus of huge investments in recent years. In **district heating**, the focus is on maximising heat recovery on existing cogenerators, including with innovative solutions, such as the installation of heat pumps. In several cases, the interventions of Herambiente and its subsidiaries concern **waste-to-energy plants**, which constitute a fundamental part of the Group's plant equipment, and consist of solutions and initiatives to maximise heat recovery and increase energy production. Marche Multiservizi also focuses on **public lighting**, replacing numerous light points and traffic lights with lamps and technologies with lower energy consumption and greater efficiency. Inrete Distribuzione's savings are mainly concentrated in the **natural gas distribution**, and are due both to technological interventions (turboexpanders and innovative control devices) and to behavioural measures. Finally, as regards the efficiency of the **corporate offices**, over the last few years various interventions have been implemented to replace the lighting fixtures of external areas as well as to replace refrigerating units and carry out maintenance on heat exchangers.

ISO 50001 ENERGY IMPROVEMENT PLANS (INTERVENTIONS CARRIED OUT AND PLANNED AT 2023)

Scope of intervention	Interventions carried out and planned (no.)	Annual savings from completed and planned interventions (toe)	Of which interventions carried out (no.)	Of which savings achieved (toe)	Company
Integrated water service	312	9,902	281	9,356	H-A-M
District heating	63	5,377	61	5,134	H
Waste-to-energy plants and landfills	55	3,489	48	3,043	HA
Public lighting	28	1,262	23	1,267	A-M
Energy networks	49	838	43	820	H-A-M
Offices	93	930	83	850	H-A-M
Vehicles and environmental services	23	739	23	739	H-A-M
Total	623	22,537	562	21,209	
	Equal to 8.1% of consumption in the base year of the Plan (2023 Target: 7.7%)		Equal to 7.6% of consumption in the base year of the Plan (2023 Target: 7.4%)		

For Hera Spa, Inrete Distribuzione Energia and Marche Multiservizi the base year refers to consumption for 2013, for AcegasApsAmgail 2014, and for Herambiente, Hestambiente, Herambiente Servizi Industriali and Frullo Energia Ambiente 2020. The savings relate to the consumption of electricity and fuel.

The savings achieved from the actions included in the Energy Improvement Plan were quantified by analysing the consumption recorded in the 12 months following the intervention, and comparing them with the historical consumption prior to the intervention being carried out.

The **562 interventions** carried out at the end of 2023, and included in the Energy Improvement Plan from the base year, allowed a saving of over **21,000 TOE**, equal to 7.6% of base year consumption and corresponding to 888.0 TJ, thus **reaching the target** set for 2023 (7.4%). The 623 total interventions identified at 31 December 2023 to be implemented in the next few years will allow for a reduction in energy consumption of around 22,500 toe (943.6 TJ). The interventions identified by the action plan are mainly concentrated in the water cycle, where more than half of the interventions are expected to be carried out, and 44% of the overall savings in energy consumption will be achieved.

The initiatives of the ISO 50001 energy improvement plan are complemented by further energy efficiency measures planned by **Hera Servizi Energia** and **Hera Luce** on condominiums and other buildings, cogeneration plants at companies, and public lighting systems.

ENERGY EFFICIENCY MEASURES BY HERA SERVIZI ENERGIA AND HERA LUCE COMPLETED AND PLANNED AT 2023

Scope of intervention	Interventions carried out and planned (no.)	Annual savings from completed and planned interventions (toe)	Of which interventions carried out (no.)	Of which savings achieved (toe)
Businesses, condominiums and other buildings	897	6,472	727	5,246
Public lighting	128	14,436	25	12,378
Total	1,025	20,908	752	17,624

The savings relate to the consumption of electricity and fuel.

The 1,072 planned interventions (of which 804 were already completed by 2023, and others are in progress) will generate an expected saving of **21,000 toe** (875.4 TJ) per year, of which around 17,000 have already been achieved (737.9 TJ).

Overall, the Group's 1,314 energy efficiency measures implemented from 2013 to today have taken the form of **savings of approximately 39,000 toe per year** (1,625.9 TJ); also considering the interventions identified and not yet implemented, the expected savings rise to 43,000 toe with 1,648 interventions (1,819.0 TJ), which can be compared to the annual energy consumption of 35 "typical" families (four people consuming 2,700 kWh and 1,200 cubic metres of gas).

White certificates

The system of Energy Efficiency Certificates (Titoli di efficienza energetica, TEE) or **White Certificates** was devised in Italy in 2005 as an incentive tool for energy efficiency, and is based on the theory of tradable permits, which are associated with an economic value and a market. These certificates are obtained as a result of interventions that guarantee **measurable and certified energy savings** (1 TEE is equivalent to saving 1 toe of energy). The system provides for a supply and demand mechanism, with **savings obligations for natural gas and electricity distributors**, which are assigned annual targets to be achieved. The Ministerial Decree of 11/01/2017, last modified by Ministerial Decree 21/05/2021, sets out the obligations of distributors until 2024. These obligations are **increasing** in the 2021-2024 period, following a trajectory consistent with the expected contribution from the mechanism to the achievement of the **national objectives for the reduction of final energy consumption** by 2030, in line with the strategies at the European level. The market value of 1 TEE over time has reached the Parameter values currently predefined by the regulatory framework (€ 250-260/ TEE).

To fulfil its obligations, Inrete Distribuzione Energia makes use of Hera Spa as its **Energy saving company (Esco)**, which has been procuring white certificates for over fifteen years. In 2023 Hera Spa submitted to the Energy Services Manager (GSE) **ten new applications relating to energy efficiency measures**, located mainly in the areas served by the Group. Among those that concern the Group itself, there are efficiency measures on district heating systems and at systems for the management of the water cycle. Furthermore, AcegasApsAmga is active in the submission of public lighting service projects relating to redevelopment works implemented by Hera Luce in the municipalities in which it operates. The Hera Group's energy efficiency promotion activity continues both internally and externally, on the one hand with the implementation and improvement of the ISO 50001 certified energy management system, on the other with the participation at industry events and conferences.

WHITE CERTIFICATE TARGETS

toe	2021	2022	2023
Gas distribution	56,990	86,203	123,450
Electricity distribution	5,256	8,490	11,670
Total	62,246	94,693	135,120

In 2023, the Hera Group submitted to the GSE projects for energy efficiency certificates equal to 20,244 toe; in the same year, the GSE approved projects presented by the Group totalling 13,759 toe.

As part of the **initiatives to promote energy efficiency**, Hera Spa has continued the partnership started in 2019 with researchers from the **Milan Polytechnic University**, who are experts in behavioural psychology and statistical sciences to develop scientifically valid programs for measuring and verifying savings. The partnership provides for the **validation of the energy savings obtained as a result of optimisation interventions** inside homes, in industrial plants, in the tertiary sector and in the public administrations, due to the **induction of virtuous behaviours** achieved with methodologies that refer to Behavioural Sciences.

As part of the initiatives aimed at increasing customers' awareness of the impact of their behaviour, in 2020 Hera Comm launched the **"Consumption Log"** service, which allows customers and residents to receive personalised advice useful for saving energy and, more recently, of water and matter (see the case study "The Consumption Log" the attachments to this report for further information). The savings results were **certified by the Energy Services Manager**, which assessed a dedicated project presented by the Group eligible for the White Certificates mechanism. By the end of 2023, **5,077 toe of energy savings had been certified** (approximately 2.5%); these were related to the behaviour of the users involved in the initiative, through a subdivision into lots by which the project was gradually extended over time to new subjects.

Energy efficiency for families

Also in 2023, the Hera Comm Group's commitment to energy efficiency is confirmed with the offer of various value-added services that allow household customers to **monitor and reduce their consumption**.

All customers on the free market can request **free** activation of the **Consumption Log**, a digital service that allows them to receive personalised reports deemed useful for comparing their electricity, gas and district heating consumption not only with that of the previous year but also with that of similar customers in terms of size, type of house, province and energy use. The report, currently active on more than **one million energy supply points** (electricity, gas and district heating) in the free market, aims to make customers **constantly aware of their consumption habits over time** and the potential effects of their optimisation by sharing personalised information pills that help them consume less and better. All data is also accessible on the platform and in the dedicated section of the MyHera app.




The adoption of second-generation electronic meters (smart meters) and the consequent availability of high-frequency data makes possible more in-depth and diversified analyses of consumption and behaviour, hence greater customisation of reports, more dynamic content, and the design of new information strategies that are not only based on energy savings, but also on the distribution of usage within the day, and above all of the household.

HOUSEHOLD FREE-MARKET CONTRACTS WITH CONSUMPTION LOG

	%	2021	2022	2023
Electricity contracts		37.9%	37.7%	38.0%
Gas contracts		31.6%	30.4%	31.1%
District heating contracts		7.9%	7.4%	7.0%

Figures do not include the company AresGas. Figures for 2022 do not include the companies Eco Gas and Con Energia.

How does this initiative contribute to responsible digital transformation? Benefits obtained in the Corporate digital responsibility realm (see the dedicated paragraph entitled "Corporate Digital Responsibility")

Social		A customised service that helps customers effectively understand the environmental and economic effects of their behaviour and provides advice through applications for waste reduction. The report can be consulted on various apps (Online Services and MyHera App).
Environmental		Creation of a digital service aimed at promoting and communicating more sustainable behaviour, with less waste and greater customer awareness of consumption habits.
Economic		Quantification of savings related to the reduction of waste caused by more sustainable consumption habits.

The **Hera Led** option allows purchasing up to two **kits of ten LED** bulbs for each contract with a 30% discount on their market value, and can be combined with numerous free market offers from Hera Comm, both for those signing a new contract both for those who are already customers. Replacing an incandescent light bulb with a highly efficient LED one can lead to **energy savings of up to 80%**. From the technical specifications of the products, it can be seen that a 9W LED bulb is able to replace a 60W incandescent bulb: considering an average daily use of four hours a day, the consumption of a LED bulb is equal to about 13 kWh/year against the 88 kWh/year of an equivalent incandescent light bulb, with obvious savings for the bill and for the environment.

Since 2023, the “**Hera Led Smart**” offer has been added, which includes the sale of **LED bulb kits with advanced features** (such as remote on/off and colour and intensity modification) that combine the advantages of LED technology with greater convenience and a better user experience.

Hera Thermo is the option that allows **monitoring gas consumption** by the installation of a smart thermostat even remotely. Its use leads to greater attention to consumption methods: through a mobile app it is in fact possible to check the temperature set in the house at any time and check the functioning of one’s boiler. Such easy monitoring allows customers to become more aware of their consumption and to reduce any waste, for example, by decreasing the set temperature in certain time slots and optimising the system’s on and off cycles. The literature has demonstrated that reducing the temperature set in the home by 1°C leads to gas savings in the winter season of between 5% and 10% (Source: Enea).

The options **Hera Clima**, **Hera Caldaia** (enhanced by the **Hera Caldaia ibrida in pompa di calore** version) and **Hera Scaldacqua**, continued throughout 2023. These offer turnkey sales and installation of high-efficiency heat pump air-conditioners, condensing boilers, (for which customers can benefit from the tax deductions provided) and water heaters, respectively,

FREE MARKET HOUSEHOLDS END OF YEAR CONTRACTS WITH ENERGY EFFICIENCY SOLUTIONS

Number	2021	2022	2023
Electricity contracts at the end of the year with at least one solution for saving electricity (% of total free market household contracts)	36.1%	38.7%	40.0%
Gas contracts at the end of the year with at least one solution for saving gas (% of total free market household contracts)	28.8%	30.5%	31.9%
Electricity and gas contracts at the end of the year with at least one energy saving solution (% of total free market household contracts)	32.1%	34.3%	35.7%

Figures do not include the company AresGas. Figures for 2022 do not include the companies Eco Gas and Con Energia.

As of 2023, free market contracts with at least one energy efficiency service (Electricity Consumption Log, Hera Led, Hera Led Smart, Hera Clima, Gas Consumption Log, Hera Thermo, Hera Caldaia e Hera Scaldacqua) number more than 910,000 and represent **35.7% of the total** (about 2.6 million). These **were up 19%** compared to 2022 (they were about 762,000).

Specifically, contracts with at least one electricity saving solution accounted for 40.0% (481,000 contracts, +22%) of the total (1.2 million), while those with at least one gas saving solution accounted for 31.9% (429,000 contracts, +17%) of the total (1.3 million).

By 2027, the **target** is to reach 42% of free market energy contracts with at least one energy saving option active (43% by 2030).

The indicator is calculated excluding contracts relating to safeguarding, default and last-resort supply services since, by their nature, it is not possible to propose offers in line with the Group’s commercial strategy in these markets. Including the service under safeguard, 29.7% of contracts have at least one energy efficiency service active (27.1% in 2022). In this case, the target for 2027 is to reach 33% of energy contracts on the free, protected and gradual protected markets with at least one energy saving option.

Finally, if last resort services are also considered, the indicator shows a spread of such options at 29.2% of customer households (26.6% in 2022).

Energy efficiency for condominiums

The Hera Group, through its subsidiaries **Hera Servizi Energia (HSE)**, actively operates in the energy efficiency sector with a wide range of services, mainly addressing condominiums, large industrial customers and the public administrations.

HSE is active in the field of **energy upgrading of condominiums**, with interventions on opaque and transparent surfaces as well as modernisation of thermal or electrical energy production units through the installation of **renewable systems** (solar thermal and photovoltaic) and **high-efficiency thermal power plants**. Modernisation of energy production units combined with the development of **thermoregulation systems** makes it possible to achieve significant reductions in condominium consumption. The replacement of a gas-fired power plant with a photovoltaic and heat pump system allows zero greenhouse gas emissions from energy consumption.

For the above-mentioned condominiums, **complete thermal energy management** is also envisaged through “Energy Service” contracts. At the end of 2023, there were 400 condominiums with an active energy service (they were up compared to 236 in 2022), and estimated savings with this integrated solution are equal to approximately **20% of total gas** consumption.

Condominiums that carried out simultaneous energy upgrades on surfaces combined with the upgrading of thermal energy production units achieved **savings from 30% to over 50% of consumption**.

As a result of the credit transfer and the energy service contract, moreover, interventions resulted in low and in many cases even zero outlays for customers. Indeed, the commercial solutions are **integrated with the transfer of credit** relating to so-called 110% Super Ecobonus, Ecobonus and Sismabonus for the energy and structural redevelopment of buildings, leaving the possibility for each condominium to independently choose the solution that best suits their own resources. The customer can choose whether to bear the cost of the interventions carried out and therefore deduct the amount on his tax return, transfer the tax deduction and pay the excess amount at the end of the work, or opt for the solution that allows no-cost works by integrating the transfer of credit with the financing of the residual amount, also combined with an energy service with a guarantee of energy savings and, therefore, a reduction in heating costs.

The professionalism and experience of HSE allowed the management of a total portfolio of **approximately 1,600 condominiums** energetically upgraded during 2023, with an improvement of at least two energy classes, divided between energy service and redevelopment works, confirming the trend of previous years (and 1,150 in 2022).

Energy efficiency for companies

The Hera Group offers multi-year **service contracts for the decarbonisation of consumption** through the creation and management of **renewable photovoltaic energy production** or **efficient energy in cogeneration and trigeneration** set-up dedicated to guaranteeing all the primary energy needs of customers.

With **photovoltaic energy** it is possible to significantly reduce the greenhouse gas emissions required for customers’ production processes, just as with **cogeneration** and **trigeneration** it is possible to simultaneously produce electricity, heat and cooling and save primary energy compared to traditional consumption configurations, reducing emissions, achieving greater energy efficiency and reducing supply costs. Examples of industries in which this service is offered are plastics, food, pharmaceuticals, ceramics and the large tertiary sector (condominiums, museums, shopping centres, and wellness centres).

The offer envisages the **supply of all energy carriers** by Hera Servizi Energia (HSE), reducing a customer’s financial and management commitments. Based on the customer’s energy needs, HSE identifies the characteristics of the technological system, takes care of preparing all the permit documents, and runs and manages the system.

At the end of 2023, there were **28 active customers with decarbonisation contracts** managed by HSE, including one with photovoltaic production units, six in trigeneration and 21 in cogeneration. The goal for 2027 is to reach 50 industrial customers for HSE energy services. The **environmental benefits** achieved by these plants in 2023 can be quantified in lower emissions of **around 14.500 tonnes of greenhouse gases** and in primary energy savings of 6,630 toe (equivalent to the average annual energy consumption of around 5,400 typical households).

Drawing from its extensive experience in the energy upgrading of public lighting systems, **Hera Luce** has recently broadened its field of action by also proposing itself as a partner for companies and private entities for **energy efficiency upgrades of indoor lighting systems**.

In fact, an energy efficiency project for the private sector was carried out in 2023, with **lighting and energy upgrades** at the workplaces of a ceramic factory. Artificial lighting systems had to be optimised for all spaces:

- lighting requirements in terms of intensity and spectral content were identified;
- spaces and activities were planned so as to optimise the use of natural light;
- specific luminaires were selected for professional uses, in line with the minimum specifications indicated by the UNI EN 1246-1 standard (Light and lighting - Lighting of workplaces - Part 1: Indoor workplaces);
- finally, staff were trained in the efficient use of luminaires.

