3

RELATIONS WITH THE ENVIRONMENT

Acea Photo Contest
Andrea Geracitano (Areti)
San Vittore del Lazio waste-to-energy plant

ENVIRONMENTAL SUSTAINABILITY AND THE PRIMARY CHALLENGES

Studies conducted by the World Economic Forum (WEF), including the most recent *Global Risks Report 2024*, highlight environmental risks among the "**top ten global risks**". Specifically, the consistent increase in the global temperature and related extreme events, the loss of biodiversity and collapse of ecosystems are **perceived as the greatest and most serious global threats over the long-term** (ten years), (see also the *Cop28 boxes: agreements to transition away from fossil fuels* and the *Biodiversity Crisis: Policies and Tools for Biodiversity Protection*)[150].
In 2023, the European Commission continued to develop Regulation 2020/852 (so-called "European Taxonomy"), based on Delegated Acts, introducing a list of economic activities and the related technical screening criteria referring to the additional four environmental goals[151] and reviewing certain activities that could contribute to achieving the two climate goals (see also *Disclosing sustainability: methodological note* and the chapter *Information required by the European Taxonomy*).
Against this backdrop, Italy is implementing its National Recovery and Resilience Plan (NRRP) to **support and promote Italy's ecological transition**, in line with the **European Green Deal** and the **Next Generation EU** recovery package. Furthermore, in 2023, Italy adopted the *National Climate Change Adaptation Plan* (PNACC), a strategy for becoming more resilient to climate crises, and worked on a proposal to update the *National Integrated Energy and Climate Plan 2030* (PNIEC), with new goals and scenarios reflecting the amendments to European legislation.

Mindful of operating in the scope of interdependence between the environment, the territory and the community, Acea endorsed its commitment to sustainable development in its ***Code of Ethics***, updated at the end of 2022, stating that "*Acea intends to conduct its business while respecting the principles of sustainable development and contributing to the pursuit of the UN Sustainable Development Goals (2030 Agenda) and as they are implemented at European (Green Deal) and national level*" and "*Acea recognises the environment as a primary asset and is committed to adopting responsible behaviour aimed at reducing environmental impacts and preventing pollution, taking into due consideration the interests of new generations and acting in accordance with the generational pact*".

With regard to the issues relating to **climate change**, in 2023, Acea published the Group's second *Climate-related Disclosure*[152], according to the recommendations of the *Task Force on Climate-related Financial Disclosures* (see the specific information box) with its goals to reduce climate-altering emissions (GHG) endorsed by the Science Based Targets initiative (SBTi) (see also *Corporate Identity*).

In 2023, with regard to **managing water**, in agreement with the relevant institutions, Acea continued preparatory actions for the construction of the new upper section of the Peschiera-Le Capore Aqueduct to safeguard the water supply in the city and province of Rome. In this regard, the Technical and Economic Feasibility Studies were completed and the authorisation procedures for certain sections are underway. Also of significance, the collaboration between the Group's water companies and Universities on the forecast studies on **aquifer water availability**, aimed at preserving and/or increasing the resilience of the entire water system.

Acea has played a primary role with regard to the **circular economy**, for a number of years, with activities aimed at **reducing waste of resources**, for example by utilising process waste and enabling **recovery of energy** and **secondary raw materials**. In this context, the Group has progressively expanded in the field of waste management (Environment business). For example, the waste processing and disposal company**Deco**,operates a Mechanical Biological Treatment plant for municipal solid waste, one of the largest and most technologically advanced facilities in Europe, which transforms biostabilised waste into Solid Recovered Fuel (SRF), used to power dedicated and non-dedicated plants, such as waste-to-energy plants and cement plants, with less than 35% of incoming waste going to landfills.
Once again, in 2023, the Acea Group attended Ecomondo, the top green and circular economy trade fair in the European and Mediterranean area, presenting a series of projects the main business areas developed (see box).

ACEA RECOGNISED AT ECOMONDO 2023: CIRCULAR ECONOMY AND THE MANAGEMENT OF WATER RESOURCES

Acea took part in Ecomondo, which was held in Rimini from 7 to 10 November 2023. This international event provided an opportunity for discussion between industries, stakeholders, policy makers, opinion leaders and local authorities, to define development strategies for the European Union environmental policy.
Acea presented initiatives undertaken by Acea Ambiente, Group companies operating in the **circular economy**, including: the **Tour Acea 2023 Digital Platform**, a portal providing 3D interactive and virtual visits to plants, offering significant educational opportunities, to understand the process whereby waste becomes a resource: waste-to-energy, sludge treatment, plastics regeneration, composting, biogas production, solid recovered fuel production to beginning the valorisation; the "**Urbees**" project, involving biomonitoring with bees (see specific information box "Bees as bioindicators, the Urbees project, in *The protection of the territory and safeguarding biodiversity*) and the **ACEA NOSE** project referring to the testing

150 The WEF 2024 was published in January 2024, confirming environmental risks among the top ten most serious long-term global risks.

151 In addition to mitigating climate changes and adapting to climate conditions, it refers to the sustainable use and protection of water and marine resources, transition to the circular economy, also with reference to waste reduction and recycling, pollution prevention and control, protection of biodiversity and the health of ecosystems.

152 Available on the Group website: www.gruppo.acea.it

of a central unit to measure air quality, installed on drones, conducted through flight campaigns, developed by Acea Infrastructure (see also the chapter *Companies and Institutions*).
For the second consecutive year, Acea received the **EMAS Award** (Eco-Management and Audit Scheme), assigned to the **project for the improvement of energy performance at the waste-to-energy plant at San Vittore del Lazio**, in the category "projects adopting energy from renewable sources from the perspective of energy independence".

Finally during the event, a ceremony was also held for the **Sustainable Development Award 2023**, introduced by the Sustainable Development Foundation and Ecomondo-Italian Exhibition Group, now in its thirteenth year, intended for businesses, start-ups and local Administrations that have stood our for their eco-innovation and efficiency in their environmental results. Acea was recognised in the section "**Circular management of water in collaboration with ENEA**". The award went to the **Acea Waidy® Management System** project, namely the cloud-native, flexible, scalable platform integrated with the water service management operating systems.

ENVIRONMENTAL AND CLIMATE RISKS: IN-DEPTH ANALYSIS AND DISCLOSURE

As noted earlier, climate change is one of the most significant environmental and social challenges of our era. The Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change, held in Dubai in 2023, promoted the formula "*transition away*"; transitioning away from fossils and achieving carbon neutrality by 2050 (see information box).

COP28: AGREEMENTS AIMING TO MOVE AWAY FROM FOSSIL FUELS

The 28th Conference of the Parties (COP28) under the United Nations Framework Convention on Climate Change (UNFCCC) was held in Dubai from 30 November to 12 December 2023 and dealt with the main issues that had emerged from the previous COP27: the need to transition towards a system based on renewable sources and reduce the use of fossil fuels, the request for processing and possible updates to the contributions made at national level (*Nationally Determined Contributions* - NDC), the establishment of a Fund for losses and damages, which recognises compensation to developing countries that are more vulnerable to the effects of climate change.
As required by the Paris Accord, work was done during COP28 on the third phase of the **global stock-take on climate** (GST) relating to an assessment of all the national commitments undertaken (Nationally Determined Contribution – NDC)[153]. It emerged that in summing up all the national commitments and assuming that the goals they contained were fully achieved, the goal of limiting the average temperature increase to less than 1.5°C compared to to pre-industrial levels, is still a long way off. The parties therefore entered into an **agreement to accelerate the global transition**, promoting the formula **"*transition away*"** and drawing up a roadmap to drastically reduce the use of coal, oil and gas. For the first time in history, the agreement makes explicit reference to **transitioning away from fossil fuels to achieve climate neutrality by 2050**. New goals were set in this regard: **triple renewables and double energy efficiency**, accelerate efforts to eliminate energy production from coal without offsetting, eliminate inefficient fossil fuel subsidies and **promote the acceleration of zero and low emission technologies**, including nuclear and carbon capture and storage technologies.
With the aim of aligning national goals and measures to the Paris Accord, countries were asked to make **new nationally determined contributions**. Parties needed to submit their NDCs for 2035 by COP30, in line with the best scientific data available and results of the *global stock-take*.
Finally, an agreement was reached on how the **Loss and Damage Fund** would work. This had been created and adopted to support countries that were more vulnerable to climate crises, with Italy committing to an allocation of EUR one hundred million in this regard.
The next COP29 conference will be hosted in 2024 in Baku, the capital of Azerbaijan.

Acea continued its **climate-change mitigation and adaptation strategy** with increased energy efficiency in Companies, and regarding water, the reuse of purified wastewater as process water in plants; implementing actions aimed at increasing the resilience of infrastructure; adopting a plan to significantly increase **generation from renewables**[154] and the dual objective of achieving a high level of **efficiency for final domestic usage and usage in energy processes** and **reducing carbon intensity** (gCO_2/kWh produced). The results obtained to date are positive – for example, only considering the energy generation plants of Acea Produzione, Ecogena (excluding heat) and from waste-to energy, a 20% decrease was recorded during the year in the specific intensity index for direct emissions (Scope 1) compared to 2022. Table 66 illustrates the energy intensity indices and Table 71, the emissions intensity indices.

Acea assesses **climate risks**, **classifying them into physical and transition risks**, in accordance with the CDP Questionnaire and with the recommendations of the *Task Force on Climate-related Financial Disclosures* (TCFD).

153 Work was done on the third and final phase of the Global Stock-take (GST) at COP28 in Dubai. This referred to the more political segment, where delegates of the parties decided on the wording that would be included in the document for its final approval. The second phase had been completed in September (started in June 2022). This referred to the more technical segment, with the publication of a summary document that assessed and summarised what had been done globally since the signing of the Paris Accord at COP21 in 2015. The first, involving the collection of data, had begun after COP26 in Glasgow, and required member countries to send in their climate action plans, i.e. an inventory of the emissions produced, the goals for medium (2030) and long-term mitigation (2050), and adaptation plans.

154 In particular, in 2023 the output of the photovoltaic plants of the investee company reached 84.3 MW. Added to the 16.7 MW of Acea Production, total installed capacity stood at 101 MW.

Following a second project carried out in **synergy with the main Group companies**[155] during 2022, Acea published the *Climate-related Disclosure* 2022 in December 2023, detailing the **analysis** of the different types of risk generated by climate change on the businesses managed (see the information box).

THE CLIMATE-RELATED DISCLOSURE BASED ON THE TCFD APPROACH

Acea, which has long been aware of the global challenge of climate action through to its experience with CDP, has aimed to expand its knowledge of the **application of international climate scenarios** through the development of **two consecutive projects**, of which the most recent in 2022, on the application of the approach recommended by the *Task Force on Climate-related financial Disclosures* (TCFD). The **11 Recommendations** issued by the TCFD **on Climate-Related Financial Disclosures** represent the benchmark model at international and EU level. They are **applicable to all organisations**, are **focused on risks** and **opportunities** connected to climate change and increasing the capacity for a panorama based on **precise analyses of scenarios**. The **2022 project** involved **the main Group companies**, operating in the water, energy production, energy distribution, and waste treatment and recovery sectors, **to identify the physical and pertinent transition risks**, as well as **quantify the economic-financial impact of the risks described**.