Estimated energy savings as a result of this project is of 26%.

In view of this experience, which is positive for both parties involved, Hera Luce intends to propose energy efficiency solutions to an increasing number of customers and private companies.

Finally, Hera Spa enters into **agreements with companies** throughout Italy, collaborating in the field of energy efficiency through the mechanism of Energy Efficiency Certificates (White Certificates) for which, through its subsidiary Inrete Distribuzione Energia, it is an Obligated Party pursuant to Ministerial Decree 28/12/2012. Specifically, the company assists businesses in obtaining Energy Efficiency Certificates, ensuring they receive the majority of the associated economic benefits. In 2023, there will be 12 active contracts.

Energy efficiency for public administrations

On the market for **public administrations**, Hera Servizi Energia (HSE) operates by means of tenders for works and integrated services also related to public-private partnership proposals, a contractual formula that allows for significant **investments aimed at reducing greenhouse gas emissions** through the production of renewable electricity through photovoltaics, the production of efficient thermal energy through solar systems, new condensing boilers and heat pumps, as well as the reduction of the energy necessary to maintain the comfort of buildings by insulating the building structures with the installation of thermal insulation and the replacement of more performing windows.

The most energy-relevant solutions proposed to customers concern interventions on buildings in which, in addition to energy upgrading, **seismic improvement** and “**net-zero-emission**” conversion or construction is combined.

The offer is completed by a modern integrated energy management through the “Energy Service” and “Energy performance contract” contract models. The above proposals make it possible to finance energy efficiency interventions with the same energy savings that the interventions generate, keeping unchanged the current expenditure of the institution receiving the proposal.

HSE is also involved in public administration tenders in the areas of facility management and operation and maintenance.

As a result of the energy service tenders won, HSE made **energy efficiency interventions coming to more than 15 million euro** during 2023.

Savings from 6 to 49% can be achieved with several interventions, based upon consumption and interventions already carried out on buildings, and which can be combined with the seismic retrofitting of buildings. Thanks to the demolition and construction of buildings with zero net emissions, even greater savings can be achieved. The environmental benefits achievable in 2024 due to the main energy upgrades carried out in 2023 are quantifiable in lower emissions of about **153 tonnes** of greenhouse gases. The target for 2027 is to carry out upgrades that will achieve environmental benefits of about 14 thousand tonnes of greenhouse gases saved.

Energy efficiency in public lighting

Two Hera Group companies, **Hera Luce** and **Marche Multiservizi**, manage **638,000 lighting points** (+5% compared to 2022) ensuring the efficiency of the public lighting service in 210 municipalities in 12 regions: Emilia-Romagna, Veneto, Friuli-Venezia Giulia, Marche, Umbria, Lombardy, Lazio, Tuscany, Piedmont, Abruzzo, Sardinia and Valle d’Aosta. In some local areas, traffic light installations are also operated, totalling more than **10,000 traffic lights**.

LIGHTING POINTS AND TRAFFIC LIGHTS MANAGED

Number	2021	2022	2023
Municipalities served (no.)	184	197	210
Lighting points at 31/12 (no.)	562,775	608,370	637,956
<i>of which LED (%)</i>	<i>39.4%</i>	<i>40.8%</i>	<i>45.3%</i>
<i>of which with management systems for optimising consumption (%)</i>	<i>80.2%</i>	<i>74.5%</i>	<i>80.3%</i>
Traffic lights (n.)	10,402	10,744	10,342
<i>of which LED (%)</i>	<i>65.6%</i>	<i>58.5%</i>	<i>60.7%</i>

At **80.3%** of the lighting points operated by the two companies, **management systems for optimising consumption** (reduction of intensity, partial switch-off, etc.) are in operation, a ratio that increased compared to the previous year as a result of the installation of these solutions on the numerous lighting points acquired. The managed lighting points in which LED lamps are used were up (**45.3%**, +4 p.p.). Lastly, **95.6%** of lighting points managed use **low energy consumption lamps** (understood as non-mercury vapour lamps, class G according to the application of the energy qualification system developed by Hera Luce on the basis of the Minimum Environmental Criteria), a value compared to the previous year that was slightly down in percentage terms (they were 96.7%) but was up in absolute terms (+4%) as a result of the numerous lighting points acquired during the year on which these solutions have not yet been fully installed.

The goal is to reach 61% LED lamps in managed lighting points by 2027.

Also in 2023, Hera Luce's commercial effort aimed at consolidating the area served and expanding the area of influence, offering potential customers smart solutions for their respective cities. Among these proposals, of particular relevance is the **commitment to energy efficiency**, which is possible thanks to the installation of **low-consumption systems and, above all**, the latest **technology LEDs**. Considering the municipalities managed by Hera Luce in 2023:

- in 118 municipalities **only electricity from renewable sources** is used; the consumption of electricity in these municipalities is equal to 52.9% of total consumption;
- in 102 municipalities electricity consumption is **less than 50 kWh/inhabitant** (calculated considering residents and tourists); 54.9% of total electricity is consumed in these municipalities. The threshold of 50 kWh/inhabitant was defined taking as reference the European average of consumption for public lighting, equal to 51 kWh/inhabitant (Censis Report 2017);
- in 48 municipalities **all lighting points managed are LED** (13.9% of total consumption).

In total, 145 municipalities served by Hera Luce have implemented one or more of these three good environmental practices (use of renewable sources, low electricity consumption, LED lamps) with a consumption equal to 80.3% of the total.

Furthermore, Hera Luce is engaged in the finalisation of numerous public-private partnership projects through the project finance instrument. The projects presented provide for the **energy upgrading and safety** of public lighting systems, in compliance with the minimum environmental criteria for public lighting (Cam) for **lighting fixtures** (which came into force in 2017) and for the **public lighting service** (entered into force in 2018). Among the criteria for awarding tender procedures, **references to the circular economy** and the drafting of a specific document capable of demonstrating a particular efficiency deriving from the ability to recycle and dispose of the resources are becoming increasingly more frequent. Hera Luce has put forward Project financing proposals for which it has been appointed the Sponsor in four municipalities.

During 2023, Hera Luce completed energy efficiency works in 23 municipalities. Overall, the interventions carried out by Hera Luce in 2023 resulted in an **annual saving of 20,552 MWh of electricity** (about 3,840 toe): considering the average electricity consumption of a 'typical' family (four people consuming 2,700 kWh per year), this annual saving can be estimated at about 7,600 households and in **avoided greenhouse gas emissions of about 5,200 tonnes**.

Hera Luce has also initiated the assignment and management of projects aimed at enhancing the efficiency of public lighting systems in 29 municipalities.

The most representative municipalities in terms of absolute toe savings in 2023 are: Ferrara (Lot I and Lot II), Limbiate (MB), Scandicci (FI) and Lignano Sabbiadoro (UD).

Hera Luce continues **development activities** linked to a variety of actions and partnerships established in previous years:

- updating of the Minimum environmental criteria for public lighting and definition of the new lighting Services Cam, as a member of the dedicated working group set up by the Ministry of the Environment, and Land and Sea Protection;
- dissemination of the “culture of light”;
- system for monitoring the performance of lighting fixtures in line with the Cams, in collaboration with the Ministry of the Environment, and Land and Sea Protection;
- development of models aimed at offering local administrations tools that allow them to understand the process of analysis and evaluation of energy efficiency activities, obtain information on the actions to be undertaken for an energy upgrading programme, and obtain an initial estimate of the costs of the interventions and the achievable benefits;
- analysis of new lighting technologies with evaluation of costs/benefits and future development possibilities in collaboration with various universities;
- development of projects aimed at making public lighting evolve towards the development of smart cities using the public lighting infrastructure;
- development of partnerships with private companies for energy-efficient indoor lighting systems;
- support for the development of Loomo, a lighting fixture for urban environments developed and manufactured from recycled plastic by Aliplast in partnership with Niteko. Loomo by Lorelux is an “infinitely circular” streetlight because it is made from recycled plastic and at the end of its life can be recycled again in a perfect example of circular economy. Furthermore, Loomo can be disassembled, a feature that allows the lighting body to be easily repaired, thus counteracting planned obsolescence and extending the product’s useful life. At Ecomondo 2023, Niteko and Hera Luce presented Loomo-IN, the new luminaire dedicated to lighting interior spaces;
- development of the project on the circular economy, with the drafting of the specific document capable of demonstrating a particular efficiency deriving from the ability to recycle and dispose of the resources used, for projects presented in the tender, using a tool for measuring the circularity of materials by third parties in 2022 (see the case study [“The evaluation and measurement of circularity in Hera Luce”](#) for additional information).
- participation in the preliminary and final public enquiry of the Uni En 11820 standard to measure its level of circularity to reaffirm its commitment to sustainability.

2.03 Energy transition and renewables

Renewable energy production facilities and overall production

The Herambiente Group produces energy from the **combustion of waste** through nine waste-to-energy plants, with a total installed electrical power of 126.6 MW. Eight of these waste-to-energy plants are dedicated to **urban waste** and, as better described later, their power and the energy they produce can be considered **51% renewable** (equal to the biodegradable portion of the processed waste). Furthermore, thermal energy is also recovered in four of these waste-to-energy plants: three of them are dedicated to feeding the nearby district heating networks (in Ferrara, Forlì and Granarolo dell'Emilia), and one feeds the neighbouring waste treatment plant (in Modena).

The Ferrara district heating plant is also thermally supported by **geothermal wells** located in Casaglia, for a potential 14.0 MW, thanks to which heat is drawn from the subsoil: in this case, geothermal energy represents the priority source of the district heating, to which is added the energy supplied by the waste-to-energy plant and, lastly, by traditional back-up boilers.

Herambiente owns the **anaerobic digestion plants** of Sant'Agata Bolognese and Spilamberto, dedicated to the production of biomethane (14.4 MW in total), and the **biodigestors** in Rimini, Voltana di Lugo and Rimini Ca' Baldacci, where there are **cogeneration biogas plants** for a total electrical power of 2.5 MW. A number of biogas exploitation plants are also active in 11 **landfills** (27.0 MW in total).

As part of the integrated water system, 3.5 MW of electricity are installed in **biogas cogeneration plants** located in seven wastewater **treatment** plants managed by the Group (Bologna, Cesena, Forlì, Modena, Padua, Savignano sul Rubicone and Trieste). The electricity produced is typically self-consumed within the sites themselves.

Photovoltaic plants are also installed at various sites, with a total capacity of about 5.1 MW. This includes the installation in 2023 of three plants with a capacity of 1.0 MW each at the Galliera landfill site in Bologna, the Biorg site in Spilamberto, and the Ducati Energia site in Bologna (the latter managed by HSE and not yet active as of 2023).

In addition to the aforementioned renewable energy production plants, the Hera group also manages plants that produce energy efficiently, including the **Imola cogeneration plant** (82.0 MW of electricity) and other smaller **cogeneration and trigeneration plants** (another 61.7 MW of total electricity) installed both to serve some district heating networks and industrial customers.

Finally, in the gas distribution branch, Inrete Distribuzione Energia and AcegasApsAmga manage six **turboexpanders** for approximately 8.4 MW of nominal electrical power located in Bologna, Ferrara, Forlì, Padua and Ravenna, which produce electricity starting from the pressure reductions inside some suitable gas cabins, without direct greenhouse gas emissions.

Overall, the Hera Group has 105 energy production plants, for a **total of 345.3 MW** installed. Of these, 128.6 MW are **renewable sources** (37.2% of the total).

HERA GROUP ENERGY PRODUCTION PLANTS BY LOCAL AREA (2023)

Province	Biogas and biomethane	Photovoltaic	Geothermal	Waste-to-en.	Turbo-expand.	Cogeneration
Bologna	7 plants* (24.7 MW)	7 plants (2.2 MW)	-	1 plant (26.5 MW)	2 plants (1.6 MW)	11 plants (108.0 MW)
Ferrara	-	1 plant (3 kW)	1 plant (14.0 MW)	1 plant (13.1 MW)	1 plant (2.1 MW)	-
Forlì-Cesena	5 plants (3.5 MW)	1 plant (20 kW)	-	1 plant (10.9 MW)	1 plant (1.4 MW)	11 plants (14.3 MW)
Modena	3 plants* (6.2 MW)	2 plants (1.0 MW)	-	1 plant (18.9 MW)	-	4 plants (5.8 MW)
Padua	1 plant (0.3 MW)	-	-	1 plant (14.0 MW)	1 plant (2.3 MW)	2 plants (0.6 MW)
Pesaro-Urbino	-	1 plant (5 kW)	-	-	-	1 plant (1.0 MW)
Ravenna	4 plants (10.3 MW)	6 plants (0.9 MW)	-	1 plant (5.0 MW)	1 plant (1.0 MW)	2 plants (3.0 MW)
Rimini	1 plant (1.0 MW)	2 plants (0.2 MW)	-	1 plant (10.9 MW)	-	-

Province	Biogas and biomethane	Photovoltaic	Geothermal	Waste-to-en.	Turbo-expans.	Cogeneration
Trieste	1 plant (0.3 MW)	4 plants (0.2 MW)	-	1 plant (14.0 MW)	-	-
Other provinces**	1 plant (1.3 MW)	3 plants (0.6 MW)	-	1 plant (13.4 MW)	-	8 plants (10.9 MW)
Total	23 plants (47.5 MW)	27 plants (5.1 MW)	1 plant (14.0 MW)	9 plants (126.6 MW)	6 plants (8.4 MW)	39 plants (143.7 MW)

The data in this table does not include the thermal energy production plants from thermal plants managed by Group companies, and thermal power is considered only for the geothermal plant.

* of which one biomethane production plant

** Florence, Perugia, Isernia, L'Aquila, Piacenza, Pordenone, Treviso, Udine and Vicenza

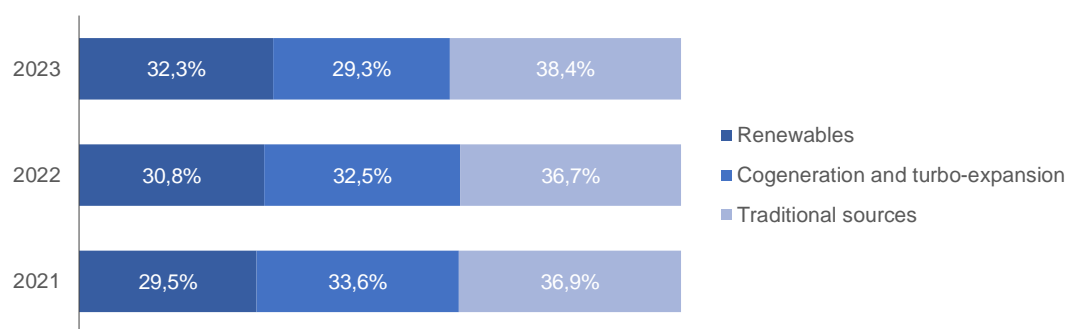
TOTAL ENERGY PRODUCTION

GWh	2021	2022	2023
Waste-to-energy (51% renewable)	453.5	474.6	501.4
Geothermal	85.7	91.2	87.0
Biomethane	75.8	72.2	80.6
Combustion of biogas from landfills	39.1	35.4	36.1
Combustion of biogas from digesters	25.5	25.2	23.2
Combustion of biogas from waste treatment plants	16.5	15.3	12.5
Photovoltaic	2.2	2.2	3.6
Total renewable sources	698.3	716.1	744.3
Cogeneration	514.1	511.5	406.5
Industrial cogeneration at third parties	268.2	231.9	261.3
Turbo-expansion	8.3	12.2	7.6
Total cogeneration and turbo-expansion	790.6	755.6	675.4
Waste-to-energy (49% non-renewable share)	455.8	456.0	483.0
Thermal power stations	414.7	398.1	405.3
Total traditional sources	870.5	854.1	888.3
Total electricity and thermal energy produced	2,359.4	2,325.8	2,308.0

The data in the table refers to the items Self-generated energy not involving consumption of other energy sources and Self-produced energy sold/transferred to third parties of the GRI 302-1 indicator.

The total energy generated by the Group's plants in 2023 (electricity, heat and biomethane) amounted to **2,308.0 GWh**, which is stable compared to the previous year (-0.8%). Of this, 61.5% comes from **renewables** or **cogeneration** and **turbo-expansion plants**, and was down slightly from 63.3% in 2022 due to increased production in traditional sources (+4%).

TOTAL ENERGY PRODUCTION



In detail, **energy generated from renewable sources** in 2023 is 744.3 GWh, i.e. **32.3% of the total**, was up by 4% compared to the previous year due to more waste combusted in waste-to-energy plants (+6%), greater production from photovoltaic energy (+67%; of note here is the installation of two plants of 1 MW each, one by the Biorg company and one at the Galliera landfill), and greater production of biomethane (+12%). On the other hand, the production of energy from the combustion of biogas generated by landfills, digesters and waste treatment plants (-5%) and extraction of Geothermal energy (-5%) was down.