Certain key Parent Company functions also participated, especially during the phase to **prioritise the risks identified**. Once the **priority risks** to be evaluated and compared with the more representative scenarios and parameters were identified, the in-depth analysis began. In the scope of **physical risks**, most Companies selected the risk of drought and water stress. The risk of extreme precipitation and flooding (Acea Produzione, Areti and Gori), heat waves (Areti) were also examined. The outcomes of the scenario analysis on the risk of lightning strikes (Acea Ambiente and Acea Produzione), developed during the previous two-year period (2020-2021) were also confirmed as valid. In terms of **transition risks**, carbon pricing was identified as the most representative risk by most of the Companies involved.
For further details, see the Acea *Climate-related Disclosure*, available on the link: https://www.gruppo.acea.it/il-nostro-impegno/informativa-climatica-tcfd.

ENVIRONMENTAL MANAGEMENT

The majority of Group Companies have implemented **Integrated Management Systems** certified in accordance with standard UNI EN ISO (see info. box *Corporate Identity* in the chapter*Corporate governance and management systems*). The Parent Company itself has an **Integrated Management System with Quality, Environment, Safety and Energy components and a Management and Sustainability Systems Policy** aimed at respecting and protecting the environment.
The UNI EN ISO 14001:2015 Environmental Management System ensures continual improvement and the capacity to identify and manage the impacts that the Company has or could have on the **environment**, promoting compliance with the continually changing regulations in force and a proactive approach in relation to environmental sustainability as a whole.

Some Group plants are subject to an **Environmental Impact Assessment** (**EIA**) under Art. 28 of Italian Legislative Decree 152/2006, as amended, with the aim of ensuring that "human activity is compatible with the conditions for sustainable development, i.e., constructed and operated in line with the regenerative capacity of ecosystems and resources, the preservation of biodiversity and a fair distribution of the benefits of economic activity"[156]. Furthermore, sites subject to EIA or IEA (Integrated Environmental Assessment) are required to adopt an **Environmental Monitoring Plan** (**EMP**) containing the set of measures used to assess the actual impact on the work on various environmental components (water, air, soil, fauna, flora, etc.). In the water segment, projects that are usually subject to EIA are aqueducts and treatment plants with a treatment capacity of over 10,000 population equivalent.

Some plants in the Environment sector may also be subject to EIA/IEA such as, for example, the Orvieto Environmental hub, and the waste-to-energy sites in Terni and San Vittore del Lazio. The waste-to-energy plants are recorded according to the **Eco-Management and Audit Scheme** (EMAS), a tool used to evaluate and improve environmental performance and report it to stakeholders.
The commitment of the Operating Companies to maintaining the efficiency of environmental Management Systems does not entirely exclude situations, usually provoked by contingent circumstances, that generate **non-conformities** that may be challenged by the competent Control Bodies and relevant Authorities. During the year, the Companies included in the scope of reporting, received **approximately 40 environmental fines**, with the consequent payment of fines totalling around **€ 136,800**[157]. An additional 103 environmental disputes are currently being settled.
Environmental problems of greater significance are forwarded to the Units responsible, which establish the facts reported and where necessary, request the required action, as well as providing feedback to the Bodies involved. As an exception, it may happen that the Company also receives significant reports from individuals; in this case they will be checked and, where needed, it will intervene to resolve them.
In the electricity distribution sector, Areti may receive comments concerning alleged environmental damage to buildings that house electrical installations. This concerns **installations necessary for the correct exercise of the electricity distribution network**, created by the Company following **authorisations granted by Bodies which are custodians of the land** and therefore fully compliant with the legislation of reference, including both town planning and environmental

155 In 2022, along with Acea Ato 2, Areti, Acea Produzione and Acea Ambiente, the companies Acea Ato 5, AdF, Gori and Gesesa took part in the TCFS project.

156 Article 4, paragraph 3 of Legislative Decree 152/2006 on Environmental Regulations.

157 The data includes fines received in previous years but paid in 2023. With reference to Acque, Publiacqua and Umbra Acque, which are not included in the reporting boundary of the NFS, the fines paid were, respectively: € 20,308; € 30,000 and € 9,000.

legislation[158]. The Assets and Special Projects Unit, which protects the company's assets, receives the notes of dispute from the owners of the immoveable properties that host **transformer substations** or are adjacent to power lines, and subsequently the Areti Health, Quality, Safety & Environment Unit **carries out the instrumental checks** in response to the disputes. **In 2023, 7 complaints were dealt with and resolved**, with another 11 raised in previous years, also resolved.

SAFEGUARDING OF LAND AND BIODIVERSITY

The **loss of biodiversity**, the **progressive reduction of natural areas** and the **collapse of ecosystems**according to the *World Economic Forum*, are among the most significant global challenges in coming years and it is therefore necessary to **contain the factors responsible for these phenomena as far as possible**, i.e. the over-exploitation of natural resources like land use, the introduction of invasive species and air, water and ground pollution (see specific information box *Biodiversity Crisis: Policies and Tools for Biodiversity Protection*). The issues of conservation and the valorisation of biodiversity are dealt with, inter alia, in the UN Sustainable Development Goals (2030 Agenda) and referenced by the European Green Deal.

BIODIVERSITY CRISIS: POLICIES AND TOOLS FOR BIODIVERSITY PROTECTION

The importance of restoring nature in Europe is the Report published by the European Environmental Agency in 2023, which underlines the importance of measures to **restore ecosystems** with **more effective management** so as to preserve the **benefits of more healthy nature, both in environmental and social terms**, like the health of people, food security and effective climate action, and also from an **economic perspective**.
In this context, after the publication in 2020 of the ***European Biodiversity Strategy for 2030***, the European Parliament in 2023, approved the ***Nature Restoration Law***, which represents the first European legislation for the restoration of nature with **legally binding objectives** for Member States, including: the restoration and improvement of land and marine ecosystems of particular interest, the recovery of urban ecosystems and the natural re-connection of rivers and agricultural ecosystems. Specifically, the law sets the ambitious **target of restoring 20% of degraded ecosystems by 2030**, with Member States obliged to draw up a Restoration Plan by 2050, which includes quantifying the areas for recovery, the measures to achieve the goals and an implementation schedule. The commitments are aligned to the ***Kunming-Montreal Global Biodiversity Framework*** adopted during the fifteenth Conference of the Parties on Biological Diversity (**COP15**) in December 2022. During COP15, the 196 signatory countries were asked to update or formulate ***Biodiversity Strategies and National Plans***.
In 2023, during the European Business & Nature Summit in Milan, more than 350 companies, financial institutions, governments and representatives of academia and civil society met to discuss how to respect the commitments under the Global Biodiversity Framework (GBF), also launching the ***European Business and Nature Charter***. Finally, the final recommendations were published during the year by the **Taskforce on Nature-related Financial Disclosures (TNFD)**, aimed at all organisations. These recommendations include general requirements for nature-related reporting and are broken down into four pillars- **governance**, **strategy**, **risk management and impact**, **metrics and targets**-, in line with the Taskforce Recommendations on Climate-related Financial Disclosures (TCFD).
In accordance with European and international guidelines, after introducing into the **Constitution** the **fundamental principles** of "*protecting the environment, biodiversity and ecosystems*"[159], in 2023, Italy adopted the ***National Biodiversity Strategy to 2030***, defining eight specific goals and focusing on **building a consistent network of protected areas** and on the **restoration of ecosystems**. To facilitate dialogue with Environmental Associations, a consultation forum was established under the Ministry of the Environment and Energy Security, which also includes the Institute for Environmental Protection and Research (ISPRA) to ensure adequate technical and scientific support.

Acea Group Companies conduct activities that could **potentially** have **impacts on biodiversity**, such as the integrated cycle of waste, operation of power generation plants, management of water sources and treatment plants and the distribution of electricity. On this basis, Acea focuses closely on **protecting the ecosystems in areas where it operates**, as defined in the procedures of the **Environmental Management Systems**, which pursue continuous improvement with a view to reducing impacts, in the context of **assessments for the planning and creation of plants**, as well as **management** of operational areas. The Companies manage processes in compliance with the environmental authorisations issued to each plant, endeavouring to go beyond merely respecting legislation. The environmental provisions contained in the authorisations issued by the competent administrative authority are established on the basis of technical and environmental assessments considering the area surrounding each plant, to **safeguard the flora and fauna present and protect the natural environment** and the segment BAT or BEMPs[160] where applicable.
Specifically, the activities involved in the **Integrated Water Service** are aimed at the **maintenance of optimal environmental conditions** and sites where water is drawn, near to springs, are managed with attention to the **conservation of existing ecosystems and, more generally, the preservation of the water flow**.

158 In this case, the environmental regulatory reference is D.P.C.M. of 8 July 2003.

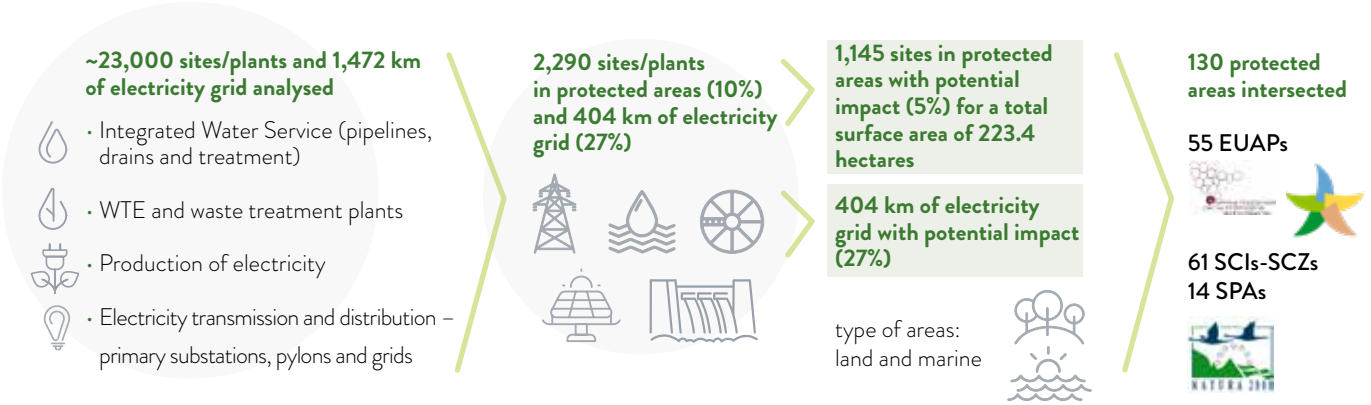
159 The Constitutional law also regulates the methods and types of protections for wildlife and specifies that private economic activity may not occur in a way that harms human health and the environment.

160 BATs (Best Available Techniques) refer to the best technical, management and control solutions able to guarantee a high level of environmental protection, BEMPs refer to **Best Environmental Management Practices**.

Likewise, with **treatment activities**, the primary goal is that **discharges**, after appropriate treatment at Acea plants, comply with the limits established by regulations in the sector and do not therefore **damage but rather protect the natural habitats of the receiving bodies of water**. In implementation of this commitment, targets have been established for **improved treatment efficiency** for certain Water Companies (see the paragraph *Strategy and sustainability*, *The 2020-2024 Sustainability Plan and operational goals*).
For **hydroelectric power stations, Acea Produzione** manages withdrawals and inputs of water in compliance with the Concessions issued by the competent authorities and with applicable regulations. **Management Projects** have been prepared for **all reservoirs**, with the relative impact studies for those in protected areas, with the goal of maintaining reservoir capacity and protecting the water quality of the reservoir and the receiving body of water, as well as guaranteeing the correct operation of discharge systems and dams (Legislative Decree 152/2006 and Ministerial Decree of 30/06/2004). The company provides for the **protection of the habitats of all species present** in order to **mitigate the effect of the artificial barrier of the dams**, which interferes with the natural migration of fish and the gradual sedimentation of the riverbed, with consequent changes in the native flora of the banks. Protection of the aforementioned basins **ensures the living conditions of the "resident" and "migratory" birds**, which use these sites for reproduction and feeding even during migration. **Acea Ambiente** manages atmospheric emissions from the **waste-to-energy plants**, in compliance with the operating authorisations issued by the competent authority and in accordance with the Air Quality Plan for the area in which the production activity is located (for more details, see the chapter on *Emissions*).
Generally, other plants in the **energy sector**, which generate electricity using fossil fuels and waste, **are incompatible with protected areas** and therefore **cannot be located within them**.

Acea has **identified those of its sites/plants located in areas with a high level of biodiversity or Protected Natural Areas (EUAP) recognised nationally and sites of the Natura 2000 Network** (SCIs, SCZs and SPAs)[161] established at European level, by **mapping of the infrastructure of the main operating companies** (Acea Ato 2, Acea Ato 5, Gori, Gesesa, AdF, Acea Ambiente, Acea Produzione and Areti)[162]. Analysis **conducted** in 2020[163] **on over 23,000 sites/plants**, including pylons but excluding underground electricity grids and pipelines, has shown that **2,290 sites**, corresponding to **approximately 10%, represent potential interference with biodiversity-rich areas**. Plants of the Environment Segment, carrying out waste-processing activity, are not located in the aforesaid areas.
Considering, instead, **only the sites/plants which could have a significant impact on biodiversity, the number drops to 1,145** and the total percentage to **5%**.
Significant impacts have been estimated taking into consideration the **design, implementation and management phases of plants**, and therefore exclude sites/plants with minimal impacts, such as the Water Kiosks of Acea Ato 2, the secondary substations of Areti and the photovoltaic plants included considered as residential plants of Acea Produzione. The analyses conducted on the **overhead electricity distribution network (1,472 km analysed)** showed interference with protected areas for approximately **27%**, corresponding to **404 km of network**.
The **total number of natural areas intersected by sites/plants/networks with a significant impact total 130** (55 EUAP, 61 SCIs/SCZs and 14 SPAs)[164] for a **total area of 223.4 hectares**.

Chart no. 49 – Acea sites/plants analysed, with potential impacts on biodiversity and protected areas intersected



Note: where SCIs/SCZs and SPAs coincide, they are only considered once under SCIs/SCZs.

These areas have **animal and plant species** habitats that are included in the **International Union for the Conservation of Nature "Red List"** as **being under threat** (in the "vulnerable", "endangered" and "critically endangered" categories)[165], i.e. at risk of extinction in the short or medium-term; these species therefore represent conservation priorities.

161 The Protected Natural Areas (EUAP) at national level are those areas recognised officially by the State pursuant to Framework Law 394/91. The Natura 2000 Network, established pursuant to "Habitat" Directive 92/43/EEC, is the main policy instrument of the European Union for the conservation of biodiversity. It is composed of Sites of Community Interest (SCIs) which are then designated as Special Conservation Zones (SCZs) and also includes the Special Protection Areas (SPAs) established by "Birds" Directive 2009/147/EC on the conservation of wild birds. The areas composing the Natura 2000 network are not reserves where human activities are excluded: the Directives intend to guarantee the protection of nature whilst also taking "account of economic, social and cultural requirements and regional and local characteristics".

162 Areas were mapped using QGIS, an open-source GIS application that enables viewing, organisation, analysis and presentation of spatial data, processing each layer of the sites/plants belonging to the Companies.

163 The analyses are based on infrastructure data of the main Group companies as at 2020. As of 2023, no significant changes had occurred.

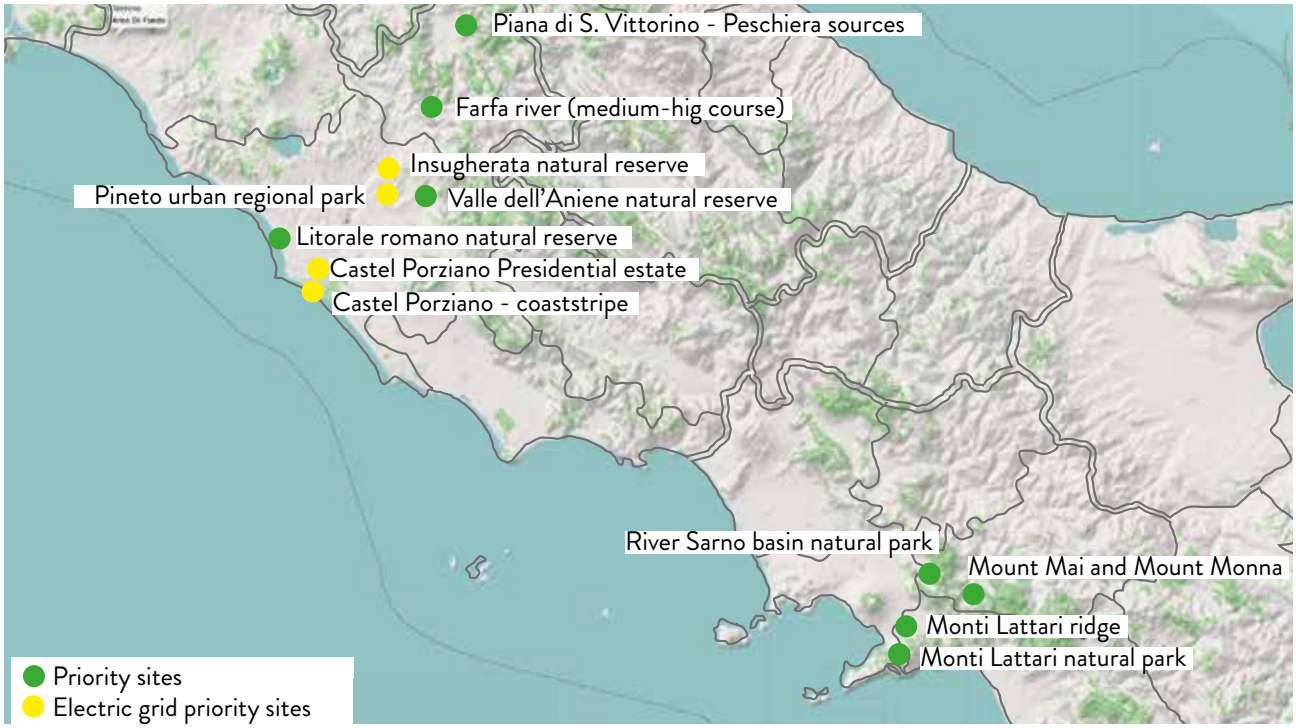
164 Where SCIs/SCZs and SPAs coincide, the areas are counted once amongst SCIs/SCZs.

165 There are 11 risk categories, from Extinct (EX), applied to species for which there is definitive evidence that the last individual example has died, and Extinct in the Wild (EW), assigned to species for which there are no longer natural populations but only individuals in captivity, through to the category Least Concern (LC), applied for species that are not at risk of extinction in the short or medium term. Between the categories of Extinct and Least Concern, there are the threatened categories, which identify species at progressive risk of extinction in the short or medium term: Vulnerable (VU, *Vulnerable*), Endangered (EN, *Endangered*) and Critically endangered (CR, *Critically Endangered*).

There are potentially 45 impacted species in the IUCN Red List: **3 plant species** (1 critically endangered and 2 endangered) and **42 animal species**, of which 7 are critically endangered, 9 are endangered and 26 are considered vulnerable (see Chart no. 50 for details).

Chart no. 50 – Number of species listed in the IUCN Red List with habitat in the protected areas intersected

With the aim of identifying the **"priority" biodiversity-rich areas** impacted by the sites/plants/electricity grids of the Group's main companies, i.e., the most fragile habitats and/or those most impacted by external factors, **Acea developed an Environmental Fragility Index (EFI)**[166]**, a tool** designed to assess the different habitats included and the portion of land occupied, the fragility of the habitat and the type of sites/plants present for each protected area impacted[167].
This led to the identification of **12 biodiversity-rich zones** considered as **priority areas** due to their increased vulnerability. In **8** of these — Parco regionale dei Monti Lattari, Dorsale dei Monti Lattari, Piana di S. Vittorino - Sorgenti del Peschiera, Riserva naturale Valle dell'Aniene, Fiume Farfa (medium-high course), Parco regionale Bacino Fiume Sarno, Monte Mai e Monte Monna, Riserva naturale Litorale Romano — **sites/plants** have potential impacts , while **4** may be affected by interference from **electricity distribution networks** (Parco Regionale Urbano Pineto, Castel Porziano — coastal area, Castel Porziano - Presidential Estate, Riserva naturale dell'Insugherata).



166 The EFI is defined based on data provided by the *Carta della Natura*, a national IT system created by ISPRA (Italian Institute for Environmental Protection and Research), which is a cartographic and evaluation tool used to identify the distribution of Italian ecosystems across the country and analyse them based on their current state, considering physical, biotic and human factors.

167 For preparation of the EFI, the initial step was calculation of the relationship between the area of each habitat and that of the protected area containing it, generating a value for the portion of the protected site occupied by each habitat. This value was then multiplied by the fragility of the habitat as defined by ISPRA (Italian Institute for Environmental Protection and Research). Following this, all of the environmental fragility values of the habitats present in each protected area were added together. Having defined the EFI for each protected area intersected, this information was then cross-referenced with the individual Group plants with significant impacts located in the protected areas (plants identified as sites with potential impacts, from "low-medium to "high"). Finally, to identify the "priority" areas with high levels of biodiversity, the IFA was multiplied by the area intersected by the plants. The higher the value for the index, the higher the "priority" of the area.

Awareness of potential interference enables optimisation of operations and the Companies have planned and/or implemented **various actions to safeguard biodiversity**, some in "priority" areas with a high level of biodiversity, as summarised in the info box.