The share of energy produced by **cogeneration plants and turbo-expanders** is 29.3% and was down 11% mainly due to lower production from the Group's cogenerators (-21%) and turbo-expanders (-38% due to revamping work on the Ravenna Bassette plant). On the other hand, production from HSE plants installed at industrial customers increased (+13%).

Electricity production

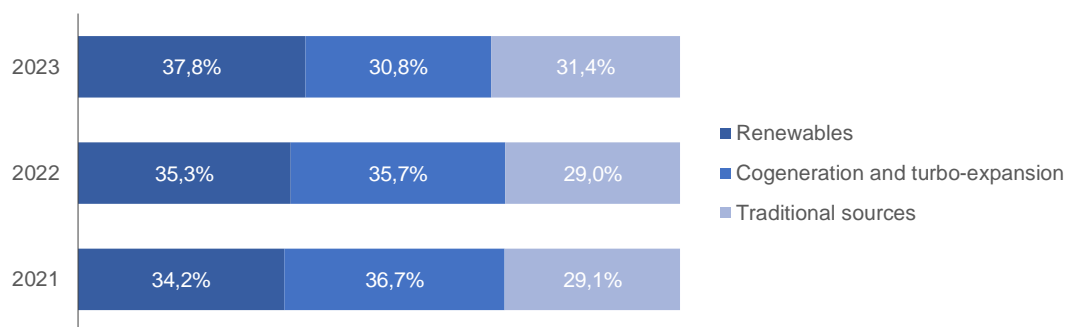
The following table shows the **gross electricity production** of the Group's plants, which also considers the energy necessary to meet consumption that is required for production itself (auxiliary consumption).

ELECTRICITY PRODUCTION

	GWh	2021	2022	2023	Installed power (2023, MW)
Waste-to-energy (51% renewable)		386.3	411.2	442.1	62.0
Combustion of biogas from landfills		39.1	35.4	36.1	13.4
Combustion of biogas from digesters		25.5	25.2	23.2	3.0
Combustion of biogas from waste treatment plants		7.6	7.4	6.6	3.6
Photovoltaic		2.2	2.2	3.6	4.1
Total renewable sources		460.6	481.3	511.5	85.2
Cogeneration		322.2	330.3	263.7	117.1
Industrial cogeneration at third parties		163.2	144.3	146.0	30.1
Turbo-expansion		8.3	12.2	7.6	8.5
Total cogeneration and turbo-expansion		493.8	486.9	417.3	155.6
Waste-to-energy (49% non-renewable share)		391.2	395.1	426.1	64.6
Total traditional sources		391.2	395.1	426.1	64.6
Total electricity		1,345.6	1,363.2	1,354.8	305.5

The **total gross electricity** generated by the Group's plants in 2023 is equal to **1,354.8 GWh**, this was a slight increase compared to the previous year (-0.6%). **68.6% comes from renewable sources and cogeneration and turbo-expansion plants** (71.0% in 2022).

ELECTRICITY PRODUCTION



In particular, the production of **electricity from renewable sources** in 2023 is 511.5 GWh, **37.8% of the total**. This value increases by 6% thanks to greater production from waste-to-energy plants (+8%) and photovoltaics (+67%); on the other hand, the contribution from the combustion of biogas produced by landfills, digesters and sewage treatment plants was down by 3%.

Production from **cogeneration and turbo-expansion** accounted for 30.8% of the total, due to less use of the Group's cogenerators (-20%) and revamping work at the Ravenna Bassette turbo-expander (-38%).

Finally, the electricity produced from traditional sources increased by 8%, which in 2023 constitutes 30.8% of the total generated; however, this is **highly efficient** production, as it derives from the waste-to-energy treatment for the portion exceeding 51% (considered biodegradable) and, therefore, classified as energy from recovery processes.

The incentive for the production of electricity through **green certificates** is granted to plants fuelled by renewable sources, which entered into operation by 31 December 2012, and to cogeneration plants combined with district heating networks, which entered into operation by 31 December 2009. Since 2016, any residual right to the issue of green certificates has been converted into a tariff ("**GRIN**" **Tariff**), as envisaged by the Ministerial Decree of 6 July 2012.

In the case of electricity obtained from **waste**, the energy allowed for incentive purposes, and to which the aforementioned multiplier coefficients are applied, is limited to the portion produced from the biodegradable fraction of waste, as it is considered a renewable source by European and national standards. The Ministerial Decree of 6 July 2012 defines the criteria for evaluating this quota on a flat-rate basis, set at **51%** in the case of waste-to-energy plants fuelled by urban waste downstream of separate waste collection. In calculating the share of energy produced from renewable sources, therefore, 51% of both electrical and thermal energy produced by the waste-to-energy plants was considered by applying the flat-rate criteria. This percentage was hypothetically applied to all the waste disposed of in waste-to-energy plants (urban and special) and for all three years considered, in order to have homogeneous and defined terms of comparison in line with current legislation. An exception is the special waste waste-to-energy plant in Ravenna, whose production, taking into account a practically zero biodegradability coefficient in the special waste disposed of due to its origin from industrial-type processes, is considered entirely non-renewable.

For cogeneration plants, the Ministerial Decree of 4 August 2011, implementing Legislative Decree 20/2007, establishes the methods for calculating the production from cogeneration, and for determining the efficiency of the cogeneration process for the purposes of qualifying as **high-efficiency cogeneration**. The subsequent Decree of the Ministry of Economic Development of 5 September 2011 established the support mechanism for cogeneration: the incentive is part of the **white certificates** market and is recognised by the Energy Services Manager, after the recognition of the qualification of "High efficiency cogeneration", based on the actual primary energy savings. This incentive is valid for 10 years, 15 if the plants are combined with district heating networks. In 2023, there were five plants covered by the support mechanism (Barca, San Biagio, Bufalini, Ecocity and Giardino following refurbishment of one of the three production units), as the rest have exhausted their incentive period.

Thermal energy production

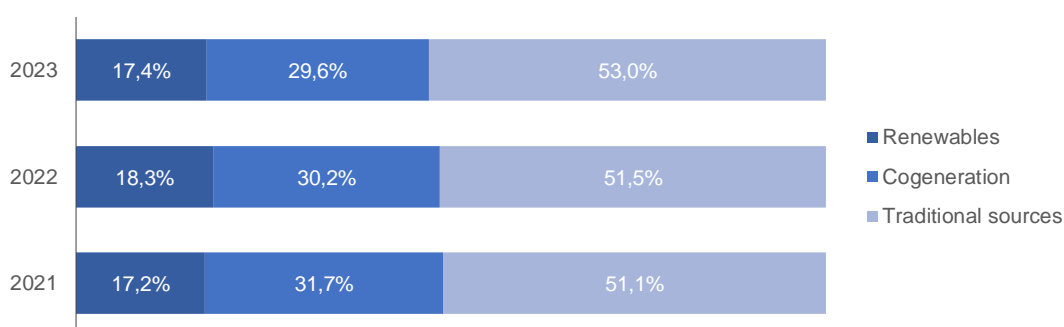
The following table shows the **production of thermal energy** from the Group's plants.

THERMAL ENERGY PRODUCTION

GWh	2021	2022	2023	Installed power (2023, MW)
Waste-to-energy (51% renewable)	67.2	63.4	59.3	38.7
Geothermal	85.7	91.2	87.0	14.0
Combustion of biogas from waste treatment plants	8.9	7.9	6.0	1.8
Total renewable sources	161.8	162.5	152.2	54.6
Cogeneration	191.9	181.2	142.8	109.7
Industrial cogeneration at third parties	105.0	87.6	115.3	30.2
Total cogeneration	296.9	268.8	258.1	139.9
Thermal power stations	414.7	398.1	405.3	516.0
Waste-to-energy (49% non-renewable share)	64.6	60.4	57.0	37.2
Total traditional sources	479.3	459.1	462.3	553.2
Total thermal energy	938.0	890.4	872.6	747.7

The total **thermal energy** generated by the Group's plants in 2023 is equal to **872.6 GWh**, and was down by 2% compared to the previous year. **47.0% comes from renewable sources and cogeneration plants** (48.4% in 2022).

THERMAL ENERGY PRODUCTION



Specifically, **thermal energy production from renewable sources** in 2023 was 152.2 GWh (-6% compared to 2022), constituting 17.4% of the total generated: energy recovery from waste-to-energy plants (-7%) and from the combustion of biogas in wastewater treatment plants (-25%), as well as extraction of geothermal energy (-5%) were down.

Thermal production from **cogeneration**, which accounts for 29.6% of the total, decreased by 4% overall due to less use of the Group's cogenerators (-21%).

Finally, the electricity produced from traditional sources remains stable, which in 2023 constituted 53.0% of the total. However, 12.3% of this production is **highly efficient** as it derives from the waste-to-energy treatment for the portion exceeding 51% (considered biodegradable) and, therefore, classified as energy from recovery processes.

Biomethane development

In 2023, the **total production of biomethane** reached **8.5 million cubic metres** (corresponding to 80.6 GWh), of which 7.0 from Herambiente's Sant'Agata Bolognese plant, which has now been in operation

for five years, and 1.5 from the Spilamberto plant of the subsidiary Biorg, which saw its first year of full operation in 2023. The two plants also produced **24,000 tonnes of compost**.

This production was achieved through the treatment of **approximately 160,000 tonnes** of municipal organic waste, lignocellulosic waste, sludge and other liquid agro-industrial waste. Part of the digestate produced by the Spilamberto plant was then sent for recovery in the composting plant in Nonantola, also managed by Biorg, with another approximately 17,000 tonnes of waste, sludge and scraps.

The biomethane produced in the network and **destined for automotive use** through various distributors in Emilia-Romagna (which can be used by residents with methane-powered vehicles) and two refuelling points for the Tper Bologna **public transport**.

The results of the Spilamberto plant are slightly less than half of the expected production, but this is in line with what happens in the first year of start-up of a plant during which it is necessary to proceed to the optimal setting of the equipment in order to reach the expected industrial production. In 2024, the Spilamberto plant is expected to operate at its nominal capacity, as well as to maintain the production performance achieved in past years at the Sant'Agata Bolognese plant; this will make it possible to approach the production target of 12 million cubic metres of biomethane per year two years early.

The Group's goal for **2027** is to **produce 16 million cubic metres per year of biomethane from organic waste** (corresponding to about 148 GWh), also due to the construction of new plants in the coming years.

An innovative **power-to-gas plant** closely integrated with the municipal wastewater treatment process is also being built at the **Idar wastewater treatment plant in Bologna-Corticella**. With this technology it is possible to convert renewable electricity into synthetic methane (similar to biomethane).

In detail, due to the installation of **an 1 MW electrolyser**, it will be possible to exploit surplus renewable electricity, which is difficult for the electricity distribution network to manage, to produce green hydrogen through the electrolysis of water; inside a special **biological methanator**, the hydrogen will then be combined with the carbon dioxide naturally present in the biogas produced in the treatment plant itself (in the digesters or from sewage sludge) and converted into methane. It is estimated that 300,000 cubic metres of synthetic methane will be produced each year.

By integrating the electricity grid with the gas grid (**sector-coupling**), this technology can be exploited to ensure, in the future, greater sustainability and flexibility of the national energy system through the decarbonisation of the production and end-use sectors of energy.

Also at the Idar purification plant, the installation of a membrane upgrading system is also planned for the production of **additional biomethane** (800,000 cubic metres) from biogas, also coming from the wastewater treatment plant's digesters.

In 2023, the authorisation process was completed with the acquisition of the construction permit, and the execution of the project commenced to facilitate the procurement of materials. The plant is expected to start up by 2025.

Through these initiatives at the Idar wastewater treatment plant, it is estimated that the total biomethane production will reach **1.1 million cubic metres annually**, equivalent to approximately 10 GWh.

Development of hydrogen

The Hera Group is evaluating new business opportunities in the field of **hydrogen development** precisely in public transport and in "hard-to-abate" sectors, also in partnership with other important economic operators and with various entities in the geographical areas served.

In **Modena** and **Trieste**, activities commenced to convert disused industrial areas into new "**hydrogen valleys**", with the aim of achieving an annual production of green hydrogen of 770 tonnes (corresponding to about 26 GWh) by 2027. See the case study "[The development of the hydrogen supply chain: Hydrogen valley](#)" for more information on this topic.

In Castelfranco Emilia, still in the Modena area, activities relating to the injection of **hydrogen into the gas distribution networks** continue. In particular, Inrete Distribuzione Energia launched the **first national trial of hydrogen for civilian use**, with two temporary releases at the end of 2022 and the end of 2023. The project involves some forty homes and 12 industrial and institutional partners to study all the technical and environmental aspects of using mixtures of hydrogen (which by its nature has no carbon content) and natural gas in existing gas distribution networks. This can make a concrete contribution to **decarbonising household consumption** and reducing the energy dependence that characterises

traditional fossil fuels (in fact, hydrogen is a vector that can be produced in “zero km” industrial processes, and specific characteristics and infrastructural equipment have been identified in the Modena area).

This trial is part of the Hera Group’s broader strategy for developing hydrogen, in a twofold perspective. On the one hand, it will see the Group’s **assets evolve**, first and foremost its own gas distribution networks, and on the other, **new business opportunities** will be created, which Hera can seize by leveraging its multi-business skills, including partnerships with other major industrial operators.

The project was also designed to **acquire direct technical data** on the distribution and use of mixtures of hydrogen and natural gas using the existing gas network, and is included in the broader set of activities aimed at certifying the Hera Group’s supply chain as qualified to use green gas. These also include the development and introduction on the networks managed by Inrete and AcegasApsAmga of “**hydrogen-ready**” **gas meters**: in fact, the installations of **NexMeter**, the gas meter that is innovative both for the cutting-edge technologies used and for its advanced safety functions, also in terms of reducing gas dispersion into the atmosphere, are continuing.

Development of photovoltaics

In 2023, the new 1.0 MW photovoltaic plant built on the **landfill** site in Galliera (Bo) went into operation, in early 2024 authorisation was obtained for the construction of another plant of about 4.2 MW on the closed landfill in Castel Maggiore (Bo), and the authorisation process for the construction of a further 7.5 MW plant at the Ravenna landfill is underway.

Photovoltaic development activities are also underway at the main **water utility plants**, e.g. at the Santa Giustina purification plant in Rimini (3 MW), the San Vitale waterworks in Calderara di Reno (4 MW), and other Group plants in Modena, Forlì and Ravenna (1.9 MW in total). In Bondeno, near Ferrara, following the acquisition of the company Tiepolo, an 8.9 MW photovoltaic park is planned.

In total, more than **150 MW in photovoltaics are planned to be installed by 2027 on owned sites** (landfill sites, water utility plants and hydrogen valley) and at external sites (energy park and agrivoltaic plants).

See case studies in the attachments to this chapter for further details on the [production of green hydrogen](#) and on [development of energy parks and agrivoltaics](#).

Development of energy communities

Following legislative and regulatory updates relating to the development of **widespread self-consumption** in Italy, the Hera Group has elaborated new models for the development of these configurations, **supporting the various stakeholders** in the construction of production plants from the start-up phase through to the long-term management of the initiatives. The above configurations are in line with the Group’s strategy in that they **promote the development of renewable energies** through the construction of new plants that can be made available to so-called **energy communities** or that are built for them, creating shared value in the area.

In 2023, specialised support was provided to local administrations to participate in the call for tenders issued by the Emilia-Romagna Region to **support the development of renewable energy communities**, which grants non-repayable contributions for the expenses to be incurred to set up and for the technical-economic evaluation of initiatives. The Group provided support both during the application stage and in the execution of technical-economic feasibility studies to enable the diffusion of new energy communities in Italy. Following the establishment of the legal entity by the founding members, Hera will provide support for the promotion of initiatives and the collection of expressions of interest to participate as community members. In this way, all those who cannot install a plant on their own will be given the opportunity to play an active role by consuming energy in the vicinity of the plants, thus obtaining environmental, economic and social benefits.

Hera proposes itself as a **partner** that can make its expertise available by studying the regulatory framework in the process of completion, following the delicate stages of setting up legal entities, in the provision of newly built plants, and in the long-term technical-administrative management of communities.

In the area of collective self-consumption, continuing the activities started in 2022, the **first pilot project in Bologna**, one of the first experiences in Emilia-Romagna, was completed in 2023. A group of self-consumers acting collectively was set up in the condominium concerned, with **18 household customers joining it**. Hera provided support in setting up the configuration, in supplying the **20 kW** photovoltaic system (which was connected to the grid and went into regular operation in May 2023), in the process for accessing the shared energy incentive (successfully concluded in July 2023), in defining the internal

rules and the way in which the economic benefits are shared, and will continue to accompany the condominium in its management in the coming years.

The experience of the first pilot project is spreading to other initiatives in the area, and the Group is developing new supply models to facilitate the implementation of these configurations.