THE MAIN PROJECTS IN "PRIORITY" AREAS WITH A HIGH LEVEL OF BIODIVERSITY

"PRIORITY" AREAS WITH A HIGH LEVEL OF BIODIVERSITY	ACTIONS
Piana di S. Vittorino - Sorgenti del Peschiera **Farfa River (medium-high course)**	The two areas are affected by the **Peschiera-Le Capore aqueduct system** managed by **Acea Ato 2** on which works are in progress to double the upper section of the aqueduct. In the **Farfa River** area, the Company has engaged the **Federico II University of Naples** to conduct a technical-scientific study on the natural characteristics of the River, which include the collection site of the Le Capore spring. The study highlighted how the release of water downstream of the Le Capore springs has benefits on the ecosystem, supporting restoration of the natural river environment with its rich diversity of animal and plant species. The River Farfa is also subject to an agreement between Acea Ato 2 and the **Riserva Naturale Regionale Nazzano**, **Tevere-Farfa**, with the aim of monitoring the evolution of the river ecosystem within the protected area.
Parco regionale Bacino Fiume Sarno	**Gori** is working on **important works to resolve pollution of the river Sarno hydrographic basin** through completion of the sewerage system and consequent collection and treatment. The project, carried out in synergy with various local players, also involves **the Marevivo Onlus environmental association** and will have significant impacts on recovery of the river ecosystem and, consequently on the entire Gulf of Naples.
Riserva Naturale Valle dell'Aniene **Riserva Naturale Litorale Romano**	To check for any critical issues in the habitats surrounding the **major treatment plants** in Rome, **Acea Ato 2** has conducted special monitoring of **areas it is responsible for and the surroundings**. Previous studies have focused on the treatment plants at Roma Nord, Roma Sud, CoBIS, Ostia, Roma Est and, in 2023, the Fregene treatment plant, located in the **Riserva Naturale Litorale Romano** was assessed. The results achieved so far have demonstrated that the plants analysed **have a positive effect** on the ecosystem, constituting **synanthropic biodiversity hotspots**, i.e. places where species that coexist or are learning to coexist with humans, tending to form a rich and stable ecological community. Indeed, the specific environmental conditions and the low impact of man-made structures facilitates the presence of an extremely particular wildlife community. New monitoring involving the Roma Nord treatment plant is expected in 2024. In the **Riserva Naturale Litorale Romano** protected area, **Areti** is pursuing a project to **decommission and demolish electricity power lines and pylons**, and has installed nests boxes on various substations **to protect birdlife**.

The initiatives launched by the Companies also involved other areas, again of particular natural interest, although not classified as "priority" areas.
In order to limit the **potential impacts** of overhead infrastructure for the **distribution of HV and MV electricity on birds, Areti employs risk mitigation initiatives** in collaboration with the relevant authorities, making use of the best technological solutions for problems that are likely to occur in sensitive areas or areas of particular naturalistic value. Specifically, in compliance with the *Memorandum of Understanding for restructuring the electricity grid*, works continue to **decommission and demolish overhead power lines** within **important protected areas**, including Parco di Veio, Riserva Naturale della Marcigliana and, south of Rome, Riserva Naturale Decima Malafede, (as well as in the priority area of Riserva Naturale del Litorale Romano). For details of the works performed in 2023, see the section *Energy distribution* in the chapter *Energy Business*. The electricity distribution company and the Park Authority of **Parco Naturale di Veio signed a pledge of commitment** under which the Company guarantees financial and operational support to launch **a plan** for **monitoring birdlife** by **installing bird-deterrent devices** on earth cables of overhead lines, composed of plastic spirals that make the cables more visible, significantly reducing the risk of bird collision. Furthermore in 2023, Areti completed its collaboration with the nature organisation **Ornis Italica**, regarding the **installation and initial monitoring of nest boxes**, some of which were installed in high biodiversity areas like the **Riserva Naturale Litorale Romano** and **Riserva Naturale Della Marcigliana**, at 30 secondary substations. The monitoring conducted showed that **certain nests were occupied** by **barn owls**, **kestrels and little owls** (species in the Red List in the category of "least Concern"): the Ornis Italica Association is **more than satisfied** with these results considering the short time that has lapsed between the installation of the nest boxes and the nesting. Finally, Areti's sustainability target, involving the **removal of 200 pylons** has had a positive impact, ensuring the recovery of the soil, also in high biodiversity areas.

Acea Ato 2 continued to monitor the **Peregrine Falcon** (included under the category of "Least Concern" in the Red List) at the SIC-ZSC site of **Villa Borghese and Villa Pamphili**, in an area around the **Acqua Vergine springs**. As always, a community of scholars, ornithologists and enthusiasts had the opportunity to follow the lives of these birds of prey that live at the Acqua Vergine spring, **thanks to the webcam managed by Ornis Italica**. Ornis Italica is an association of researchers promoting the Birdcam.it project,

which broadcasts images of a nest situated on Acea infrastructure (www.birdcam.it). The project was a great success in 2023, with the birth and development of peregrine falcon chicks. In addition, the Company carried out monitoring to assess the hydrological system of the **River Mignone**, with the aim of promoting the sustainable management of water withdrawals and water resources and preserving the balance of natural ecosystems. This project was conducted in collaboration with the Park Authority of the **Monterano Canal Nature Reserve** in which the plant is located.

In 2023, AdF took part in work groups for the **Pecora and Pesa river basins**, which had been initiated in 2022, with the aim of developing proposals, formulated jointly by the various stakeholders, on regional and environmental development topics which will help to reduce impacts on the ecosystems of the two water basins.
Acea Ambientecontinued with the **UrBees** project that had begun in 2020, aimed at environmental monitoring by observing the **behaviour of bees as bioindicator insects** (see specific information box).

BEES AS BIOINDICATORS, THE URBEES PROJECT

Acea Ambiente launched the **UrBees** project in 2020, in collaboration with **bee-keeping experts** and the **Sacro Cuore Catholic University** with the aim of environmental monitoring by observing the behaviour of bees as **bioindicator insects**.
The project included the installation of **three hives** at the **San Vittore del Lazio** (FR) waste-to-energy plant to carry out **environmental biomonitoring** of the surrounding area. Biomonitoring is an innovative tool for environmental control that allows the effects of pollution to be identified, observing living organisms and their biological parameters through the study of ecological changes due to the effects of one or more polluting substances present in the biosphere. Bees were chosen as bioindicator insects because they make the hive a real environmental control unit. Bees replicate the same behaviour every day: they leave the hive to carry out reconnaissance flights, then return with the information on the environment they explored (in their hair and wings). In this context, honeybees, in particular, are one of the best "sentinel species". They support plant biodiversity and enable determination of qualitative and quantitative data regarding the health or lack thereof of a specific ecosystem, along with mapping of an area's biodiversity.
The observations made have highlighted the **overall good health of the bees** and the **absence of instances of unexpected illnesses or depopulation**. Specifically, the project has proved that dust from emission sources are absent from the bees' wings.
In 2023, 3 honey samples were collected from the hives. These were **analysed** so as to identify the pollen composition and consequently accurately establish the honey's botanical and geographical origins. The botanical species identified on the basis of the analysis were classified according to their greater or lesser presence in the samples analysed and compared in terms of their relative abundance.
The analyses on the honey samples found a total of 85 different species of plants, resulting in a floral biodiversity index[168] of 0.937: a significantly high figure that reflects the extent and variety of botanical species around the waste-to-energy plant, contributing to the honeybees' health.
During the year, the countless flights made by the bees **produced 40 kg of honey** from three different blends of botanical species: "41 flowers honey", "34 flowers honey" and "46 flowers honey".

During 2023, at certain Acea Ambiente sites, including **the plant at Terni** and the plant hub at **Orvieto Ambiente**, **green areas were created with the planting of native tree species** aimed at reducing the visual impact of installations and increasing the variety of plant and animal species in surrounding areas. In addition, once again at the **Orvieto Ambiente** plant, **bee hives were installed** in collaboration with the Sacro Cuore Catholic University. The outcome of the analysis will provide information to assess the plant biodiversity in the study area, thus obtaining data on an equivalent area of 7 km^2, calculated as the average range of a bee's flight of 1.5 km. Finally, a zoning project is underway within the plant hub, intended to create a **natural garden**.

168 The floral biodiversity index for UrBees considers the presence of abundant botanical species and the influence of rarer botanical species in a study area of 7km^2, defined as the average range of a bee's flight (1.5km). They are designated at a number between 0 and 1. The closer to 1, the more balanced the biodiversity in the area.

MANAGEMENT OF WATER RESOURCES, SPRINGS AND PROTECTED AREAS

Through the companies **Acea Ato 2, Acea Ato 5, Gori and Gesesa,** the Group mainly uses springs located in uncontaminated areas for water supply.

The supply system of the area managed by Acea Ato 2 comprises **seven aqueduct systems**, from **14 main sources**, the distribution networks, and numerous smaller local sources, mainly wells, for a **flow exceeding 21,000 litres/second**. The drinking water aqueduct and distribution network extends for more than **15,800 km**[169]. In addition to this priceless natural resource, following upgrading works on the Grottarossa drinking water plant, Lake Bracciano, and the river Tiber also represent water reserves, after appropriate treatment, to be used only in the event of water emergencies.

EVALUATION OF THE GROUNDWATER AVAILABILITY

In accordance with that established by the criteria of the Water Framework Directive (WFD, 2000/60/CE), investigation of the availability, in quantitative terms, of potential groundwater resources and the possible impacts associated with the withdrawal of water resources from springs can be performed by monitoring certain variables through implementation of appropriate interpretive models.
The main aspects to monitor can be identified as precipitation (rain and snow), evapotranspiration, surface run-off and infiltration into the soil in the area where the balance is assessed. For the refilling areas representative of the aquifers managed by **Acea Ato 2**, a continuous calculation methodology was implemented (from 1990 to today), for quantification of the components of the hydrological balance at a daily level. This method, re-proposed by Acea Ato 2 according to the national guidelines (Technical criteria for analysis of quantitative status and monitoring of groundwater stores ISPRA 157/2017), is considered a **valid tool to monitor the quantity of groundwater stores**.
Acea Ato 5 has continued a study on water availability on certain important sources. An analysis of precipitation and withdrawals has been done for the years 2017-2023. Specifically, a **net reduction in precipitation** was noted over the last six years, and consequently less refilling of supply sources; the model used made it possible to make forecasts on water availability. A report is prepared on a periodic basis that, based on the patterns observed and comparing the availability scenarios of previous years, formulates hypotheses on water availability. The document is presented by the Company at the periodic meetings convened by the Permanent Observatory on the Use of Water Resources for the Lazio Region.
AdF constantly monitors the volume of water withdrawals using data provided continuously by remote-control gauges or data taken in the field by operating personnel and sent by tablet to the company management system. The data received from the two channels flow into a single system which is used to monitor the water districts to direct leak detection activities, and to monitor the water balance and the relative technical quality indicators (M1a and M1b). On the basis of this monitoring, three-monthly updating is also carried out on a document shared with the Tuscan Water Authority regarding possible water-emergency status, **with indication of critical issues involving "drought"** (lack of resources) **and management or infrastructural actions planned to handle such issues**. Monitoring dashboards created to enable the real time assessment of the qualitative and quantitative characteristics of supply sources have proved particularly useful for monitoring the situation of the water crisis declared in summer 2022 in terms of resource use planning and for reporting and communication purposes.

In the territory that falls within Ato 5 Lazio Meridionale - Frosinone, **Acea Ato 5** manages **80 sources**, **75 of which are active**, with 42 wells/well fields and 33 springs. In addition to these sources referred to above, the Company purchases/sells water through exchange points with other operators and Municipalities. From the sources, the water is transported to the Municipalities through a supply network, which follows a complex distribution network beginning with tanks and dividing elements before reaching users served, and totalling **6,212 km**.
Gesesa, which operates in the Sannita District Area in the Campania Region, for the supply of drinking water, manages approximately **1,970 km** of network, springs, primarily seasonal, and collects the majority of the water utilizing groundwater wells. There are three large collection systems: the Benevento plain, constituted of the well of Pezzapiana, a well located at the aquifers of Monte Taburno and a well located near to the Grassano spring.
AdF, which operates in Optimal Territorial Conference no. 6 "Ombrone", manages the drinking water system through a network that stretches approximately **8,400 km**. Almost 50% of the water is drawn from the **Fiora springs** located on the slopes of Monte Amiata, while in the Siena area, the most significant systems are the Luco well field and the Vivo aqueduct, which takes water from the three springs of Amiata Ermicciolo, Ente and Burlana, located in the Vivo d'Orcia area.
The water system managed by **Gori** in the **Sarnese Vesuviano** territorial district, extending over approximately **5.270 km**, has three main subsystems: Vesuviano, Monti Lattari and Ausino. The Vesuviano System is the most extensive of the three and arises from the functional integration of the Sarno aqueduct and the Vesuviano aqueduct, in turn interconnected with external elements of the Campano aqueduct, the West Campania aqueduct and the Serino aqueduct. This is responsible for supplying the majority of the OTA 3 municipalities. The Monti Lattari System serves the territory of the Sorrento Peninsula, the Island of Capri and the Stabiese plain. Finally, the Ausino System, represents the supply framework for the municipalities that occupy the eastern edge of the territory. The water drawn from endogenic sources represents approximately one third of the total, while the remainder originates from systems outside the OTA.
All of the Companies guarantee operations and the correct maintenance of collection infrastructure, water plants, supply systems and

169 The figure includes amounts that have not yet been georeferenced.

distribution networks and user meters. Extraordinary maintenance is also performed (renovation, upgrading and/or expansion of plants and networks).
In 2023, **Acea Ato 2** continued the development of all interventions in collaboration with Acea Infrastructure, intended to secure and modernise the **Peschiera aqueduct system**, an **essential strategic infrastructure**: to ensure greater resilience of the procurement and supply system managed. The design-authorisation stage was completed **for the 4 sub-projects**[170] relating to hydraulic works, identified in 2021, which will also be carried out with financing [171] obtained as part of the National Recovery and Resilience Plan (PNRR)[172]. Regarding the **main intervention** called "New upper section of the Peschiera Aqueduct", which will also be implemented thanks to the additional funding[173] provided by the 2023 Budget Law (Law 197/22), **the authorisation process continued during the year**[174] (see *Quality in the water area* in the chapter *Customers and the community*).
Table no. 53 indicates the location of the sources falling within the **zones subject to absolute protection**[175]. This refers to "water stress areas", as per the international definition of the World Resources Institute[176]. The water drawn is freshwater[177], apart from 1.3% of the amount drawn by AdF, corresponding to approximately 0.76 million cubic metres, from marine sources. The total surface areas represented are in high water stress areas.
The data on withdrawals from sources by the Company is provided in the *Environmental accounts Report*.
To protect areas **where springs are located**, Acea Ato 2 also employs **satellite monitoring**. Surveillance is concentrated in the places showing – on the basis of the comparison between two images taken from space at a distance of several months – **an unjustified or suspect morphological variation**, such as new, unsurveyed constructions, earth movements, small landfills. The Company performs checks on site to identify any threats to water resources, ensuring precise monitoring. In fact, in 2023, **thanks to the use of a satellite to perform change detection** and additional inspections carried out along the supply and collection network, **62 violations were identified**.

Table no. 53 – The principal sources under protection

sensitive area	municipality	area (m²) (*)
IN OTA 2 – CENTRAL LAZIO[178]		
Peschiera springs	municipality of Cittaducale (Rieti, Lazio)	187,289
Le Capore springs	municipality of Frasso and Casaprota (Rieti, Lazio)	618,273
Acqua Marcia spring	municipalities of Agosta-Arsoli-Marano Equo (Rome)	818,457
Acquoria spring	municipality of Tivoli (Rome)	8,862
Pantano Borghese Acqua Felice springs	municipality of Zagarolo (Rome)	392,123
Simbrivio springs	municipality of Vallepietra (Rome)	190,624
Ceraso springs and wells (Simbrivio aqueduct)	municipality of Vallepietra (Rome)	9,072
Pertuso springs	municipality of Trevi – Filettino (Lazio)	66,853
Doganella springs	municipality of Rocca Priora (Rome)	137,873
Acqua Vergine springs	municipality of Rome	220,566
Torre Angela wells	municipality of Rome	49,897
Finocchio wells	municipality of Rome	32,197
Laurentina wells	municipality of Ardea	7,650
Pescarella wells	municipality of Ardea	2,472
Lake Bracciano	municipality of Rome	1,038
supply works on the Tevere River by the Grottarossa water treatment plant	municipality of Rome	1,769
supply works on the Mignone River by the Lasco del Falegname river crossing	municipality of Canale Monterano	2,000
other supply sources (minor springs and other well fields)	various municipalities in OTA 2	100,000

170 These are the "New Marcio Aqueduct - Lot I", the "Raddoppio VIII Syphon - Casa Valeria Section - Ripoli Tunnel Exit - Phase I", the "Ottavia - Trionfale Supply System" and the "Monte Castellone - Colle Sant'Angelo (Valmontone) Pipeline".

171 Equalling approx. € 244 million.

172 According to Ministerial Decree 517/21 and the Decree of the State General Accounting Office no. 160/22 (provision for launch of works that cannot be postponed).

173 Equalling approx. € 700 million.

174 On the basis of the opinion of the authority responsible for overseeing public works expressed at the meeting on 14/10/2020 (no. 46/2020) and pursuant to art. 44, paragraph 1-*bis* of Law 108/21.

175 The areas of absolute protection are the areas immediately surrounding the catchments or off-springs, as defined in Legislative Decree no. 152/2006.

176 https://www.wri.org/aqueduct. The check as to whether the sources were located in water stress areas was carried out using *Aqueduct*, a recognised tool developed by the World Resources Institute (WRI).

177 Water with total dissolved solids ≤1,000 mg/l.

178 Compared to the previous version of the document, the data on fully protected areas have been restated following the progressive conclusion of ongoing studies to outline the protected areas.

IN OTA 5 – SOUTHERN LAZIO		
Posta Fibreno wells	municipality of Posta Fibreno (Frosinone)	20,000
Tufano wells	municipality of Anagni (Frosinone)	18,000
Capofiume spring	municipality of Collepardo (Frosinone)	10,000
Madonna di Canneto spring	municipality of Settefrati (Frosinone)	10,000
Forma d'Aquino wells	municipality of Castrocielo (Frosinone)	20,000
Carpello wells	municipality of Campoli Appennino (Frosinone)	15,000
Mola dei Frati wells	municipality of Frosinone	5,000
IN THE SANNITA DISTRICT AREA		
18 wells	municipalities of Benevento, Telese Terme, Castelpagano, Vitulano, Melizzano, Sant'Agata de' Goti, Cautano	9,110
Ciesco spring	Castelpoto	307
Gradola spring	Tocco Caudio	707
Monticelli spring	Castelpagano	358
Pietrafitta and Ruggiero spring	Torrecuso	2,242
San Vito spring	Frasso Telesino	249
Voneventa spring	Molinara	516
IN THE SARNESE VESUVIANO DISTRICT		
Vado spring	municipality of Bracigliano (Salerno)	1,338
Forma spring	municipality of Gragnano (Naples)	322
Imbuto spring (*)	municipality of Gragnano (Naples)	187,159
sorgente S.M. Lavorate	municipality of Nocera Inferiore (Salerno)	5,971
S.M. spring and well field La Foce	municipality of Sarno (Salerno)	60,202
Fontana Grande source	municipality of Castellammare di Stabia (Naples)	330
centres of Murata, Pugliana, Casaliciello, Santa Lucia and Tartaglia	municipalities of Cercola, Ercolano, Pollena Trocchia, Roccarainola and San Giorgio a Cremano (Naples)	15,473
centre of Monte Taccaro and Angri well field	municipality of Angri (Salerno)	43,072
well field of Suppezza, Gragnano, San Mauro Montalbino, Mercato Palazzo and Santa Lucia	municipalities of Castellammare di Stabia, Gragnano, Nocera Inferiore and Sarno (Salerno)	46,610
wells of Traiano, Stromboli-Vesuvio and Petraro	municipalities of Castel San Giorgio, Mercato San Severino and Nocera Superiore (Salerno)	7,203
21 wells in the province of Salerno	municipalities of Bracigliano, Castel San Giorgio, Corbara, Fisciano, Mercato San Severino, Nocera Inferiore, Nocera Superiore, Pagani and Siano (Salerno)	10,657
4 wells in the province of Naples	municipalities of Castellammare di Stabia, Palma Campania, Roccarainol and San Giorgio a Cremano (Naples)	1,529
IN OPTIMAL TERRITORIAL CONFERENCE NO. 6 "OMBRONE"		
Spring of Galleria Alta – Galleria Bassa – Fonte Carolina	municipality of Santa Fiora (Grosseto)	37,046
Ermicciolo Spring	municipality of Castiglione d'Orcia (Siena)	3,885
Arbure Spring	municipality of Castel del Piano (Grosseto)	7,443
Ente Spring	municipality of Arcidosso (Grosseto)	327
Burlana Spring	municipality of Seggiano (Grosseto)	2,442
Luco well field	municipality of Sovicille (Siena)	10,063

(*) the surface area data is estimated.

ENERGY BUSINESS

SCOPE

The chapter *Energy Business* includes Acea Produzione, Areti and Ecogena, the energy production plants of Acea Ambiente, Orvieto Ambiente (part of Acea Ambiente until 2022), Deco and Ecologica Sangro[179] for the production of biogas. Waste-to-energy activities are also described in the chapter *Environment Business*.

933 GWh
energy produced
(**1,047 GWh** including the PV plants not included in the NFS reporting scope)

69% energy produced from renewable sources (**72%** including the PV plants not included in the NFS reporting scope)

approximately **202,500 t** of **CO_2** saved thanks to **electricity produced** from **renewable sources** instead of conventional sources (238,400 t CO_2 including the production of the PV plants not included in the NFS reporting scope)

The Acea Group, which operates in the **generation** of electricity and thermal energy, in the **distribution** of electricity in Rome and Formello, including management of public lighting, and in the **sale** of electricity, heating and gas, **manages the entire chain of production and supply** through the operations of separate independent Companies, as required by electricity-market regulations.
To improve the **management of distribution infrastructure**, Acea implements hi-tech innovative solutions — remote control, IoT and smart grids — enabling **increased grid resilience**. The increased "flexibility" of the grid also responds to the trend of increasing numbers of connected **prosumers** (see also chapters *Customers and the community* and *Institutions and business*).