Renewable energy for Hera Group

In 2023, the electricity consumption of the main Group companies was **100% covered by energy from certified renewable sources**, achieving the target envisaged and validated by Science Based Targets initiative.

CONSUMPTION OF ELECTRICITY FROM RENEWABLE SOURCES

GWh	2021	2022	2023
Consumption of electricity from the grid from renewable sources (GO)	471.2	555.4	554.1
Total electricity consumption from the grid	572.8	555.4	554.1
Consumption of electricity from the grid from renewable sources (%)	82.3%	100%	100%

Renewable energy for our customers

In order to support the Hera Group’s objectives of contributing to the achievement of carbon neutrality for its customers and citizens served and of reducing its own greenhouse gas emissions by 37% by 2030, also in 2023 Hera Comm guaranteed solutions for the **reduction of its customers’ carbon footprint**, through the supply of **electricity from certified renewable sources** (with Guarantee of Origin) and of **natural gas with offsetting of greenhouse gas emissions**, for the first 12 months from the subscription of the offer, through carbon credits certified by international standards.

The carbon credits cancelled in 2023 (919,000) contributed to the performance of the following projects:

- A **280 MW hydroelectric plant in Turkey** (506,000 credits), capable of generating around 800 GWh/year of energy, with an estimated benefit of around 470,000 tonnes of greenhouse gases avoided each year. Support for this project has also made it possible to create jobs for the local community during the construction and management phases, and to avoid floods downstream of the project’s activities, contributing, at the same time, to the protection of some animal species in the area, such as migratory waterfowl.
- A 25 MW **wind farm in India** (30,000 credits) built by local know-how and which gave employment to and fostered economic development in the local community, with an estimated reduction of around 30,000 tonnes of greenhouse gases per year.
- A 700 MW **hydroelectric power plant in Brazil** (383,000 credits) contributes to the reduction of 600,000 tonnes of greenhouse gases and contributes to access to cheap and reliable energy for the local population.

Customers that choose these offers also contribute to reducing paper consumption, thanks to the electronic delivery of bills, and no need to travel, thanks to direct wire transfers.

ELECTRICITY AND GAS CONTRACTS AT THE END OF THE YEAR WITH “GREEN OFFERS”

	2021	2022	2023
Electricity contracts at the end of the year with the supply of renewable energy (% of total electricity contracts on the free market)	41.9%	63.9%	79.4%
Gas contracts at the end of the year with offsetting of Gas emissions (% of total gas contracts on the free market)	29.7%	35.6%	63.3%
Electricity and gas contracts with “green” offers (% of total electricity and gas contracts on the free market)	35.4%	49.2%	71.3%

Figures do not include the company AresGas. Figures for 2022 do not include the companies Eco Gas and Con Energia.

In 2023, customers who have chosen the supply of “green” energy are over 2.1 million, and represent **71.3% of the total** contracts, they were up by 67% compared to 2022 (were around 1.3 million).

Specifically, contracts with renewable electricity supply accounted for 79.4% (2.1 million contracts, they were up by 48% from 2022), while congas with greenhouse gas offsetting accounted for 63.3% (937,000 contracts, double the previous year’s figure).

The indicator is calculated excluding contracts relating to safeguarding, default and last-resort supply services since, by their nature, it is not possible to propose offers in line with the Group’s commercial strategy in these markets. Including these segments as well, 56.4% of energy contracts provide for the supply of “green” energy (71.0% of electricity contracts and 45.0% of gas contracts).

As of 2021, the range of renewable energy offers also includes the **Hera Fotovoltaico** option, which allows the purchase of photovoltaic systems through a turnkey service starting from the technical inspection to the management of administrative and tax paperwork. 2023 saw the addition of the **Hera Fotovoltaico Kit Fai da te**, option, the offer for the sale of so-called “plug & play” micro-plants designed for those who do not have the possibility of installing a system on their roof (in fact, it can be installed on the home’s balcony, in the garden or on the terrace, and can be connected to a normal dedicated electrical socket via a power cable). The power of the micro-system is **300 W**, much less than normal roof-mounted systems (typically at least 3,000 W), but it still allows to produce the energy needed to cover the average needs of a household appliance or stand-by at home.

In 2023, 1,130 photovoltaic panels were sold for a total installed power of 6,286 kW. The total since the start of the offer is **2,427 systems**, with a capacity of **13,276 kW**. The target by 2027 is to sell 150 MW of photovoltaic power of the plants sold and with the development of energy communities.

Sales of “green” energy

In 2023, **5,479.6 GWh of renewable energy** were procured for the free market, equal to **42.8% of the total** (vs 40.5% in 2022). Of these, 4,895.0 GWh were covered by Guarantee of Origin (GO) certificates, while the remainder is represented by the residual share of renewable electricity present in the national complementary energy mix.

RENEWABLE ELECTRICITY SOLD ON THE FREE MARKET

GWh	2021	2022	2023
Renewable electricity sold	4,620.9	4,311.6	5,479.6
Electricity sold on the free market	10,159.5	10,658.2	12,795.3
Renewable electricity sold (% of volumes sold on the free market)	45.5%	40.5%	42.8%

The calculation takes into account the Guarantees of Origin purchased by Hera and, for the remaining part of electricity, the latest GSE data available relating to the national complementary energy mix. The final balances for the years prior to the reporting year have been updated on the basis of the latest GSE data available at the time the Financial Statements were drawn up. The data does not include Company AresGas. The data does not include Eco Gas and Con Energia.

In detail, the household segment covered its consumption at 77.0% from renewable sources, companies at 29.1%, condominiums at 64.5%, and the Consip segment at 22.1%.

Also considering the enhanced protected, gradual protected and safeguarded service markets, **in 2023 a total of 5,606.7 GWh of renewable energy were sold, equal to 38.6% of the total** electricity sold (vs 36.3% in 2022). By their nature, these markets do not allow customers to be proposed offers in line with the Group’s commercial strategy (the law does not provide for the service offered to these customers to include the supply of energy from renewable sources). For the enhanced protected service, the purchase of electricity which is sold to customers is the responsibility of the Single Buyer (also in this case, the share of renewable electricity present in the national complementary energy mix is considered at 7.4%, based on the latest available data).

The goal by 2027 is to sell 56% of renewable electricity on the free market.

Sales of **methane gas with offsetting of CO2 emissions** (active for the first 12 months after subscribing to the offer) grew further in 2023, after the start of the marketing of this offer in 2019: the share sold with offsetting of emissions on the free market increased from **0.8% in 2019 to 20.4% in 2023** (14.2% in 2022).

METHANE GAS SOLD ON THE FREE MARKET WITH GREENHOUSE GAS EMISSIONS OFFSETTING

million sm3	2021	2022	2023
Natural gas sold with greenhouse gas emissions offsetting	288.3	379.6	461.6
Natural gas sold on the free market	2,578.6	2,676.6	2,261.4
Natural gas sold with greenhouse gas emissions offsetting (% of volumes sold on the free market)	11.2%	14.2%	20.4%

The data do not include AresGas.

Also considering the protected markets and those relating to default services and last-resort supply, the total methane gas sold with greenhouse gas emissions offset in 2023 was 15.0% (10.8% in 2022).

2.04 Climate change mitigation

Hera for the climate

The challenge of climate change and Hera Group's commitment

Climate change is one of the greatest challenges humanity must face today. Accepting this challenge means starting an **ecological transformation** of technology, economy and society. Fossil fuels are among the main causes of climate change, and it is, therefore, essential to reduce their consumption to limit the increase in the main gas responsible for the greenhouse effect: carbon dioxide.

The Group's commitment in this area starts from a variety of actions undertaken in terms of **mitigation and adaptation** discussed in this chapter.

The Group's strategy for the mitigation of climate change mainly takes the form of:

- choice of **renewable electricity** to power one's activities;
- increase in the **production of energy from renewable sources** (in particular, biomethane and geothermal energy to support district heating, green hydrogen as an energy vector and photovoltaics);
- initiatives and projects to **reduce one's carbon footprint**. For example: ISO 50001 certified energy efficiency plans and lower environmental impact on the company fleet;
- of solutions for **reducing the carbon footprint of residents and customers** in all segments (households, condominiums, businesses and public administration). For example: sale of electricity from renewable sources and methane gas with offsetting of greenhouse gas emissions, additional services to households and businesses for energy efficiency, development of district heating, energy efficiency and renewable electricity in public lighting, energy upgrading of buildings, and support for urban electric mobility;
- promotion and implementation of **circular economy** initiatives, such as sorted waste collection, commitments on plastic recycling and production of biomethane from organic waste;
- implementation of **technological and plant innovation projects and initiatives** for a higher environmental sustainability of the activities;
- assessment and feasibility study for carbon dioxide capture system.

Since 2006, the Hera Group has been a member of CDP, an independent non-profit organisation which offers companies and countries a system for measuring, detecting, managing and sharing information on climate change and the sustainable use of water resources on a global level. Membership of the CDP requires the participants to **measure and report** on all performance and the initiatives and strategies implemented to reduce greenhouse gas emissions. In 2023, Hera was assessed with **level A-** (on an A-D scale), an improvement on level B in 2022 and **above the European average (B)**, the "Energy utilities network" **sector average (B)** and the **global average (level C)**.

The CDP also provides an assessment of the strategy, actions and engagement practices adopted to mitigate climate change **along the company's value chain**: the Hera Group scored B in 2023. Again, the score is higher than the European average (B-), the energy utilities network sector average (B-) and the global average (C level).

Once again in the context of **reporting**, this assessment contains:

- the results of the process of **alignment with the Recommendations of the Task Force on Climate-related Financial Disclosure (TCFD)**, which began in December 2019 and involved numerous Departments and all the Group's Business Units;
- reporting of greenhouse gas emissions validated by the **Science Based Targets initiative** in March 2021.

TCFD recommendations

In 2015, the Member States of the United Nations Organisations signed the **Paris Agreement**, by which they undertook to keep the increase in the global average temperature below 2°C compared to pre-industrial levels, and possibly limit its increase to 1.5°C by the end of the 21st century (the latter objective also confirmed by the latest COPs in Glasgow and Sharm El-Sheikh). In the same year, the G20 **Financial Stability Board (FSB)** established the **Task Force on Climate-related Financial Disclosures (TCFD)** with the aim of supporting organisations towards greater transparency about the financial opportunities and risks associated with climate change. In 2017, the TCFD published its reporting recommendations (updated in 2021), which today represent an international reference for the management of climate risks by companies. The **TCFD recommendations** are applicable to organisations across all sectors and classified into four areas: Governance, Strategy, Risk management, and Metrics & targets.

The Hera Group has decided to adopt the approach proposed by the TCFD by launching a process of alignment with the recommendations in December 2019, the results of which were published in the 2020 Dnf (Non-financial declaration) and in the **“Hera for climate” report**. The working group dedicated to TCFD consists of: The Shared Value and Sustainability Department, Enterprise Risk Management, Central Department of Regulation Strategy and Local Authorities, and Energy Management. At some stages, the following were also involved: Central Innovation Department, Central Administration, Finance and Control Department, Central Personnel and Organisation Department, Quality, Safety and Environment Department, and the Business Units.

Governance related to climate change

At the level of the **Board of Directors**, the supervision of the risks and opportunities related to climate change is supported by the **Control and Risk Committee**, by the **Risk Committee** and, indirectly, by the **Ethics and Sustainability Committee**, whose duties include monitoring the implementation of sustainability policies and the preventive evaluation of the sustainability report to be submitted to the Board of Directors.

The **Chief Executive Officer** is responsible for ensuring the implementation of the sustainability and shared-value guidelines, through the Shared Value and Sustainability Department, whose duties include the coordination of the **balanced scorecard** system. The **Chair of the Board of Directors**, in addition to presiding over the Executive Committee, is responsible for defining the strategic guidelines and for decisions relating to the **allocation of capital**. In fact, the Central Department for Regulation Strategy and Local Authorities reports directly to him.

The **Control and Risk Committee** is the advisory body set up in application of the Self-Regulatory Code, in order to support the decisions and assessments of the Board of Directors relating to the internal control and risk management system, including those deriving from climate change, with adequate preliminary activities.

At management level, the **Risk Committee** defines risk management policies and develops specific guidelines and objectives for the business units. In 2021, its functions were updated by making climate change explicit in the list of significant risks that the Committee must deal with.

The **Shared Value and Sustainability Department** has among its responsibilities some of the key elements to ensure the good management of climate risks and opportunities. In fact, the Management coordinates the process of defining the balanced scorecards, prepares the Company guidelines and reporting in the area of Shared Value and Sustainability, and develops new sustainability projects. Furthermore, the head of the Department is also a member of the Group’s **Ethics and Sustainability Committee**.

The **Central Strategy, Regulation and Local Authorities Department** plays a key role in the resilience of the Group’s strategy. The Management’s prospective and future-oriented analysis skills were fundamental in performing the **first analysis of the Hera Group’s climate scenarios**. Among the initiatives identified to seize the opportunities defined through scenario analysis, the most promising have been included in the Business plan.

The **Central Administration, Finance and Control Department**, as it pertains to the management of climate-related opportunities and risks, in particular for the activities of defining the annual budget and raising capital, and the **Energy Management department**, which supports the Chief Executive Officer in the development of energy saving initiatives, play a role in the organisational structure of the Hera Group.

With the aim of **strengthening the governance of climate change aspects**, the following internal documents were updated during 2021: Management system manual, Group risk management policy (guidelines), Management control planning (guidelines), Management system management review (procedure), Investment authorisation process (procedure) and Business impact analysis methodology and risk assessment (procedure). In particular, the reference to the analysis of medium-long term climate scenarios was introduced in the **“Group Risk Management Policy”** guideline, while the **“Management Control Planning”** guidelines specify that the strategic planning process must include the medium-to-long term industrial development in line with the corporate **“Purpose”** and, therefore, with the pursuit of carbon neutrality, one of the three areas of shared-value creation.

The management system and Enterprise risk management

The quality, safety, environmental and social responsibility **management system** is the set of interrelated or interacting elements that support the implementation of the Hera Group’s policies and objectives in a large number of areas, including those relating to climate change.

As regards the processes for **identifying, assessing and managing climate risks**, the organisational structure adopted by the Hera Group makes it possible to manage exposure to risk deriving from its

businesses and, at the same time, to preserve the effectiveness of management along the entire value chain.

In the corporate governance system, the **Control and Risk Committee**, within the Board of Directors, has the task of supervising the operation of the internal control system, the efficiency of corporate operations, as well as compliance with laws and regulations.

The Control and Risk Committee regularly receives information from the **Risk Committee**, which represents the main body for guidance, monitoring and information relating to risk management strategies, including those pertaining to climate. The Risk Committee is responsible for defining the guidelines for the **Enterprise Risk Management** process, the mapping and monitoring of company risks and the definition of the **Risk Policies**, to be submitted to the approval of the Board of Directors.

The specific risk analyses are conducted by the **Enterprise Risk Manager** or by the Risk Specialists, who play an essential role in the identification, assessment and control of risk management methods. Climate-related risks, both physical and transitional, are included among the risk categories for which an analysis has been initiated by the Enterprise Risk Manager.

Starting from 2020, the **climate scenario analysis** conducted by the cross-functional working group has led the Enterprise Risk Manager to define new quantification methodologies in order to estimate the potential financial impact of the most significant climate risks.

Analysis of climate-related scenarios

Scenario analysis is a methodology used to test the **resilience of business plans** under different assumptions of future developments. In the context of climate change, the study of scenarios makes it possible to understand how physical and transitional climate **opportunities** and **risks** can affect business over time.

To carry out its analysis, the Hera Group selected the **two most relevant scenarios** from the nine taken as a starting point.

The **IEA ETP 2DS transition scenario**, developed by the International Energy Agency, was selected as the “ambitious” climate scenario, which describes a future evolution characterised by strong decarbonisation processes to keep the increase in average temperatures below 2°C.

IEA ETP 2DS TRANSITION SCENARIO: KEY PARAMETERS BY 2050

Energy	<ul style="list-style-type: none"> Energy intensity (TWh/GDP): -67% vs. 2013 Production of advanced biofuels: 20-fold increase from 2020 to 2025 Natural gas import price: \$ 10.2 /MBTU (2017: \$ 5/MBTU)
Electricity	<ul style="list-style-type: none"> Strong increase in renewable electricity production Emission factor: <40 gCO₂/kWh (2017: 484 gCO₂/kWh) 50% of solar generation from domestic panels (distributed generation) Electricity demand: +68% vs. 2017
Greenhouse gas emissions	<ul style="list-style-type: none"> CO₂:emissions: -54% vs. 2017 CO₂ price: up to \$210/t (2017: 5.8 euro/t) Carbon capture utilization and storage (Ccus): 3,500 MtCO₂ (2017: 2.4 MtCO₂)

The **IPCC RCP 8.5 physical scenario** was selected as a “pessimistic” scenario, to understand the possible impacts on the Hera Group’s strategy in the event of a “business-as-usual” trajectory and consequent sharp increase in the average temperature (about 4°C). The indicators available in the models that simulate the RCP 8.5 scenario were selected starting from the results of an analysis previously conducted by Enterprise Risk Management, which involved the business units, to identify the climate-related events to which they are most exposed.