ENERGY PRODUCTION: FOSSIL AND RENEWABLE ENERGY SOURCES

GROUP PLANTS

Through **Acea Produzione**, **Acea Ambiente**, **Orvieto Ambiente**, **Deco** and **Ecologica Sangro**, the Group **produces electricity** primarily from renewable sources. **The majority of production is provided by hydroelectric plants** and **another significant portion**, also partially renewable, **from waste-to-energy plants utilising paper-mill waste** and **Solid Recovered Fuel** (SRF).
Acea continued to **grow the photovoltaic sector**, in accordance with the current Business Plan. As of March 2022, this aim has been supported by a financial transaction under which Acea transfers its existing photovoltaic assets — which are either already in operation or in the process of being connected to the grid — to a Company of which Acea Produzione is a minority shareholder[180], while **retaining control of the management of the plants**, and has signed agreements aimed to **purchase the renewable energy produced** by the plants.
Lastly, **Acea Produzione** also has fossil fuel (thermoelectric) production plants, mainly relating to the **high-efficiency cogeneration plant** at the Tor di Valle power station, which had the highest availability during the year.
The power park includes:

- **7 hydroelectric power stations** located in the Lazio and Abruzzo regions for a total of **119.3 MW**;
- **2 thermoelectric power stations** located within the Municipality of Rome area: Montemartini (78.3 MW)[181] and Tor Di Valle (28.5 MW), for **106.8 MW_e total available installed capacity**;
- a **photovoltaic park** for a total of **16.7 MW**[182] (total capacity, including the plants owned by the investee company and not consolidated on a line-by-line basis, is **101 MW**).

The generation of energy from **waste-to-energy processing** is managed by **Acea Ambiente**, taking place at **two plants** located in San Vittore del Lazio and Terni, and both with percentages of **biodegradable** material

179 The Company was included in the scope this year, with 2022 figures.

180 In particular, this refers to AE Sun Capital Srl, established in January 2022, and 40% owned by Acea Produzione and 60% by the investment fund Equitix Investment Management.

181 The power station is operational only in the event of extraordinary energy demand, and operation can also be managed remotely from the control room at the Tor di Valle Power Station.

182 Output of the Acea Produzione, Acea Solar, Acea Renewable, SF Island and Fergas Solar 2 plants.

(renewable source) varying between 40% and 50%. The total gross electrical power currently available is approximately **62.5 MW$_e$**[183].
In addition, the Environment Business produces renewable electricity using **biogas** derived from the anaerobic digestion process at the Orvieto Ambiente Technology Hub, the sites managed by Deco and the Acea Ambiente composting plants of Aprilia and Monterotondo Marittimo.
The Company **Ecogena**, certified as an ESCo (Energy Services Company) in accordance with UNI CEI 11352:2014, **develops the energy efficiency initiatives for the Group** and reports their results to Gestore dei Servizi Energetici (GSE) for the awarding of Energy Efficiency Certificates (EEC).
The activities assigned to Ecogena include also the design and building of **cogeneration and trigeneration** plants[184] for the production, in combined mode, of **electrical, heat and cooling energy**.
The total production capacity of the **cogeneration plants** managed by Ecogena, combined (or not) with **district heating networks**, amounts to a total electrical output of **3.9 MW**, located in areas across the Lazio region.

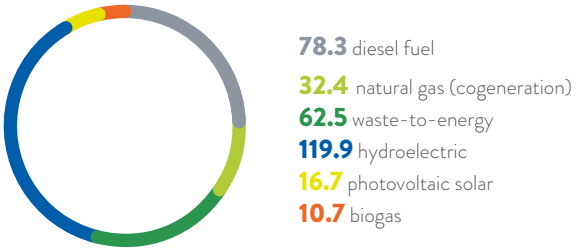
Table no. 54 – Installed power of the electric power stations of Acea Produzione

hydroelectric power stations	thermoelectric power stations
A. Volta di Castel Madama (Rome) power station gross power **7.4 MW**	Tor di Valle power station – high-efficiency cogeneration section (CAR) (*) (Rome) Methane fuel - gross power **28.5 MW**
G. Ferraris di Mandela (Rome) power station gross power **5.9 MW**	Montemartini power station (Rome) Diesel fuel - gross power **78.3 MW**
Salisano power plant (Rieti) gross power **25.0 MW**	
G. Marconi di Orte power plant (Viterbo) gross power **21.8 MW**	
Sant'Angelo power plant (Chieti) gross power **58.4 MW**	
Cecchina power plant (Rome) gross power **0.4 MW**	
Madonna del Rosario power plant (Rome) gross power **0.4 MW**	
general total: gross capacity 226 MW	

(*) The CAR plant in Tor di Valle provides district-heating service in the area south of Rome.

Installed capacity, which totals[185] **around 320 MW** (404 MW including the Investee company not consolidated on a line-by-line basis), is represented in Chart 51, broken down by energy source.

Chart no. 51 – Installed electricity power of companies included in the NFS divided by energy source (MW) (2023)



ELECTRICITY PRODUCED

In 2023, total gross energy production increased by 10%, going from 851 GWh in 2022[186] to **933 GWh in 2023** (1,047 GWh, including energy produced by the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis).
The increase was **mainly** attributable to **higher rainfall** during the year that impacted on hydroelectric energy production (+ 90 GWh, a 27% increase). There were also increases in **photovoltaic (+7 GWh) and biogas production** (**approx. 6 GWh more**), also due to the entry of Ecologica Sangro in the reporting scope[187]. For further details, see the *Environmental Accounts*.

Electricity generated from renewable sources, amounting to approximately **643 GWh (757 GWh** including the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis) represents the **majority** at **around 69%**[188], with the following contributions:

- 425.1 GWh from hydroelectric power,
- 147.3 GWh from waste-to-energy,
- 50,1 GWh from biogas (Orvieto Ambiente waste-management plants, Deco and Ecologica Sangro[189], Aprilia and Monterotondo Marittimo sites of Acea Ambiente),
- 20.4 GWh from photovoltaic plants[190] (134.4 GWh including the plants of the subsidiary not consolidated on a line-by-line basis), see Chart no. 52 and Table no. 55.

183 Includes the three lines of the San Vittore del Lazio plant and the power from the Terni plant. The figure has been adjusted in relation to what was previously published.

184 Cogeneration, i.e. the combined production of electrical and thermal energy, allows high efficiencies to be achieved, between 80 and 90%. Trigeneration, which is a special application of cogeneration, allows use of a part of the thermal energy recovered in order to produce cooling energy in the form of cooled water for air conditioning in rooms or for industrial processes.

185 Total installed power includes the plants operated by Acea Produzione, Ecogena,Orvieto Ambiente, Acea Ambiente (waste-to-energy plants and the Aprilia, Monterotondo Marittimo and Grasciano 2 plants) and Deco for the production of biogas.

186 The data includes production by Ecogena.

187 Detailed information is provided in the Environmental Report: data for the Ecologica Sangro plant is also included for 2022, for comparison purposes over the two-year period. Excluding this contribution, the increase stands at 8% thanks to the rise in biogas production at the Orvieto Ambiente plant.

188 72% if including the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis.

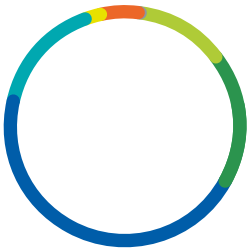
189 10.8 Gwh were produced from the Ecologica Sangro plants.

190 Detailed information is provided in the Environmental Report.

In 2023, the **upgrading and energy efficiency measures at hydroelectric power plants** continued, with the aim of optimising the use of available water resources, with the same specifications in terms of installed power and authorised by concession.

Almost half of the energy **from waste-to-energy production** is associated with the combustion of the **biodegradable fraction of waste** used as a primary source. In particular, **the renewable share of the fuel** (CSS) entering **the San Vittore del Lazio plant**, in 2023 was at around **47%** of the total waste-to-energy production, whereas at the **Terni plant**, this share was at about **44%**.

Chart no. 52 – Electricity produced subdivided by primary energy source (TJ) (2023)



2.4 diesel fuel
419.8 natural gas
623.4 waste-to-energy (thermoelectric)
1,530.5 hydroelectric
530.3 waste-to-energy (renewable)
73.4 photovoltaic solar
180.3 biogas

Note: the values reported in the chart are expressed in TJ (1 GWh=3.6TJ).

Table no. 55 – Electricity produced (by primary energy source) (2021-2023)

PRIMARY ENERGY SOURCE	2021	2022	2023
	TJ (GWh) (*)		
ELECTRICITY PRODUCED (BY PRIMARY ENERGY SOURCE) (**)			
diesel fuel	5.9 (1.6)	7.9 (2.2)	2.4 (0.7)
natural gas (cogeneration)	406.1 (112.8)	425.1 (118.1)	419.8 (116.6)
Waste-to-energy (approximately 54% of the total in 2023)	730.4 (202.9)	678.7 (188.5)	623.4 (173.2)
total thermoelectric	**1,142.4 (317.3)**	**1,111.7 (308.8)**	**1,045.6 (290.4)**
hydroelectric	1,564.9 (434.7)	1,207.1 (335.3)	1,530.5 (425.19
waste-to-energy (approximately 46% of the total in 2023)	552.7 (153.5)	534.8 (148.6)	530.3 (147.3)
biogas	113.0 (31.4)	159.6 (44.3)	180.3 (50.1)
photovoltaic solar	283.0 (78.6)	48.6 (13.5)	73.4 (20.4)(***)
total renewables	**2,513.6 (698.2)**	**1,950.2 (541.7)**	**2,314.5 (642.9) (****)**
general total	**3,656.0 (1,015.6)**	**3,061.8 (850.5)**	**3,360.1 (933.4) (****)**

(*) 1 GWh = 3.6 TJ.
(**) Some data from 2022 was adjusted following the consolidation, to also take into consideration the biogas production at the Ecologica Sangro site. Natural gas includes production by Ecogena.
(**) Photovoltaic includes the production at the plants located on Acea Ato 2 sites and in Orvieto, for a total of 2 GWh produced.
(****) Including the data from the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis, the 2023 data would be solar photovoltaic 483.8 TJ (134.4 GWh), total renewables 2,724.9 TJ (756.9 GWh), overall total 3,770.5 TJ (1,047.4 GWh).

THERMAL ENERGY PRODUCED

Total thermal energy produced in 2023 was **100.6 GWh**.
The **Tor di Valle** thermoelectric power plant generated **83.9 GWh of thermal energy**.
The heat generated was used to serve **41,385 residents** in the area south of Rome (Mostacciano, Torrino and Mezzocammino) by means of a district-heating network which provides a volume equal to 3,716,272 cubic metres.

The thermal energy figure is supplemented by the **16,7 GWh** of thermal energy produced in 2023 by the Ecogena plants.
The Ecogena plants also produced **11.6 GWh** of refrigeration energy.
For production data for the three-year period for Acea Produzione and Ecogena, see Products in the Energy business of the Environmental Report.

ENERGY DISTRIBUTION

THE DISTRIBUTION NETWORKS

approx. **32,200 km**
the distribution network
in Rome and Formello

approximately
9,800 GWh
of electricity demand
(Areti)

improves territorial protection (underground HV network/total HV network): **50%** (49.3% in 2022)

Areti manages the **electricity distribution network** of Rome and Formello, covering **approximately 32,200 km**, supplying over **2.8 million residents**. In terms of volumes of electricity distributed, about 9,200 GWh in 2023, Acea is the third largest Italian operator in the sector. Table no. 56 presents the principal plant data of the Company, including the number of primary and secondary substations, the transformers[191] and the km of overhead and underground distribution lines.