RCP 8.5 PHYSICAL SCENARIO: KEY PARAMETERS

	Size	Parameter	1980-2005	2050 Trends
Rainfall		Days with heavy rainfall	23 days	↘
		Rainy days	90 days	↘
		Consecutive days without rain	25 days	↗
Temperatures		Average maximum temperature	17.5°C	↗↗
		Average minimum temperature	8.5 °C	↗↗

Size	Parameter	1980-2005	2050 Trends
	Heating degree days	1950 days	↘↘
Sea	Sea level	+8 cm (vs. 1990)	↗↗

Timelines have also been defined in order to distinguish and classify risks, opportunities and impacts among those in the short, medium and long term. This strategic approach makes it possible to go beyond the traditional time frame of the Business plan.

Short term	Medium term	Long term
0 to 5 years	5 to 10 years	10 to 30 years
Business plan time period	Decarbonisation targets time period	European Green Deal time period

Risks and opportunities resulting from climate change

[201-2]

The analysis of the ETP 2DS and RCP 8.5 climate scenarios made it possible to identify **eight physical risks, eight transition risks and 15 opportunities**. Each risk and each opportunity has been associated with:

- a time period;
- a priority level (defined as a combination of the level of probability that the context in which Hera operates will change according to what is described by the risk/opportunity and the impact of the risk/opportunity on the business);
- one or more management methods (for risks) and one or more business initiatives (for opportunities).

Physical risks

The analysis of the RCP 8.5 climate scenario conducted by the Hera Group, combined with the investigations already carried out by Enterprise Risk Management and the support of the business units, made it possible to identify **eight physical risks** distributed over the medium- and long-term time horizons, consistent with the notion that the impacts of climate change will become increasingly evident. To mitigate, manage or transfer these risks, **21 management** methods have also been identified, which allows the Group to be better prepared in view of possible future changes.

Some of the management methods envisaged in the 2023-27 Business plan are indicated in the following paragraph: Hera’s strategy for the climate”.

RCP 8.5 SCENARIO: OVERVIEW OF PHYSICAL RISKS AND MANAGEMENT METHODS

	8 Physical risks	21 Management methods (no. and risk categories)
Changing weather and climate phenomena	2 medium term 2 long term	6 Acute 8 Chronic
Temperature rise	2 medium term 1 long term	2 Acute 3 Chronic
Sea level rise	1 long term	2 Chronic

Short-term time horizon: 2023-2027; Medium term: 2028-2030; Long term: 2031-2050

Of the eight physical risks assessed, those characterised by a higher level of priority were subjected to in-depth studies to simulate the related **impacts**. In particular, the risk associated with the **drop in the consumption of gas and district heating** for civil use following the increase in temperature was considered significant in the long term. For further details on the simulations of the quantifications of the impacts, also financial, of this risk, see paragraph 1.02 “Risk Factors: Actors, Methodology and Scope of Management” of the Report on Operations, while for the evaluations related to the potential effects in terms of impairment test, please refer to paragraph 2.02 “Notes” of the Consolidated Financial Statements.

As part of the risk management activities carried out within the Hera Group, in 2022 the company **assessed the risks correlated with weather-climate events**, with particular reference to floods and their effect on the Group’s assets; in this regard, it completed a risk assessment project called “**Analysis of hydraulic risk in the climate change**”. See the paragraph “[Resilience and adaptation](#)” for additional details in this regard.

Transition risks

The climate transition risks have been identified mainly through the analysis of the ETP 2DS scenario of the International Energy Agency. The analysis led to the mapping of eight **transition risks**, mainly concentrated in the medium term and distributed over two of the three categories of the classification suggested by the TCFD. To mitigate, manage or transfer these risks, **13 management methods** have also been identified, which allows the Group to be better prepared in view of possible future changes.

Some of the management methods envisaged in the 2023-2027 Business plan are indicated in the following paragraph: “Hera’s strategy for the climate”.

IEA 2DS SCENARIO: SUMMARY OF TRANSITION RISKS AND MANAGEMENT METHODS

8 Transition risks		13 Management methods (no. and risk categories)
CO ₂ : -54% by 2050	4 medium term	1 Regulatory policy/Reputation 2 Regulatory policy 1 Market 1 Reputation
Electricity: increase in demand and share of renewable energy sources	3 medium term 1 long term	3 Technology 3 Market 2 Regulatory policy

Short-term time horizon: 2023-2027; Medium term: 2028-2030; Long term: 2031-2050

Transition risks prioritised are subjected to in-depth studies to simulate their **impacts**. The risks relating to **energy efficiency** trends and the **electrification of consumption**, and the extension of **carbon pricing** systems, deserve further evaluation. Management methods and monitoring indicators have been outlined for each risk class.

Assessments are also underway on the effects of transitional risks from **electrification of consumption** for the electricity and gas distribution networks, and for the end customer market. For the evaluations related to the potential effects in terms of impairment test, please refer to paragraph 2.02 “Notes” of the Consolidated Financial Statements.

Opportunities

The opportunities deriving from the decarbonisation processes have been identified by the Hera Group through the study of the ETP 2DS scenario of the International Energy Agency. The analysis led to the identification of **15 opportunities**, mainly associated with forecasts for the reduction of greenhouse gas emissions produced, the increase in the demand for electricity and greater penetration of renewable energy sources, and the development of advanced biofuels. Most of the opportunities are foreseen in the short term and **39 initiatives** have been identified to seize them.

There are 11 opportunities classified as relevant **in the short term** (by 2027). The initiatives designed to collect the most promising opportunities have been further developed to inform the new Hera Group **2023-2027 Business plan**. The following paragraph describes how the new Plan seizes the opportunities to participate in the decarbonisation process, and which initiatives will be implemented to achieve the objectives (indicated over the short term).

IEA 2DS SCENARIO: SUMMARY OF OPPORTUNITIES AND INITIATIVES

15 Opportunities		39 Initiatives (number and categories of opportunities)
CO ₂ : -54% by 2050	6 short term 1 long term	10 Resource efficiency 9 Energy sources 8 Products and services 1 Markets
Electricity: increase in demand and share of renewable energy sources	3 medium term 3 long term	5 Energy sources 4 Products and services 1 Resource efficiency
Energy: increase in advanced biofuels	1 short term 1 medium term	5 Energy sources 2 Resource efficiency

Short-term time horizon: 2023-2027; Medium term: 2028-2030; Long term: 2031-2050

Hera's climate strategy

The Hera Group's 2023-2027 Business plan confirms the sustainability guidelines of European policies as a reference and the **Sustainable Development Goals** at the basis of the creation of shared value.

The reference framework of the new Business plan is made up of **three strategic dimensions** that represent the great challenges of the sector: **ecological transition, innovation and cohesion and social development**. The Group's projects hinge on these strategic dimensions in all businesses supervised, with the aim of combining the industrial development of the multi-utility with that of the context in which the Group operates, promoting well-being for all stakeholders and generating shared value ("Shared-value" Ebitda).

The "Shared-value" Ebitda indicator measures the portion of the Group's consolidated Ebitda generated by business activities that respond to the drivers of change and the related impact areas identified in the shared-value creation model that guides Hera's approach to sustainability.

In the shared-value creation model, updated last year, one of the three drivers of shared value creation is the **pursuit of carbon neutrality**, for managed services and for the benefit of customers and the reference territorial ecosystem. The actions envisaged to combat climate change, therefore, play an important role in the environmental sphere and in the model of creating shared value.

The strategic structure looks beyond the period covered by the Plan, reaching 2030. Here the objectives for reducing greenhouse gas emissions in line with the criteria of the Science Based Targets initiative stand out in particular, in relation to which it is possible to find ample discussion in the following paragraph.

The procedures for managing physical and transition risks and the business initiatives associated with the opportunities are shown below.

Physical risk	Time period	Priorities	Management method
Floods with consequent landslides and mudslides	Medium term 2028-2030	Medium-high	<ul style="list-style-type: none"> Interventions for the infrastructure upgrading of drainage networks, accumulations and purification plants Increased alert capacity for extreme events in sensitive areas
Rising temperatures	Long term 2031-2050	Medium-high	<ul style="list-style-type: none"> Market strategies oriented towards the development of strategic environmental assessments (VAS) dedicated to customers to integrate and enrich the offer portfolio
Extreme weather phenomena	Medium term 2028-2030	Medium-low	<ul style="list-style-type: none"> Resilience plan and upgrading of the electricity distribution network in view of extreme winter events, with interventions on overhead lines and substations
Changes in the time distribution of annual precipitation and average rainfall quantities	Long term 2031-2050	Medium-low	<ul style="list-style-type: none"> Strengthening and expansion of supply sources to increase the resilience of the aqueducts Creation of interconnections between water networks Enhancement of the application of advanced leak detection techniques to increase the level of efficiency of network

Transition risk	Time period	Priorities	Management method
Electrification of energy consumption and development of renewable energy sources	Medium term 2028-2030	Medium-high	<ul style="list-style-type: none"> Proposal aimed at the development and sale of photovoltaic systems, consumer and utility scale, and the development of sustainable mobility Acquisition of increasing shares of customers in the electricity sector, as a result of the energy carrier switch Development of gas networks for flexibility needs in the use of renewable gases Greater presence in the electricity distribution sector
Limits on the generation of greenhouse gas emissions	Medium term 2028-2030	Medium-high	<ul style="list-style-type: none"> Reduction of the Group's carbon footprint with energy efficiency projects, increasing the optimised management of consumption and the use of zero-emission energy sources
Introduction of measures that require structural and non-structural efficiency measures	Medium term 2028-2030	Medium-high	<ul style="list-style-type: none"> Specific projects activated in the field of energy efficiency Strengthening of advanced techniques aimed at limiting the use of primary resources, in the field of: <ul style="list-style-type: none"> water (reduction of water leaks, reuse of water resources) waste (initiatives to enhance recovery and recycling)

Opportunities	Time period	Initiative	Area
Policies on air quality and urban emissions, with associated incentives intended to promote efficient district heating systems	Short term 2023-2027	<ul style="list-style-type: none"> Saturation of production capacity of current district heating systems Conversion of district heating systems to "Efficient District Heating Systems" Interconnection of district heating systems Geothermal source enhancement "CLIMA" project and other initiatives to optimise leak detection and reduce gas network losses 	<ul style="list-style-type: none"> District heating Gas sales
	Middle term 2028-2030	<ul style="list-style-type: none"> Installation of capture, use and storage of CO₂ for waste-to-energy plants 	<ul style="list-style-type: none"> Gas distribution Waste treatment
Tax relief for energy efficiency and EU incentives for decarbonisation	Short term 2023-2027	<ul style="list-style-type: none"> Energy efficiency services for buildings 	<ul style="list-style-type: none"> Gas sales Electricity sales
Customer awareness and growth of green offers by Utility companies	Short term 2023-2027	<ul style="list-style-type: none"> Sale of electricity from renewable sources and gas with emissions offsetting Green loyalty programs and value-added services for energy efficiency and carbon neutrality Sale of heat pump systems Digitisation of documents and bills 	<ul style="list-style-type: none"> Gas sales Electricity sales
		<ul style="list-style-type: none"> NexMeter metres installation 	<ul style="list-style-type: none"> Gas distribution Gas sales
Technological optimisation and plant efficiency	Short term 2023-2027	<ul style="list-style-type: none"> Energy efficiency measures and optimisation of plants through revamping 	<ul style="list-style-type: none"> Energy consumption
Promotion of the circular economy and growth in the demand for recycled plastic and/or bioplastic	Short term 2023-2027	<ul style="list-style-type: none"> Expansion of plastic recycling business 	<ul style="list-style-type: none"> Waste treatment
Dissemination of renewable energy communities and	Short term 2023-2027	<ul style="list-style-type: none"> Development of energy communities 	<ul style="list-style-type: none"> Electricity sales

Opportunities	Time period	Initiative	Area
environmental communities, and growth in the demand for distributed renewable energy		■ Sale of photovoltaic systems	■ Electricity sales
		■ Development of smart grids	■ Electricity distribution
Development of electric mobility and increased demand for electricity along road infrastructures	Short term 2023-2027	■ Fleet conversion to low-carbon	■ Company fleet
		■ Installation of electric charging infrastructures	■ Company fleet ■ Electricity sales
Production of biomethane through recovery processes (possible eligibility for incentives)	Short term 2023-2027	■ Production of biomethane from organic waste	■ Waste treatment
Production of syngas and/or green gas (hydrogen, biogas) for the decarbonisation of the gas supply chain and for the management of any surplus production of renewable energy	Short term 2023-2027	■ Construction of a power-to-gas plant for the accumulation of electricity	■ Management of the water cycle
		■ Green hydrogen production initiatives	■ Gas sales ■ Waste treatment
		■ Experiments with the injection of hydrogen into the gas network	■ Gas distribution ■ Gas sales
Strengthening of Hera's positioning as a reference for the sustainability of local area and cities	Short term 2023-2027	■ Creation of an Energy Park	■ Electricity sales
Development of photovoltaic fields on land available to Hera and not usable for other purposes	Short term 2023-2027	■ Installation of photovoltaic panels on landfills, water service plants and other external sites (agrivoltaics)	■ Energy consumption ■ Electricity sales
Increased access to capital to match benchmarks	Long term (2031-2050)	■ Net Zero Project	■ All scopes

Climate performance and targets

The Hera Group's strategy for **seizing the opportunities** associated with decarbonisation and **mitigating the risks** of climate change is also governed by monitoring specifically defined **metrics**.

On the one hand, the indicators relating to **greenhouse gas emissions** and the related intensity indexes measure the Company's overall ability to reduce its impact on the climate and minimise risks. On the other hand, the **metrics that influence emissions**, reclassified in line with the guidelines of the TCFD (Guidance on metrics, targets, and transition– 2021). These quantitative measurements, which also include economic-financial indicators, capture the ways in which the Hera Group is redesigning its internal processes and, above all, the commercial offer to seize the opportunities offered by regulatory, technological and market evolutions related to decarbonisation.

The following table summarises types and number of indicators envisaged for each monitoring area. The indicators are shown in the attachments to this Report.

Monitoring scope	Indicators	Of which with target / forecasts
Emissions	12	10
Emission intensity indices	6	2
Risks and opportunities	4	0
Investments and use of capital	5	0
Remuneration	2	0
Other metrics - Energy	13	10
Other metrics - Resources	7	7
Total indicators	49	29

Hera Group's greenhouse gas emissions

The **Group's total greenhouse gas** emissions (Scope 1 + market-based Scope 2 + Scope 3) in 2023 amounted to approximately **12.6 million tonnes of CO₂e**.

In particular, the emissions directly produced by the Group (**Scope 1**) are approximately 936 thousand tons of CO₂ and represent 7.4% of the Group's total emissions. Indirect emissions deriving from the electricity consumed by the Group (**Scope 2**), calculated using the market-based method, are zero thanks to the total coverage of consumption with energy from renewable sources certified by the Guarantee of Origin.

The emissions caused indirectly by the Group's activities (**Scope 3**) are approximately 11.7 million tonnes of CO₂ and, or 92.6% of the Group's total emissions. Scope 3 emissions can be divided into "upstream" (upstream activities in the supply chain) and "downstream" (downstream activities in the supply chain) categories. Scope 3 of the Hera Group includes the following emission categories:

- upstream activities (5.0 million tonnes of CO₂, 39.8% of total Group emissions): production of fuels used to generate non-renewable electricity sold to customers; production of natural gas sold to customers; production of fuel consumed in industrial cogeneration plants installed at third parties' locations; production of fuels consumed in owned vehicles; production of fuels consumed for the generation of non-renewable electricity consumed internally; network losses of electricity consumed internally; use of suppliers' vehicles for waste collection; use of Herambiente vehicles to transport waste; production and printing of paper bills;
- downstream activities (6.7 million tonnes of CO₂e, 52.8% of total Group emissions): consumption by customers of methane gas sold; energy production from joint venture plants; and, waste recycling operations from sorted collection.

[305-1]
[305-2]
[305-3]

BREAKDOWN OF GREENHOUSE GAS EMISSIONS

thousands of tonnes CO ₂ e	2021	2022	2023	Delta 2023/2022
Waste treatment (waste-to-energy plants and municipal waste landfills)	569.7	527.7	558.8	+6%
District heating	197.7	195.6	163.8	-16%
Energy services of HSE, and other fuel consumption	170.5	165.8	164.8	-0.6%
Gas network leaks	13.7	16.7	15.6	-5%
Company fleets	30.2	30.8	32.4	+5%
Total direct emissions (Scope 1)	981.8	936.6	935.7	-0.1%
Indirect emissions deriving from energy consumption (Scope 2, market-based)	46.6	0.0	0.0	-
Total emissions Scope 1+2 (market-based)*	1,028.4	936.6	935.7	-0.1%
Sale of methane gas – downstream emissions*	6,561.6	6,898.4	6,100.1	-12%
Sale of electricity*	3,170.3	3,357.1	3,914.1	+17%
Sale of methane gas – upstream emissions	1,122.9	1,175.2	1,007.3	-14%
Emissions related to energy production and consumption (not included in Scope 1 and 2)	359.6	283.0	214.2	-24%
Other indirect emissions related to managed services	509.0	537.5	456.6	-15%
Total indirect emissions (Scope 3)	11,723.5	12,251.1	11,692.4	-5%
Total emissions Scope 1+2 (market-based) + Scope 3	12,751.9	13,187.7	12,628.1	-4%

The calculation criteria are aligned with the methodology of the Science-Based Targets initiative. The calculation specifications adopted are detailed in the Attachments. Data does not include Tri-Generazione, and Alipplast's foreign subsidiaries. Scope 1 data on fuel consumption do not include the companies Macero Maceratese, Vallortigara Servizi Ambientali and Recycla. The Scope 1 data relating to gas network leaks do not include AresGas. The Scope 3 data relating to the sale of electricity and methane gas does not include AresGas. Scope 3's 2022 data for electricity sales does not include Eco Gas and Con Energia. Scope 3's data for natural gas sales for 2021 has been aligned with the calculation methodology used for 2022 data.

*Indicators with validated science-based target. For the sale of electricity, the target relates to carbon intensity (t CO₂e/MWh). See the dedicated paragraph “Reduction of Greenhouse Gas Emissions: Objectives, Results and Targets” for additional information.

In 2023, total greenhouse gas emissions (Scopes 1, 2 and 3) were down by 4% compared to 2022.

Specifically, direct emissions (**Scope 1**) and indirect emissions from electricity consumption (**Scope 2**) remain stable (-0.1%; on a like-for-like basis with the previous year, thus excluding the consumption of the A.C.R. company acquired in 2023, emissions would improve by 0.7%). Emissions from waste treatment plants increased (+6%, due to restarting the waste-to-energy plant for special waste in Ravenna, which will be shut down for the whole of 2022 due to revamping works) and from the corporate fleet (+5%; on a like-for-like basis would go up by 5%). On the other hand, emissions from district heating service plants were down (-16%, due to a lower thermia during the year, the building efficiency measures of the last few years, and reduced functionality of cogenerators) and methane fugitive emissions from gas distribution networks (-5%). Finally, emissions from fuel consumption in HSE plants serving industrial customers and Group plants remain stable (-0.6%; on a like-for-like basis would go up by 2%)

The Scope 2 emissions of 2023 are **zero** thanks to the total coverage of electricity consumption with certified renewable energy. Scope 2 emissions are calculated with the “market-based” method, making the most of the organisation’s specific procurement choices, i.e., the purchase of renewable energy with certificates of Guarantee of Origin and, therefore, zero impact; the emission factor relating to the national “residual mix” is applied to the portion of electricity purchased without certificates (the latest available is equal to 457.2 g CO₂e/kWh). If calculated with the “location-based” method, thus applying a national average emission factor (equal to 255.6 g CO₂/kWh) which does not consider the Company’s specific purchasing decisions, Scope 2 emissions amounted to approximately 141 thousand tonnes (154,000 in 2021, 0.7%).

The total indirect emissions of the **Scope 3** type in 2023 amount to approximately 11.7 million tonnes of CO₂e, these **were down by 5%** compared to the previous year.

Emissions from the sale of natural gas were down by 12%, due to lower volumes sold in all segments, with the exception of those to the last resort market, which remained stable.

With regard to electricity sales, emissions were up by 17%: volumes sold from renewables increased (+1.2 TWh, or +37%) but to a lesser extent than overall volumes (+2.4 TWh, or +21%).

Indirect emissions related to energy consumption and production were down by 24%, mainly due to lower energy produced by plants in which Hera holds a minority stake.

Finally, other indirect emissions related to managed services were down by 15%, in this case due to lower fuel consumption in vehicles operated by suppliers for waste collection and transport.

For a more detailed analysis of the trend in indirect emissions from the sale of methane gas and electricity, see the paragraph below relating to the greenhouse gas reduction objectives.

Greenhouse gas emissions under the EU-ETS program

The **European Union Emissions Trading System (EU ETS)** is a cornerstone of European policies to combat climate change, and represents a key tool for a cost-effective reduction of greenhouse gas emissions. The system covers about 40% of the emissions of the countries involved; its fourth phase of application began in 2021, and will end in 2030. On an annual basis, the plants in the regulated sectors must report the greenhouse gas emissions recorded, then void a number of **emission permits** (“European Union Allowances”, 1 EUA = 1 ton of carbon dioxide equivalent) made available on the market in a calibrated measure, and decreasing over time to **encourage a progressive reduction of emissions** in accordance with long-term Community objectives.

The contribution to the achievement of greenhouse gas emission reduction targets by 2030 (**-55% on a 1990 basis**), translates for the sectors covered by the EU ETS into a reduction of -62% compared to 2005. Finally, the EU ETS Directive with which the EU introduced and regulated the scheme was updated with Directive (EU) 2023/959 of 10 May 2023.

In the Hera Group, there are **nine** plants subject to the **EU ETS regulation** in 2023, all attributable to the activity of energy production serving the **district heating** networks. Emissions in 2023 (127,521 t CO₂) were lower than in 2022 (149,421 tCO₂) considering the effect of a milder climate.

To take into account the fact that district heating is a **public utility service** and that it meets environmental sustainability criteria, the burden associated with the final emissions imposed by the System is partly mitigated through the free assignment of emission permits, or a maximum amount of permitted emissions within which no costs are foreseen. In 2023, Hera’s total carbon dioxide emissions amounted to 34,249 metric t CO₂. Specifically, 8,476 t CO₂ were allocated as free European Union Allowances (EUAs). It’s noteworthy that excluding the Fair system acquired in 2022, the allocation of

EUAs free of charge is diminishing in accordance with the **decreasing trajectory over time** aimed at promoting the attainment of long-term greenhouse gas reduction goals.

In 2023, the emissions of plants under the Eu-ETS regime amounted to 13.6% of the Group's total direct emissions (in 2022 they were 16.0%).

Carbon intensity indices [305-4]

The Group's emissions results can be represented by means of a number of indicators which mark its evolution and prospects, giving an overview of the Company's performance in terms of reducing the impact of greenhouse gases released. By comparing direct (Scope 1) and indirect emissions from energy consumption (Scope 2) with some economic and demographic indicators, it is possible to obtain **carbon intensity indices** that reflect improvements generated.

CARBON INTENSITY INDICES

	2021	2022	2023
Total Scope 1 and 2 emissions (t CO ₂ e)	1,028,381	936,590	935,657
Ebitda (mn€)	1,224	1,295	1,495
Carbon intensity index (t CO ₂ e Scope 1 and 2 / gross operating margin in mn€)	840	723	626
Residents served (thousands)	4,224	4,194	4,201
Carbon intensity index (t CO ₂ e Scope 1 and 2 / thousands of residents served)	244	223	223

The calculation criteria are aligned with the methodology of the Science-Based Targets initiative. The Scope 1 data relating to gas network leaks do not include AresGas.

The emission intensity index calculated by comparing Scope 1 and 2 greenhouse gas emissions to **Ebitda** further improved compared to the previous year (-13%) thanks to the GOP increase (+15%), against stable emissions (-0.1%). The **resident**-based ratio remains stable. Finally, the ratio on a customer basis went up slightly (4.5 tonnes per customer).

Considering the reporting obligation E1-6 - Gross Scope 1,2 and 3 greenhouse gas emissions and total greenhouse gas emissions, as required by the new European ESRS standard, the ratio of the Hera Group's total emissions to revenues for the year 2023 is 848 tonnes per million euro, up 29% compared to 2022 due to a decrease in revenues (-26%).

CARBON INTENSITY INDEX FOR ELECTRICITY SALES

	2021	2022	2023
Emissions from the sale of electricity (thousands of t CO ₂ e)	3,170.3	3,357.1	3,914.1
Electricity sold (TWh)	11,301.3	11,641.8	14,054.6
Carbon intensity index of electricity sales (t CO ₂ e / MWh) *	0.281	0.288	0.278

*Indicator with validated science-based target: -50% to 2030 compared to 2019. See the dedicated section 'Reducing greenhouse gas emissions: objectives, results and targets' for more details. Scope 3 data on electricity sales does not include AresGas. The data does not include Eco Gas and Con Energia.

The **carbon intensity index of electricity sales** in 2023 improves to 0.278 t CO₂e/MWh (-3% compared to 2022) and stands at -24% compared to the base year (2019) used as a reference for setting the Science Based Targets. The improvement in the indicator stems from a smaller increase in absolute emissions (+17%) than the increase in volumes sold (+21%).

Reduction of greenhouse gas emissions: objectives and results

As part of the process of aligning reporting with the TCFD recommendations, the Company evaluated the climate and transition scenarios with a horizon of 2050. On the basis of these insights, 15 development opportunities for the businesses managed by the Group were identified and translated into initiatives during the preparation phase of the Business plan. These initiatives, together with the evolution of the energy and climate scenario, will lead to a reduction in the Group's both direct and indirect greenhouse gas emissions.

On the basis of the above, **objectives** have been defined for **reducing emissions by 2030** compared to 2019, consistent with the methodology of the **Science-Based Targets initiative** (as regards, in particular, the "Well-below 2°C" level, aimed at limiting the increase in the Earth's average temperature well below 2°C), and included in the **2023-2027** Business plan approved in January 2024. The scope of the objectives regards both the emissions of the Group (Scope 1 and 2) and those of customers (Scope 3, relating to the sale of electricity and the sale of downstream methane gas) and, therefore, relates to 86.5% of the Group's total emissions for 2019. The objectives thus defined were submitted to the Science-Based Targets initiative at the end of January 2021, and subsequently updated in March 2021 in response to the request of the Science-Based Targets initiative.

The objectives for reducing greenhouse gas emissions consistent with the "Well below 2°C" scenario validated by the Science-Based Targets initiative are:

- Scope 1+2: **absolute reduction of 28%** by 2030 compared to 2019 (includes biogenic emissions deriving from the consumption of bioenergy and from the combustion of the biodegradable fraction of municipal solid waste);
- Scope 2: to **increase from 83% to 100%** by 2023 the share of certified renewable electricity purchased to cover internal consumption;
- Scope 3 sale of downstream methane gas: **absolute reduction of 30%** by 2030 compared to 2019;
- Scope 3 electricity sales: **reduction of carbon intensity (t CO₂e/MWh) by 50%** in 2030 compared to 2019 in line with the Sector decarbonisation approach (Sda).

Based on these objectives, the reduction of greenhouse gas emissions for the defined perimeter is expected to be 37% in 2030 compared to 2019.

These objectives will be achieved thanks both to the reduction initiatives described above and to exogenous aspects made explicit in the Cen energy scenario developed by Terna and Snam and taken as a reference for the definition of the targets: decarbonisation of electricity production, increase in energy efficiency, and electrification of consumption.

Below is a table with the trend for the last three years of the indicators with 2030 targets validated by SBTi. The 2027 forecast is also reported as per the 2023-27 Business plan. To more correctly represent the trend of emissions with respect to the medium and long-term objectives, the final data from this balance are presented in an "adjusted" version, which sterilizes the increase in emissions associated with gas volumes sold in last-resort services, which, since the end of 2021, have recorded an extraordinary and transitory increase as a result of the sharp increase in the prices of energy vectors.

GREENHOUSE GAS EMISSIONS AND "SCIENCE-BASED" REDUCTION TARGETS

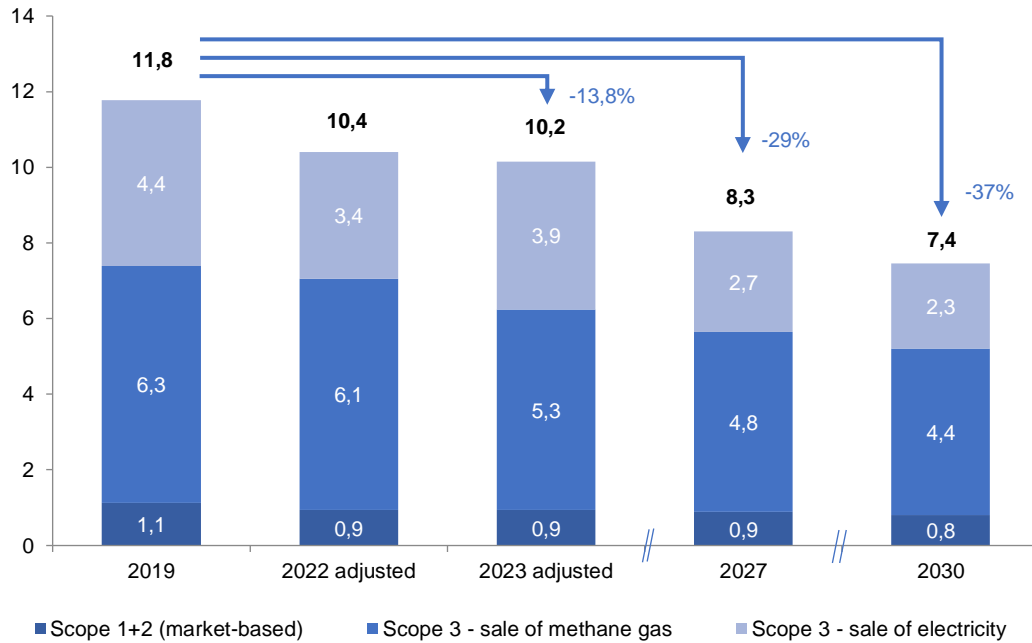
	2019 (base year)	Delta 2022/2019 (adjusted)	Delta 2023/2019 (adjusted)	2027 (forecast)	Target 2030
Direct and indirect emissions Scope 1+2 (market-based)	1,131.0 kt CO ₂ e	-17%	-17%	-21%	-28%
Scope 2 indirect emissions (market-based) *	48.4 kt CO ₂ e	-100%	-100%	-100%	-100%
Indirect emissions Scope 3 downstream from the sale of methane gas	6,263.5 kt CO ₂ e	-2%	-15%	-24%	-30%
Carbon intensity of electricity sales - Scope 3 upstream	0.365 t CO ₂ e/MWh	-21%	-24%	-46%	-50%
Total SBT target perimeter	11,781.2 kt CO₂e	-12%	-14%	-29%	-37%

*corresponding to 100% renewable electricity purchased for internal consumption. The calculation criteria are aligned with the methodology of the Science-Based Targets initiative. The 2019 figure includes the data relating to EstEnergy, Amgas Blu, Ascotrade, Ascopiave Energia, Blue Meta, Etra Energia, merged into Hera at 31/12/2019. Data does not include Tri-Generazione, and Aliplast's foreign subsidiaries..Scope 1 data on fuel consumption do not include the companies Macero Maceratese, Vallortigara Servizi Ambientali and Recycla. The Scope 1 data relating to gas network leaks do not include AresGas. The Scope 3 data relating to the sale of electricity and methane gas does not include AresGas. Scope 3's 2022 data for electricity sales does not include Eco Gas and

Con Energia. Scope 3's data for methane gas sales does not take into account transitory increases in volumes sold in services of last resort.

In addition, the following graph shows the greenhouse gas emissions in the 2019-2023 period, those forecast for 2027 on the basis of the business plan and the 2030 targets validated by SBTi.

HERA GROUP GREENHOUSE GAS EMISSIONS (IN MILLIONS OF T CO₂e)



The calculation criteria are aligned with the methodology of the Science-Based Targets initiative. The 2019 figure includes the data relating to EstEnergy, Amgas Blu, Ascotrade, Ascopiave Energia, Blue Meta, Etra Energia, merged into Hera at 31/12/2019. Data does not include Tri-Generazione, and Aliplast's foreign subsidiaries. Scope 1 data on fuel consumption do not include the companies Macero Maceratese Vallortigara Servizi Ambientali and Recycla. The Scope 1 data relating to gas network leaks do not include AresGas. The Scope 3 data relating to the sale of electricity and methane gas does not include AresGas. Scope 3's 2022 data for electricity sales does not include Eco Gas and Con Energia. Scope 3's data for methane gas sales does not take into account transitory increases in volumes sold in services of last resort.

During the 2019-2022 period, Scope 1 and 2 emissions were down by 17%: this was achieved mainly due to: the reduction of emissions from waste treatment plants, thanks to the closure in 2020 of the waste-to-energy plant for urban waste in Ravenna, the gradual reduction of urban waste sent to landfills, and the plant shut-down for revamping work on the waste-to-energy plant for special waste in Ravenna for the whole of 2022; the purchase of only renewable electricity for the whole Group; the lower internal consumption of fuels deriving partly from energy efficiency measures and partly from climatic conditions; to a lesser extent, lower fugitive losses from the gas network and lower gas consumption in district heating service plants, again due to energy efficiency measures and climatic conditions.