The environmental indicator related to **protecting the territory** – calculated as a percentage share of the **underground high-voltage** (HV) **network in relation to the total of the HV lines in use** (overhead and underground) –, thanks to the continuing transformation and modernisation of the high and extra-high-voltage electricity distribution grid, **improved again in 2023** and stood at 50% (the ratio was 49.3% in 2022).

Table no. 56 – Number of overhead and underground distribution lines and plants (2021-2023)

Areti				
systems and output				
	u. m.	**2021**	**2022**	**2023**
High-Voltage/High-Voltage – HighVoltage/Medium-Voltage primary substations	no.	70	70	70
High-Voltage/High-Voltage and High-Voltage/Medium-Voltage transformers	no.	170	169	169
transformation power	MVA	7,921	7,757	7,799
substations in use	no.	13,309	13,347	13,419
Medium Voltage/Medium Voltage - Medium Voltage/Low Voltage transformers	no.	12,893	12,914	12,959
transformation power	MVA	6,313	6,347	6,382
overhead and underground networks				
high voltage network – overhead lines	km	275	247	241
high voltage network – underground lines	km	244	240	240
medium voltage network – overhead lines	km	420	420	420
medium voltage network – underground lines	km	10,269	10,357	10,441
low voltage network – overhead lines	km	1,642	1,595	1,586
low voltage network – underground lines	km	18,829	19,396	19,697

The activities defined in the **Plan to modernise the high-voltage (150 kV) electricity distribution network**[192], which are constantly being developed, reduce the environmental impact thanks to the demolition of power lines and the removal of pylons, and help to deliver energy savings through the reconfiguration and optimisation of the HV network:

- subsequent to the new 150 kV Selvotta – Castel Romano line coming into service, work continued on dismantling the HV lines, no longer in operation, with the removal of a total of 39 - 60 kV pylons removed from the quadrant south of Rome (LAT Laurentina-Castel Romano 1 and 2);
- upgrading work was completed on the existing 150 kV HV Capannelle – Cinecittà/O, with the commissioning of the new 1.6 km cross linked polyethylene cable section, with the consequent decommissioning of two sets of HV cables for a total of 2.7 km.

191 With regard to polychlorinated biphenyls (PCBs), pursuant to Legislative Decree no. 209/99 and Law no. 62/05, Acea disposed of transformers with PCBs above the 500 ppm threshold in 2009. In 2023, there were 63 transformers with PCBs above 50 ppm but below the threshold of 500 ppm, reported to ARPA. 10 transformers were disposed of during the year, for a quantity of PCBs of 116 ppm and a weight of approximately 7 tonnes, all of which were recovered..

192 Defined in the Memorandum of Understanding signed in 2010 between Areti SpA, Municipality of Rome and Terna SpA.

The management of the electricity distribution network of Rome and Formello is characterized by the **continuous improvement of the performance**, with a particular focus on energy efficiency. Areti implements measures, such as the reclassification of medium voltage levels from 8.4 kV to 20 kV and the installation of MV/LV transformers with very low losses, which help to **reduce grid losses**. In 2023, **grid losses** amounted to **about 6.2% of total issued power**, improving on the figure from the previous year (6.5%). For further information see the *Energy savings* section in the chapter *The use of materials, energy and water*.

Upgrading electricity lines promotes and supports the energy transition. In this context, certain projects undertaken by Areti, such as **RomeFlex**, **G.I.M.M.I.**, **BeFlexible** and **Flow**, were particularly significant. The first step in creating a local market for ancillary services to better manage the expected increase in loads on the distribution network, by actively involving customers; the second, develops a system that improves grid monitoring and maintenance; the third, tests the use of flexibility services, focusing on possible synergies between the electricity system and water system; and the fourth, tests the grid services provided by electrical cars to the electricity system, based on the use of smart charging technologies and bidirectional charging. See also the section *"The Commitment to Research and Innovation" in the Institutions and Business chapter*.

PlatOne

The **PlatOne (PLATform for Operation of distribution Networks) project** is funded by the European Horizon 2020 project and involves ten public-private partnerships from Italy, Greece, Belgium and Germany, with coordination by the German Aachen University. Through the companies, Areti and Acea Energia, Acea heads the Italian pilot project on Rome, in three specific areas of the capital, working with ENEA, Siemens, RSE, ENG and Apio.
The project, **successfully completed in 2023** and becoming the **basis for developing the RomeFlex project**, introduced an **innovative approach to managing the distribution grid**, **whilst increasing its security and stability**. The ecological transition exposes urban distribution grids to a significant increase in loads, linked, among other factors, to the **diffusion of electrical vehicles and heat pumps** as well as an increase in **distributed generation connected via medium and low voltage**. This generates critical consumption and generation peaks for the grid, which in order to be better managed, require the **active involvement of end users** in operating the grid, based on the creation of a "**local flexibility market**". The PlatOne project has tested this solution, developing a multi-platform system that can involve all market participants, and which currently forms the basis for the local flexibility market in Rome, co-managed by Areti and GME.
For the end customer, the project implements and standardises a technological solution enabling the resource and certifying all energy transactions connected to flexibility using blockchain technology.
In addition, the user is provided with **an App**, for interaction with the aggregator, e.g. offering the possibility to **modulate loads during certain time periods**. The aggregator processes the flexibility supply of its customers and sends them to the market platform, where flexibility demand of the distributor is also received, connected to grid requirements.
To access the flexibility market, it is necessary to install a second-generation **meter** and a **device**, called a **Light Node**, needed to receive activation commands and certify energy transfers.
Furthermore, it will be necessary for both individual and aggregate customers to install devices that can modulate their production, such as storage, modular heat pumps, generators and co-generators.
The platforms and technologies developed for the PlatOne project and currently forming the basis of RomeFlex, have been shared with other national distribution system operators (DSO), who would like to use them in their own projects, in accordance with ARERA Resolution 352/2021: Unareti[193] has already subscribed to RomeFlex[194] and other DSOs are also expected.

G.I.M.M.I. GRID INNOVATION PROJECT

The G.I.M.M.I. project (Massive and Targeted Infrastructure Inspection Management) is an innovative end-to-end solution combining **satellite monitoring**, **artificial intelligence (AI) and drones in a single system**. The satellite platform enables Areti to periodically acquire images of HV and MV overhead lines. These are processes and analysed by an algorithm using Artificial Intelligence technology that enables identification of human or plant interference. Once interference has been identified and classified on the basis of the level of severity, it is possible to launch targeted inspections using drones.
Implementation of these systems for HV and MV grids offers multiple benefits. The quick response and precision of information enable **specific inspections**,in place of mass cyclical inspections, thus reducing the number of inspections, increasing their efficacy and reducing working times, supporting prevention or quick resolution of outages, to the benefit of many customers and the operator. In addition, the reduced impact of motor vehicles and elimination of helicopter flights for cyclical inspections contributes to reducing CO_2 emissions.
The project, launched in 2021 and still in progress, involves GMatics, a start-up offering satellite monitoring and analysis services using AI algorithms, and the Milan Polytechnic, which has the task of analysing, mapping and providing indications on current and future trends for drone applications.
In 2023, **the new inspection and monitoring process became standard practice** and was improved with the release of the Media Data Storage platform, allowing for the filing and smart consultation of photos and videos obtained through inspections and the release of integrations between the satellite alerting system and SAP, making the intervention much more efficient.

193 Unareti is an electricity and gas distribution company in the areas of Brescia, Milan and Bergamo (only gas distribution).

194 The first RomeFlex services auction was conducted in December 2023 with considerable market success: with regard to the 2 MW flexibility required by Areti, 11 BSP (balancing service provider - aggregators) offered a total of 3.2 MW, and in respect of this amount, Areti exercised its option to collect to receive up to 50% extra capacity, contracting 3 MW of flexibility for the period February-April 2024.

Areti also continued its experimentation with vegetable oil transformers, launched some years ago, with the relevant characteristics and advantages shown in the information box.

LOW ENVIRONMENTAL IMPACT TRANSFORMERS

In 2023, Areti continued its **experimentation with plant oil meters**, an **insulating liquid of plant origins (natural esters)** which compared to the mineral origin oil in use, whilst having similar electrical and physical characteristics, has a higher flammability temperature, is **totally biodegradable** and reusable at the end of its life. To reduce the risks associated with the experimentation, the project involves **three MV/LV transformers** that have been custom designed and built (two at 400 kVA and the third at 630 kVA, which came into service in 2015); to date, no anomalies have been found in the transformers' operations, with at least a 10-year term expected on an experimental basis, during which inspections and checks will be conducted on the quality of the dielectric oil. Once the results are in, an assessment will be made regarding wide-scale use.

ENVIRONMENT BUSINESS

SCOPE

The chapter includes Acea Infrastructure for the Smart Comp project; the activities of the waste-to-energy plants and compost production plants, all falling under Acea Ambiente; the activities of Orvieto Ambiente (part of Acea Ambiente until 2022); the activities of Aquaser, di Acque Industriali, Berg, Demap, Deco[195] and Ecologia Sangro since 2023.

47,534 t of quality compost produced: **+13%** compared to 2022

50 GWh of energy produced (+13%) from approx. **29,000 kNm³** of biogas (+12% compared to 2022)

waste-to-energy: **376,391 t** of waste input and **85,219 t** of waste output: **23%** (output/input)

For the second consecutive year, Acea won the **EMAS award:** the San Vittore del Lazio waste-to-energy plant implemented the best **innovative energy from renewable sources project**

WASTE-TO-ENERGY, COMPOSTING, DISPOSAL OF LIQUID WASTE AND RELATED SERVICES

Acea has expanded its capabilities in managing the final part of the waste cycle, with the aim of **recovery, recycling and reuse** and, where possible, **recovery of energy**. Specifically, The Group manages the treatment of **municipal solid waste** (MSW) and other types of waste (such as green waste from separated waste collection, industrial waste, etc.) **for the recovery of material** and disposal of residual materials in landfill, **the storage, selection, sorting and separation of multi-material waste** originating from separated waste collection, such as plastic and metal packaging, for subsequent **recovery, the treatment of liquid waste** such as leachates and liquid sludge, **waste-to-energy** the volumes for disposal, the land needed for the disposal and recovery of the waste energy portion, **and the production of high quality compost** for agricultural use.
The management of solid and liquid waste is performed at plants using advanced technology and in recent years, in order to improve

195 Deco also manages other plants that have merged directly into the company Acea Ambiente. For more details, see *Integrated waste treatment*.

and renew processes and increase recovery of materials and/or energy, some of them have been upgraded or expanded. The Terni waste-to-energy plant is currently undergoing revamping.
The Companies that operate in the business areas referred to, **conduct research**, also in collaboration with universities and companies operating in the circular economy field. Included in this context is the well-established Acea Smart Comp composting activity carried out by **Acea Infrastructure**.
Specifically, during 2023, innovative digital solutions were investigated and tested to manage assets, including the "Digital Twin" solution applied to **Acea Smart Comp** and aiming to implement a predictive maintenance system for the compost bins. The development of the composting process is supported by the University of Tuscia, where composting bins were installed and introduced in 2022 on a loan-for-use basis for experimental purposes. The standard system was utilised to replicate the research group's experiment on a broader scale, and in a controlled environment.
In 2023, with the launch of the *Call 4 Ideas* tender, Acea submitted **two proposals** to the Lazio region regarding the adoption of virtuous solutions, including Acea Smart Comp, directed at creating **environmental and circular communities**, seeking to extend the life cycle of resources and materials, and implementing business, circular consumption and climate neutral models, as well as implementing *Nature Based Solutions* (NBS).
Furthermore, with a view to adding value and recovering waste from industrial processes, in the scope of the collaboration between Acea Infrastructure and the Chemistry Department at the La Sapienza University in Rome, a **study was launched to identify possible ways to add value to the waste from the screens at urban wastewater treatment plants**.
Chart no. 53 illustrates the types of processing and recovery of materials or energy for the Environment Business.