Compared to 2022, Scope 1 and Scope 2 emissions remained stable in **2023**: emissions from waste-to-energy plants increased (also due to the restart of the Ravenna special waste-to-energy plant) and from the corporate fleet (as a result of the change in the perimeter for the acquisition of A.C.R.). On the other hand, emissions from landfills for municipal waste (due to the progressive reduction of waste delivered) and district heating service plants decreased (due to lower temperatures during the year, the building efficiency measures of the last few years) and methane fugitive emissions from gas distribution networks (also due to predictive maintenance). Finally, emissions from fuel consumption in Group plants and HSE plants serving industrial customers remained stable (excluding the change in perimeter due to the acquisition of A.C.R. consumption would decrease). On a like-for-like basis, thus excluding A.C.R. which was acquired in 2023, Scope 1+2 emissions would improve by 0.7% compared to 2022.

Compared to 2019, the 2023 reporting shows a **17% reduction in Scope 1 and 2 emissions** (-18% on a like-for-like basis).

With regard to **Scope 3 emissions related to the sale of methane gas** (downstream), the emissions recorded during the 2019-2022 period were down by 2% (+10% also considering the extraordinary and transitory increase in volumes sold to the services of last resort gas) in proportion to the contraction in volumes sold resulting from milder temperatures, more efficient behaviour by household, condominium

and corporate customers, and also due to the effect of the sharp increase in energy carrier prices, specifically during the second half of 2022; these reductions were only partly offset by the increase in sales to Consip.

Compared to 2022, in **2023** Scope 3 emissions from gas sales were down by 13%, again this year due to milder temperatures, more virtuous behaviour by customers and in spite of a drop in energy carrier prices also during the early months of the year. Including the increase in volumes sold to gas utilities of last resort, emissions were down by 12% compared to 2022.

Compared to 2019, the 2023 reporting shows a **15% reduction in Scope 3 emissions from methane gas sales** (-3% also considering the increase in volumes sold to gas utilities of last resort).

As regards absolute **Scope 3 emissions from electricity sales**, the reduction recorded during the 2019-2022 period was 23.5% due to higher volumes from renewables sold to the free market (from 30.2% in 2019 to 40.5% in 2022) against a decrease in volumes sold (-3%). At the same time, the carbon intensity index of electricity sales was down by 21%.

Compared to 2022, in **2023** absolute emissions were up by 17% due to an increase in volumes sold from renewable sources (+1.2 TWh, or +37%) that is lower than the increase in total volumes sold (+2.4 TWh, +21%, due to the increase in the customer base, including in the safeguarding service); however, the intensity index was up by 3% due to higher volumes from renewables sold on the free market (40.5% in 2022 and 42.8% in 2023).

Compared to 2019, the 2023 reporting shows an **11% reduction in absolute Scope 3 emissions from the sale of electricity and a 24% reduction in the carbon intensity index**.

In summary, considering the scope of greenhouse gas emissions for which the reduction objective by 2030 has been defined, the **fourth annual report** after the validation of the objectives by SBTi allows us to determine, keeping in mind the same volumes sold in last-resort gas services, these showed a **decrease of 14%** compared to 2019. Also considering the increase in volumes sold in last-resort gas services, significantly influenced by the trend of the energy market in the last period, the overall emissions relating to the perimeter of the SBT target are reduced by 7% compared to the base year.

Hera Net Zero

During 2023, Hera explored the opportunity to communicate its **Net Zero ambitions** with a **climate transition plan** in line with science and the Paris Agreement.

To this end, a project was launched and a working group set up, coordinated by the **Shared Value and Sustainability** and **Strategy, Regulation and Local Authorities** directorates, which saw the involvement of numerous other functions, directorates and business units such as Energy management, Enterprise risk management, Investor relations, Renewable energy production, Ecological transition, Hera Comm, Herambiente and HSE.

Numerous meetings were held to understand the **challenges** involved in preparing an **ambitious, solid and credible** climate transition plan and thus to identify and seize the **opportunities** arising from the transition to a low-carbon economy.

After benchmarking the ambitions disclosed by other companies and reviewing reference standards and frameworks, possible **levers for decarbonisation** were identified, specifically: energy efficiency, the use of renewable energy for internal consumption, renewable energy production, carbon capture and storage, electrification of its customer base and the sale of renewable electricity. In-depth sessions were then organised on the scenarios and on **Hera's positioning in some key areas**:

- evolution of gas and electricity demand;
- carbon capture, storage and utilisation (**CCUS**);
- development of renewable energy from **photovoltaics**;
- **carbon credits** for emission offsetting and carbon sequestration;
- development of **energy efficiency in buildings**;
- development of the market for **renewable energy guarantee of origin certificates**.

At the time of writing, these investigations are ongoing with the aim of **drafting** a climate transition plan for all Scopes (1, 2 and 3) **in the coming months** and **notifying stakeholders** of its Net Zero commitment.

Emissions avoided, offset or absorbed

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GREENHOUSE GAS EMISSIONS AVOIDED, OFFSET OR ABSORBED

thousands of tonnes CO ₂ e	2021	2022	2023
Avoided emissions	902.6	913.3	974.5
Offset emissions	582.8	765.2	941.0
Sequestered emissions	0.8	1.5	2.3
Total avoided, offset or sequestered emissions	1,486.2	1,680.0	1,917.8

Thanks to the activities managed by the Group, around **1.9 million tonnes** of greenhouse gases were avoided overall in 2023. Comparing this value to the number of residents served, **457 kilogrammes of greenhouse gases per person were avoided**.

The emissions avoided as a result of the following activities have been considered in the calculation:

- separate collection sent for recovery;
- Aliplast’s sale of recycled plastic compared to the sale of virgin plastic;
- production of electricity from renewable sources sold to the grid compared to the national thermoelectric mix;
- use of district heating compared to traditional heating with methane, LPG and diesel boilers;
- consumption of biomethane produced compared to fossil methane gas;
- HSE energy efficiency interventions on industrial customers and public administration buildings that are not customers of the Group;
- development of public recharging infrastructures;
- to a lesser extent, use of recycled paper for printing bills compared to bills printed on non-recycled paper and digitisation of documents compared to the use of paper.

In addition, **emission offsets** from the sale of methane gas to customers are also included in the calculation (see section “[Renewable energy for our customers](#)” for more details) and, to a lesser extent, **CO₂ sequestration** from trees planted as a result of the Group’s initiatives, which can be estimated at 2,300 tonnes for 2023 (as per disclosure requirement E1-7 - Greenhouse gas absorption and greenhouse gas mitigation projects financed with carbon credits; see case study ‘More than 24,000 trees planted by 2024’ for more details).

Attachments

CASE STUDIES

Energy - Pursuing carbon neutrality

Energy transition and renewables

The development of photovoltaics in landfills

In July 2023, the **new photovoltaic system in Galliera** (Bo) was commissioned, built on an exhausted landfill and made up of 2.5 thousand panels for a total installed power of **1 MW**. The expected electricity production is 1.4 GWh per year and will be **totally fed into the grid**, leading to an expected benefit of 600 tonnes of greenhouse gases avoided each year.

In addition, in the early months of 2024, Hera obtained authorisation for the construction and operation of another photovoltaic system on a closed and restored landfill in **Castel Maggiore**, which is also in the Bologna area. The new system will contain almost **6.5 thousand panels** for a total power of approximately **4.2 MW**, which is set to produce around 6.6 GWh of electricity per year, which is equivalent to around 3,000 tonnes of greenhouse gases avoided each year. The plant will be divided into two sections with a power of 3.2 MW and 1.0 MW (the latter may be dedicated to a **renewable energy community**).

Finally, the authorisation process is also underway for the construction of an additional **7.5 MW photovoltaic system** at the Ravenna landfill.

The construction of photovoltaic systems on exhausted landfills is promoted by the Emilia-Romagna region and by national legislation through incentives and simplifications since these projects also offer an opportunity **to avoid consuming soil**, given that they are developed on areas that are difficult to use for other purposes, for example for cultivation.

These initiatives are another example of how much the Hera Group strives to be a key driver on the path towards the energy transition and the electrification of consumption, with innovative tools for energy efficiency and self-production.

The development of photovoltaics in landfills contributes to the achievement of targets 7.2, 9.1, 9.2, 9.4 and 13.2 of the UN 2030 Agenda.

The development of energy parks and agrivoltaics

The **Energy park** project is an innovative model of sustainable development, which combines energy transition and attention to the environment in a single area, forming a single green infrastructure for the generation of renewable energy and the protection of biodiversity.

The project has four pillars:

- The production of renewable energy in synergy with agriculture using **agrivoltaic systems**;
- Safeguarding the ecosystem by protecting and expanding biodiversity;
- The conversion to sustainable agriculture by promoting best agricultural practices;
- The creation of an area for the community through the creation of an urban forest.

Energy park initiatives were launched in Bologna and Faenza during 2023.

A site for construction was identified in **Bologna** near via Stalingrado, which Hera has acquired. The project will use an area of 70 hectares and will see the installation of **20 thousand bifacial photovoltaic panels** with a total power of approximately 14MW which will allow the generation of over 20 GWh per year (consumption of 7,400 “typical” families), reducing Bologna’s carbon footprint by approximately 9,000 tonnes of greenhouse gases and increasing the city’s energy self-sufficiency.

In **Faenza**, the land owned by Società Agricola le Cicogne Srl, established by the Fondazione Banca del Monte e Cassa di Risparmio Faenza and by Crédit Agricole Italia, was acquired. The dimensions are similar to the Energy Park in Bologna.

The authorisation procedures prior to the operational and construction phase of the Energy parks are set to be launched in 2024.

In 2023, thanks to a **partnership with Orogel**, a Cesena cooperative leader in Italy in the production of fresh frozen vegetables, the **Horowatt** company was born to produce renewable energy and promote the energy transition.

Horowatt's first area of intervention concerns the construction of a 5.1 MW **agrivoltaic system** which will be built on approximately 13 hectares of land near the Orogel plant in Cesena and will be able to produce **approximately 8 GWh** each year, equal to 25% of the overall energy needs of the industrial sector.

The photovoltaic panels will be mounted on metal structures at a minimum height of 2.1 metres above the ground to allow agricultural activities to be carried out below. In addition, thanks to an integrated automation system with sensors on the land, **the panels can be oriented** not only to adapt to the position of the sun and guarantee maximum energy efficiency, but also to respond to specific agricultural needs, for the benefit of the crops underneath ("Agriculture 4.0").

The plant will pave the way for additional future initiatives aimed at **developing a new agriculture model**, which combines food production with energy production **without soil consumption** in a sustainable manner.

Authorisation to carry out the works and to then start constructing the plant should be obtained in 2024.

Thanks to these initiatives, Hera will be able to initiate concrete actions in the field of renewables and sustainability, pooling its best skills and experience to support residents, businesses and public administrations towards the energy and environmental transition.

The development of Energy parks and photovoltaics contributes to the achievement of targets 7.2, 9.1, 9.2, 9.4 and 13.2 of the UN 2030 Agenda.

The development of the hydrogen supply chain: hydrogen valleys

The Hera Group is implementing "**Hydrogen valley**" projects in Modena and Trieste where **hydrogen will be produced from renewable sources** to support decarbonisation in industrial sectors, SMEs and local transport and at the same time promote **the reuse of disused industrial areas**, thus contributing to the sustainable management of the area and promote the development of local economies.

In particular, the **IdrogeMO project in Modena**, carried out in conjunction with Herambiente and Snam, consists of:

- A **photovoltaic system with 6.3 MW** of power divided into 5.3 MW of ground-mounted photovoltaic units, which will be built on the slopes of the disused landfill in Via Caruso, and 1 MW of floating photovoltaic units, located on the body of water located north of the project site. This system will also come with a **battery electric energy storage system (BESS)**;
- A **green hydrogen production system** using a **2.5 MW** power electrolyser which will lead to the production of **approximately 400 tonnes per year** of green hydrogen per year (approximately 13 GWh) and from compression and loading systems in hydrogen tube trailers.

The overall cost of the work is 20.8 million euro, approximately 94% of which is financed by the funds of the National Recovery and Resilience Plan (NRRP) through financing line 3.1 ("Hydrogen production in abandoned industrial areas (Hydrogen valleys)") which falls under Mission M2 ("Green revolution and ecological transition") Component C2 ("Renewable energy, hydrogen, network and sustainable mobility"). Authorisation procedures are set to begin at the beginning of 2024, with the plant being commissioned in 2026.

In **Trieste**, AcegasApsAmga signed a partnership agreement with Hestambiente to also participate in the NRRP M2C2 Inv.3.1 tender.

The project, submitted to the Friuli-Venezia Giulia Region, involves the installation of a platform with an annual production capacity of **370 tonnes of renewable hydrogen** (approximately 12 GWh), of which approximately 116 tonnes are produced thanks to the energy of a dedicated photovoltaic system of at least **4.5 MW** of power which will be installed in a degraded area ("Ex-Esso") within the Trieste Site of National Interest, allowing an area with otherwise unused production potential to be maximised. The photovoltaic system will be equipped with an **electrical energy storage system**, suitably sized, which will allow maximum use of self-produced electrical energy during the hours of lower or no energy production.

The initiative also envisages **industrial symbiosis** between the hydrogen production platform and the waste-to-energy plant in Trieste which involves the reuse of the purge water from the evaporative cooling towers of the waste-to-energy plant as part of the renewable hydrogen production process.

For the project, a loan of 14 million euro was requested from the Region to partially cover the entire investment. The construction of the plant and its commissioning are expected to be completed by 2026. Letters of intent were also signed with Trieste Trasporti S.p.A., CoSELAG (Local Economic Development

Consortium of the Julian Area) and Adriafer S.r.l. to use renewable hydrogen mainly in the sectors of **local public transport, rail and road transport** in the port and dry port logistics of the port of Trieste and in **road transport** serving the industrial area of the province of Trieste.

For the construction of the portion of the plant intended solely for the production of renewable hydrogen, AcegasApsAmga also obtained financing amounting to 1.5 million euro from the European tender “HORIZON - JTI - CleanH2 - 2022-06-01: Hydrogen valleys”. AcegasApsAmga is a partner of the North Adriatic Hydrogen Valley (NAHV) consortium, financed by the aforementioned European tender, which aims to create an economic, social and industrial ecosystem based on the hydrogen supply chain. This ecosystem, thanks to the collaboration between companies, research institutes and public bodies from Friuli-Venezia Giulia, Slovenia and Croatia, aims to become the first cross-border hydrogen valley. In this context, AcegasApsAmga proposes, in addition to the initiative described above, an asset readiness study to evaluate the possibility of introducing a mixture of renewable natural gas and hydrogen with gradually increasing percentages of hydrogen into the current natural gas distribution network.

For both projects, participation in the NRRP tender was successful in 2023 with the entire available funding being awarded; the design of the hydrogen and photovoltaic systems, necessary **to start the authorisation process**, could therefore begin.

In 2024, the authorisation process should come to an end and the activities relating to the main works and supplies will start being awarded.

The development of the hydrogen chain contributes to the achievement of targets 7.2, 9.1, 9.2, 9.4 and 13.2 of the UN 2030 Agenda.

The development of smart grids

Hera and **Gridspertise**, an Enel Group company dedicated to the digital transformation of electricity grids, have signed a collaboration agreement aimed at **developing the smart grids of the future**.

This agreement concerns the trial of an **integrated system for collecting and measuring data** from Hera Group’s gas devices and Gridspertise’s smart meters for electricity grids. The multi-service gas-electricity integration tests will be carried out in Italy on the network managed by Inrete Distribuzione Energia, the Hera Group’s distribution company.

With this activity, the two companies will combine their expertise and achieve **technical synergies** in the area of **network digitisation**. In particular, Hera will be able to count on its experience in the field of **smart gas meters**, where it patented the advanced NexMeter, the first of its kind internationally in terms of technology and safety functions adopted, also in terms of reducing gas dispersion into the atmosphere. Gridspertise will provide its most innovative solutions for an integrated management of metering data to help develop **new smart and sustainable grids**, to accelerate the digital transformation of electricity infrastructures. In recent months, Gridspertise has signed agreements with the Hera Group for the supply of 435 thousand smart meters and concentrators, as well as an innovative remote management system that will be used in the trial; at the same time, Hera has made plans to install 310 thousand gas NexMeters by 2027, 250 thousand of which are already operational, and 449 thousand 2G electric meters, 149 thousand of which have already been installed.

The result is a package of network management solutions whose key element consists in facilitating the energy transition. Based on the results of the trial, the two companies will evaluate joint participation in future tenders, which will also be held outside Italy, in which hardware and software solutions for gas and electricity metering will be sold. This collaboration may also extend, at a later stage, to solutions concerning the integrated water cycle, in terms of both metering and smart water grids.

The results of this collaboration may also interest multi-utility companies **abroad**, thus extending the outstanding technology conceived and developed in our country to international markets.

In Trieste, **AcegasApsAmga** is performing interventions on the electricity distribution network to encourage the reduction of greenhouse gas emissions by **bringing about an increase in the electrification of final consumption** and increasing the “Hosting capacity” of the grids, i.e. the system’s ability to accommodate more energy electricity generated from renewable sources.

The proposed actions aim to guarantee a solid development basis for initiatives aimed at ports (cold ironing, advanced logistics platforms, integration of renewable energy sources) and the related integration into the urban fabric with its own requirements, all in conjunction with developments set out in Terna’s strategic plan for the reinforcement of the high voltage electricity grid in the Trieste area.

The characterisation of the smart grid has its origins in the adoption of innovative software solutions, guaranteeing the full effectiveness of the construction, adaptation and enhancement activities of the planned physical grid assets.

In 2023, the focus was on the design and procurement of the main plants and infrastructures, while in 2024 the work to lay the new medium voltage lines and upgrade the “Cacciatore” primary substation will begin.

In addition, 1,130 robotized secondary substations will be in operation by 2023 to support the electrification of consumption and the widespread generation of renewable energy. The target for 2027 is to robotize 1,260 secondary cabins.

The development of smart grids contributes to the achievement of targets 7.3, 9.1, 9.2, 9.4, 11.3 and 17.17 of the UN 2030 Agenda.

Climate change mitigation

Hera for Bologna carbon neutral city

The Hera Group is one of the main partners of the Municipality of Bologna in the commitment that the municipal body signed as part of the launch of the “Climate City Contract” with the aim of **achieving carbon neutrality in Bologna by 2030**.

To achieve this, various interventions have been discussed, which aim to contribute to the reduction of greenhouse gas emissions and which will be included in the Action Plan prepared by the Municipality.

Expansion of district heating networks through the interconnection of CAAB-Pilastro and Berti-San Giacomo systems: the project involves connecting four currently separate district heating systems by laying approximately 8.3 km of network and increasing the potential of the thermal generation section at the Frullo waste-to-energy plant for the power supply of the four interconnected systems. The project allows heat to be recovered so it can be used for district heating purposes for approximately 108 Gwh/year. The CAAB-Berti interconnection is expected to be commissioned by 2025. 53% of the project is financed by NRRP funds.

Power-to-gas (see [“The development of biomethane”](#)): the project involves the construction of an experimental plant at the Idar di Bologna purifier consisting of:

- a biological methanation reactor for the **production of biomethane** from green hydrogen produced in an electrolyser and from sewage sludge and biogas from the Idar digesters;
- a membrane upgrading system for the production of **more biomethane** from biogas still coming from the digesters.

Overall biomethane production is estimated at **1.1 million cubic metres each year**. The plant is set to be started up by 2025. 84% of the project is financed by NRRP funds and is carried out in partnership with the company Pietro Fiorentini.

Energy Park for the Tecnopolo Manifattura (see the case study [“The development of Energy parks and agrivoltaics”](#)): the project involves the construction of a 14 MW Energy park which includes:

- a shared area of land for both agriculture and agrivoltaic panels for virtuous and synergistic agricultural and energy production for the community;
- a wooded area for the absorption of carbon dioxide, the protection of biodiversity and a recreational space for residents.

The project is set to be completed by 2030.

Photovoltaic system at the San Vitale aqueduct plant in Calderara di Reno: the project involves the construction of a photovoltaic system of approximately 4 MW at the Hera aqueduct plant in San Vitale. Commissioning is expected by 2025.

Energy efficiency improvement in process sections: a series of energy efficiency interventions implemented between 2018 and 2022 at the Group’s plants, networks and offices such as:

- Idar purifier (electricity consumption reduced by 459.8 Mwh/year);
- Bologna’s primary aqueduct system (reduction in electricity consumption of 796.1 Mwh/year);
- Plants for district heating (reduction of 63.9 MWh/year in electricity consumption and of 440.6 thousand cubic metres/year in methane gas consumption);
- Installation of LED lamps at Hera offices (reduction in electricity consumption of 116.0 Mwh/year);
- Gas distribution networks (reduction in electricity consumption of 72.6 MWh/year and methane gas consumption of 36.4 thousand cubic metres/year).

Production of biofuels from used vegetable oils: circular economy project with the aim of collecting and giving a second life to used vegetable oils in order to produce biofuel of plant origin. The oil coming from urban collection and catering in the municipal area is transformed into HVO (Hydrotreated vegetable oil)

biofuel at the Eni Biorefinery in Porto Marghera (Ve). The initiative allows approximately 131 thousand litres/year of biofuel to be produced.

Production of biomethane from urban organic waste (also see “[The development of biomethane](#)“): production of biomethane (and quality compost) from the organic portion of solid urban waste in the Sant’Agata Bolognese plant, now active since 2018. The biomethane produced is introduced into the network and marketed as a transport fuel, to power public and private vehicles, including **some Hera waste collection vehicles** and the Tper public mobility fleet used in the Bologna area (including the shuttles that connect Bologna Airport with the City).

Hera for Bologna carbon neutral city contributes to the achievement of targets 7.2, 9.1, 9.2, 9.4, 11.3, 11.6, 12.2, 12.4, 12.5 and 13.2 of the UN 2030 Agenda.

In order to provide information on the carbon footprint of certain products, since 2018 Aliplast has been carrying out a broad calculation of the carbon footprint of five product types: PE granules, PE films, PET granules, PET plates, PET flakes.

Aliplast measures the carbon footprint of its products

Aliplast commissioned this study in order to carry out research on the environmental **performance of these products**, as regards global warming, and to quantify the greenhouse gas emissions related to a functional unit of each product (set at one kilogram), in order to identify the phases of their life cycle showing the highest environmental criticalities and **intervene** so as to reduce their environmental impact. The European impact methodology EF v3.0, developed by the Joint Research Centre for the Product Environmental Footprint (PEF) initiative, was used. One of the outcomes of the LCA is the amount of CO₂ equivalent, whose calculation method is the IPCC 2013 Gwp 100, contained in EF v3.0.

The project involved **analysing the greenhouse gas emissions of Aliplast products and comparing them with those of the corresponding virgin products**. The result, expressed in kg of CO₂ equivalent, states that in 2023, with a production of approximately 100 thousand tonnes of PE granules, PE films, PET granules and regenerated PET sheets, the production of approximately 210 thousand tonnes of CO₂ equivalent was avoided, which is equal to over 500 thousand barrels of oil. The greenhouse gas savings achieved thanks to the contribution of suppliers and customers who choose Aliplast’s recycled products is comparable to the emissions of approximately 120 thousand cars running on gas and travelling 10 thousand kilometres in a year.

Aliplast’s activity for measuring the carbon footprint of its products contributes to achieving **UN 2030 Agenda target 11.6, 12.2, 12.4, 12.5 and 13.2**.

GREENHOUSE GASES: METRICS AND TARGETS

Criteria for calculating greenhouse gas emissions

The Ministry of the Environment’s coefficient (expressed in CO₂e) for natural gas consumption in stationary plants, and the Defra 2023 coefficients (expressed in CO₂e) for fuel consumption for industrial purposes (diesel, LPG) and in vehicles (diesel, petrol, methane, LPG) were used to estimate the Scope 1 emissions.

Greenhouse gas emissions from landfills have been estimated by considering the methane contained in the biogas leaving the landfills and the carbon dioxide resulting from the combustion of the captured biogas, subtracting the amounts corresponding to the presence of biodegradable matter. For waste-to-energy plants, the estimate included the carbon dioxide resulting from the combustion of the non-biodegradable part of the waste (estimated following ENEA’s guidelines) and other fuels used in the plant. Leaks from the gas network were estimated and considered to be fully dispersed into the atmosphere.

The global warming potential (GWP) considered for methane is 28 (Source: 5th Assessment Report of the IPCC).

To estimate electricity consumption emissions (Scope 2), Ispra’s “National Inventory Report 2023” coefficients were applied to the location-based method and AIB’s “European residual mixes, results for the calendar year 2022” to the market-based method (expressed in CO₂e).

To estimate Scope 3 emissions, the Defra 2022 coefficients were used (expressed in CO₂e), with the exception of emissions from sales of non-renewable electricity, for which the coefficients from Ispra’s “National Inventory Report 2022” were used.

The entry “Sale of natural gas - downstream” considers emissions resulting from consumption by customers of the gas sold. The entry “sale of electricity” considers emissions resulting from the consumption of fuels for the generation of electricity sold to customers (net of the portion of renewable electricity). The entry “sale of natural gas - upstream” considers emissions from the production of gas sold to customers. The entry “emissions related to energy production and consumption” includes: (i) the production of gas consumed in industrial cogeneration plants installed at third-party premises; (ii) emissions produced by the joint venture plants of Tamarete, Teverola and Splanise (downstream); (iii) electricity network losses (upstream); (iv) the production of fuels used to generate the electricity consumed internally (net of the portion of renewable electricity) (upstream); (v) the production of fuels consumed in Group vehicles (upstream). The entry “other indirect emissions” includes: (i) the use of vehicles by suppliers for waste collection (upstream); (ii) the use of vehicles by suppliers for waste transport (upstream); (iii) recycling operations for glass, plastic and paper sent for recovery and sold (downstream); (iv) bill printing (upstream).

With regard to greenhouse refrigerant gases, the companies Hera Spa, AcegasApsAmga, Hera Servizi Energia, Herambiente, HeraTech, InRete Distribuzione Energia, and Uniflotte provide for special monitoring and management methods by adopting specific operating instructions and procedures.

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INDIRECT GREENHOUSE GAS EMISSIONS

tonnes of CO ₂ e	2021	2022	2023
Emissions from the purchase of goods and services	173	205	197
Emissions related to fuel and energy consumption	4,332,535	4,575,924	4,960,813
Emissions from the use of leased assets	91,715	85,618	70,291
Total Scope 3 emissions - upstream	4,424,423	4,661,747	5,031,301
Emissions from treatment of products sold	409,862	451,680	386,161
Emissions from use of products and services sold	6,561,623	6,898,371	6,100,146
Emissions from investments made	327,561	239,345	174,888
Total Scope 3 emissions - downstream	7,299,047	7,589,396	6,661,194
Total indirect emissions - Scope 3	11,723,470	12,251,142	11,692,495

EMISSION INDICATORS

Indicator	2021	2022	2023	Target 2027	Target 2030
Direct emissions Scope 1 (kt CO ₂ e)	981,8	936,6	935,6	889	814
Eu-Ets Scope 1 emissions (% of total Scope 1)	15,1%	16,0%	13,6%	n.d.	n.d.
Indirect Scope 2 emissions from electricity consumption (market-based) (kt CO ₂ e)	46,6	0,0	0,0	0	0
Total emissions Scopes 1+2 (kt CO ₂ e)	1.028,4	936,6	935,6	889	814
Scope 1+2 emissions (% reduction vs. 2019)	-9%	-17%	-17%	-21%	-28%
Scope 3 indirect emissions from natural gas sales (downstream) (kt CO ₂ e)	6.373,8	6.112,9	5.307,6	4.753	4.385
Scope 3 indirect emissions from natural gas sales (downstream) (% reduction vs. 2019)	+2%	-2%	-15%	-24%	-30%
Scope 3 indirect emissions from electricity sales (kt CO ₂ e)	3.170,3	3.357,1	3.914,1	2.668	2.141
Scope 3 indirect emissions from electricity sales (% reduction vs. 2019)	-28%	-23,5%	-11%	-39%	-49%
Total emissions Scopes 1+2+3* (kt CO ₂ e) 2	10.572,5	10.406,6	10.157,4	8.310	7.422
Total emissions Scopes 1+2+3* (% reduction vs 2019)	-10%	-12%	-14%	-29%	-37%
Total avoided, offset or absorbed emissions (kt CO ₂ e)	1.486,2	1.680,0	1.917,8	n.d.	n.d.
<i>of which: avoided emissions</i>	902,6	913,3	974,5	n.d.	n.d.
<i>of which: offset emissions</i>	582,8	765,2	941,0	n.d.	n.d.
<i>of which: absorbed emissions</i>	0,8	1,5	2,3	n.d.	n.d.

*The Scope 3 value reported relates to the sale of natural gas (downstream) and the sale of electricity. The Scope 3 data relating to the sale of methane gas do not consider the transitory increases in volumes sold in last-resort services. The Scope 3 data relating to the sale of natural gas for 2021 have been aligned with the calculation methodology used for the 2022 data.

EMISSION INTENSITY INDICES

Indicator	2021	2022	2023	Target 2027	Target 2030
Carbon intensity index of electricity sales (t CO ₂ e from electricity sales / MWh electricity sold)	0,281	0,288	0,278	0,196	0,183
Carbon intensity index of electricity sales (t Co ₂ e ₂ e from electricity sales/MWh electricity sold) (% reduction vs. 2019)	-23%	-21%	-24%	-46%	-50%
Carbon intensity index of production value (t CO ₂ e Scopes 1+2 / production value in mnEuro)	1.164,0	656,7	847,7	n.d.	n.d.
Ebitda carbon intensity index (t CO ₂ e Scopes 1+2 / Ebitda in mnEuro)	840	723	626	n.d.	n.d.
Carbon intensity index per resident served (CO ₂ e Scopes 1+2 / k residents)	243	223	223	n.d.	n.d.
Carbon intensity index per customer (CO ₂ e Scope 3 / k customers)	5,2	5,2	4,5	n.d.	n.d.

RISKS AND OPPORTUNITIES

Indicator	2021	2022	2023	Target 2027	Target 2030
Hera Ebitda aligned to EU Taxonomy (climate mitigation and adaptation) (% of eligible Ebitda)		88%	90%	n.d.	n.d.
Hera revenues aligned to EU Taxonomy (climate mitigation and adaptation) (% of eligible revenues)	-	88%	94%	n.d.	n.d.
Ebitda CSV Driver Energy (mnEuro)	225,1	216,0	282,1	n.d.	n.d.
Ebitda CSV Driver Waste management (mnEuro)	292,0	393,3	422,1	n.d.	n.d.

INVESTMENTS AND USE OF CAPITAL

Indicator	2021	2022	2023	Target 2027	Target 2030
Hera CapEx aligned to EU Taxonomy (climate mitigation and adaptation) (% of eligible CapEx)	-	90%	92%	n.d.	n.d.
Hera OpEx aligned to EU Taxonomy (climate mitigation and adaptation) (% of eligible OpEx)	-	72%	73%	n.d.	n.d.
CSV Driver Energy investments (mnEuro)	85,0	95,0	170,6	n.d.	n.d.
CSV Driver Environment investments (mnEuro)	164,3	259,8	356,0	n.d.	n.d.
CSV Driver Local areas (and businesses) investments - Resilience and adaptation (mnEuro)	105,7	31,9	223,0	n.d.	n.d.

REMUNERATION

Indicator	2021	2022	2023	Target 2027	Target 2030
Portion of BSC premium linked to CSV Energy drivers (% of total variable remuneration)	4%	7%	5%	n.d.	n.d.
Portion of BSC premium linked to CSV Environment drivers (% of total variable remuneration)	13%	9%	7%	n.d.	n.d.

OTHER METRICS – ENERGY

Indicator	2021	2022	2023	Target 2027	Target 2030
ISO 50001 Energy saving measures (% reduction vs base year)	-6,8%	-6,9%	-7,6%	-9%	-10%
Internal consumption of grid electricity from renewable sources (%)	82,3%	100%	100%	100%	100%
Electricity and gas contracts at the end of the year with at least one energy-saving solution (% of total free market household contracts)	32,1%	34,3%	35,7%	42%	43%

Indicator	2021	2022	2023	Target 2027	Target 2030
Renewable electricity sold to customers on the free market (% of total volumes sold on the free market)	45,5%	40,5%	42,8%	56%	50%
Natural gas with offsetting of gas emissions sold to free market customers (% of total volumes of gas sold on the free market)	11,2%	14,2%	20,4%	n.d.	n.d.
Energy production from renewable sources (GWh)	698,3	716,1	744,3	n.d.	n.d.
District heating energy mix from renewable, recovered or high efficiency sources (%)	66,9%	68,8%	66,2%	79%	n.d.
Housing unit equivalents served by district heating (no.)	91.410	96.825	97.135	n.d.	n.d.
Public and private charging points installed for electric transport (no.)	1.252	1.886	2.170	>5.100	n.d.

OTHER METRICS - RESOURCES

Indicator	2021	2022	2023	Target 2027	Target 2030
Waste sent for material and energy recovery in Herambiente's sorting plants (t)	344.360	349.444	378.300	n.d.	n.d.
Waste sent for material and energy recovery in Herambiente's sorting plants (%)	80,8%	80,6%	84,8%	n.d.	n.d.
Plastic recycled by Aliplast (thousands of tonnes)	80,9	79,2	84,6	120	149
Reduction in internal water consumption (% vs 2017)	-17%	-20,5%	-21,5%	-24%	-25%
Water network leakage (mc/km/day)	8,1	8,1	-	7,4	n.d.
Reusable purified wastewater (%)	6,0%	7,3%	10,1%	14%	18%
Water contracts with Consumption Log (% of total residential customers)	27%	35%	37,5%	77%	n.d.