Chart no. 53 – Incoming volumes of waste managed by type of plant/activity (t) (2023)

376,391 waste-to-energy (pulper and SRF)
215,503 compost (including Orvieto)
421,517 input waste at the Orvieto hub and Deco and Ecologica Sangro sites (landfills)
222,028 intermediation and selection
253,419 liquid waste and leachate

WASTE-TO-ENERGY

In addition to the activities described of solid and liquid waste treatment and anaerobic-digestion lines at composting sites, **Acea Ambiente** also manages the waste-to-energy process through the plants of San Vittore del Lazio and Terni. The two plants are operated according to the certified Environmental Management Systems and registration with the European EMAS III scheme (see also *Corporate identity*, *Management systems*). For the second consecutive year, in 2023, the waste-to-energy plant at San Vittore del Lazio received the EMAS award at Ecomondo, for the best innovative project for energy from renewable sources, thanks to the extension of the capacitors on the waste-to-energy plant's Line 1.
Based on **circular economy logic**, the primary objective is to recover as much material as possible. In 2023, **the volume of waste leaving the system was at 23% compared to the waste-to-energy volume**,ensuring a reduction in the volumes that needed to be disposed of and in the and use needed for this purpose. The second objective is the recovery of energy from waste, which provides both energy and economic benefits - see Chart 52 and Table 55 in this regard.
In its current configuration, the San Vittore del Lazio plant is the **largest in the Lazio Region** and plays an important role in the management of municipal waste, both for the advanced technologies used for its construction and for its considerable treatment potential[196]. It is composed of **three independent waste-to-energy lines** designed to be fed with Solid Recovered Fuel (SRF), with the following characteristics:

- 52 MW_t of thermal power for line 1 and 56.7 MW_t of installed thermal power for each of the other two lines, for a total thermal power of approximately 165 MW_t
- 13.9 MW_e of electric power for line 1 and 17.5 MW_e for each of the other two lines, for a total power of approximately 49 MW_e;
- approximately 400,000 t/year of SRF, sludge and other waste at full treatment capacity.

In 2022, the Lazio Region issued Resolution no. G14621 **to create a fourth waste-to-energy line**, enabling the complete processing of waste entering the plant in the case of shutdowns for upgrading or scheduled maintenance, as well as treatment of sewage sludge in compliance with the indication of the Waste Management Plan approved by the Lazio regional authority. In the second half of 2023, the **award notice was issued for the design**, **construction and commissioning of the aforementioned line**, with the **executive design phase started**, which should be completed in 2024. Work will extend up to 2026, and operations should start in the second half of that year.
In 2023 **294,174 tonnes of waste** were processed by the waste-to-energy plants and approximately **249.7 GWh** of electricity was generated, which was in line with 2022 production, at 251.3 GWh.

Table no. 57 – The San Vittore del Lazio waste-to-energy plant: operating data (2021-2023)

	u. m.	2021	2022	2023
incinerated fuel	t	307,391	289,550	294,174
gross electricity produced	GWh	267.74	251.26	249.70
conversion or recovery efficiency (*)	kWh/kg SRF	0.87	0.87	0.85

(*) Relationship between gross electricity produced and quantity of SRF converted to energy.

Revamping work got underway in July 2023, at the **Terni plant** aimed at bringing the waste-to-energy system in line with the new Best Available Techniques (BAT) set by legislation. These should be completed in May 2024, when the plant will restart operations. The plant comprises **a waste-to-energy line** with the following characteristics:

- 52 MW_t of thermal power installed;
- 13.6 MW_e of electrical power installed;
- 120,000 t/year of pulper waste (paper mill waste resulting from the pulping of waste paper), as the maximum potential for incoming waste.

196 With reference to Decree Law 133/2014 (referred to as *Sblocca Italia*), the plant has been defined as a strategic structure of primary national interest for the protection of health and the environment, as per Lazio Regional Decree no. 199 of 24/04/2016.

The waste-to-energy plant **is equipped with photovoltaic systems**, the primary system on the pulper waste pre-treatment area and a secondary system on the adjacent building, which in 2023 generated a**pproximately 436 MWh of electricity**, with around 55% consumed on site and the remainder sold to the grid, in line with previous years.
In 2023, **waste-to-energy for 82,217 tonnes of paper mill pulp** was undertaken, producing approximately **71 Gwh** of electricity, which was down on the 2022 figures (-18% energy production), also due to the start of the revamping work at the plant.
For data on the emissions of both waste to energy plants see the chapter *Air emissions*, in addition to the data reported in the *Environmental accounts*.

Table no. 58 – Terni waste-to-energy plant: operating data (2021-2023)

	u. m.	2021	2022	2023
waste-to-energy paper mill pulper	t	99,730	97,796	82,217
gross energy produced	GWh	88.67	85.81	70.78
conversion or recovery efficiency (*)	kWh/kg pulper waste	0.89	0.88	0.86

(*) Relationship between gross electricity produced and quantity of pulper waste converted to energy.

For information on the projects to recover sodium bicarbonate and calcium chloride dihydrate from the treatment of residual sodium carbonate (RSC), as well as on the treatment of fly ash and the recovery of mixed plastics, see the section *The Commitment to Research and Innovation* in the *Institutions and Business* chapter.

INTEGRATED WASTE TREATMENT

The company **Orvieto Ambiente**[197], in Umbria, manages an important **hub system for waste treatment, the recovery and disposal of waste**, ensuring the integrated cycle of municipal solid waste and equivalent materials, produced by all municipalities in the province of Terni. The landfill site is also authorised to receive special waste.
The Orvieto Ambiente hub includes the mechanical biological treatment of municipal solid waste, composting and refining of the organic fraction of the sorted waste and disposal in landfills. These activities take place in accordance with the certified Management Systems (see the section *Management systems* in *Corporate identify*), with the goal of **maximising recovery of materials** (production of high-quality compost) and supporting both the **production of renewable energy** (utilising biogas produced for energy) and, as far as possible, the **reduction of waste sent to landfill**.
As mentioned above, there are **beehives** at the hub, which are use to **biomonitor the environment** by sampling wax, honey and bee matrices, with public educational events planned aimed at local communities.
Total waste entering the plant in 2023, was **99,513 tonnes**, of which 60% (approximately 59,700 tonnes) was sent to landfill, marking a 71% improvement on 2022. The remainder was almost entirely sent to the **anaerobic digestion and composting** section of the treatment plant **for the production of biogas and compost**.
The end product resulting from the aerobic process is refined and subsequently analysed for its chemical and physical classification as **high-quality compost**, for use as a raw material in commercial growing, environmental restoration, and for maintaining green areas (for more information see the "Use of Compost in Agriculture" box).
There are **two plants** at the Orvieto Ambiente hub **that produce energy** supplied respectively by the **biogas** produced by the anaerobic section at the treatment plant and the biogas produced naturally from the landfill. The latter is collected through a supply network and sent to two internal combustion engines that transform it into electricity, which is then sold to the grid:

- approximately **2.8 Mm³ of biogas and 5.2 GWh of energy** were produced at the treatment plant in 2023 **(+63% compared to 2022**[198]**)**;
- approximately **7.4 Mm³ of biogas** and **11.4 GWh of energy** were produced at the **landfill site** (**+20% compared to 2022)**.

In total, approximately 16.6 GWh of electricity was fed into the grid (for more information see the Environmental Report).
The Orvieto Ambiente hub is also equipped with a **photovoltaic plant** owed by Acea Produzione, which, in 2023, generated around 580 MWh, which was used entirely for self-consumption on site.
The company **Deco** operates in Abruzzo, where it is responsible for managing its own plants[199] and plants owned by Acea Ambiente (such as the Grasciano hub[200]). In particular,

- a **landfill** for non-hazardous waste in **Casoni** (Chieti), divided into four sites with a total capacity of over 900,000 m³, which reached capacity in November 2023;
- a **landfill** for non-hazardous waste in **Colle Cese** in the Municipality of Spoltore (Pescara), divided into three sites with a total capacity of over 1,000,000 cubic metres;
- a **landfill** for non-hazardous waste in **Grasciano in the Municipality of Notaresco (Grasciano 2)** with an approximate capacity of 480,000 cubic metres.

The first two of the above plants belong to Deco, while the latter belongs to Acea Ambiente. Biogas for the production of electricity is recovered at all three sites. In 2023, Deco's waste processing plants produced approximately **4.3 MNm³ of biogas**[201] **and around 1.4 GWh of electricity**.
Deco also operates a **Mechanical Biological Treatment** (TMB) for Municipal Solid Waste (MSW) in Casoni (Chieti), and recovers materials and SRF. In 2023, TMB treated **252,286 t of MSW**, from which **4,101 t of metals** and **95,869 t of SRF**. Around 53% of the SRF produced was used in cement plants outside Italy instead of conventional fossil fuels, while 47% was used in italian waste-to-energy plants to produce electricity. The facility also has a photovoltaic

197 The company Società Orvieto Ambiente Srl was established on 21 February 2023 and is responsible for managing to plant hub at Orvieto (TR).

198 The increase in electricity production in 2023 was due to the increased quantities of waste generated by the digestor.

199 Deco's facilities include a Transfer Point where third-party urban waste collection vehicles transfer the collected waste from their own machines to larger-capacity vehicles, and a depot on the quayside of the port of Ortona and in the Ortona industrial zone, in the Province of Chieti, both authorised for the storage of waste for recovery, where the SRF to be shipped is stored, providing several logistical, organisational and environmental advantages. This is not included in the reported data due to its negligible significance.

200 The Grasciano site also includes other plants that have been inactive for several years: a platform for the treatment and energy recovery of waste from separated waste collection, a landfill for non-hazardous waste (Grasciano1) and two waste treatment lines (one for mixed and/or similar waste to produce SRF and the other for the wet organic fraction derived from separated waste collection to produce high-quality compost).

201 Of which about 1 million Nm³ was used for electricity generation, with the remainder burned off in the flare.

system on the roof that produced 984 MWh in 2023, of which around 860 Mwh (or 87%) was self-consumed on site by the MBT plant and the remainder was fed into the grid.
Ecologica Sangro also operates in Abruzzo, managing the landfill at Cerratina a Lanciano (Chieti). The Cerratina site includes:

- the **landfill** (operational since 1995);
- the **energy recovery from landfill gas** plant (since 2005).

The landfill, classified for "non-hazardous waste" is divided into 3 sites with a total capacity of almost **2,800,000** m^3. In 2023, it received **56,197 t** of **municipal waste**.
The energy recovery from gas plant produced from the landfill, has an electrical output of 1,672 kW, producing over **10.7 GWh** in 2023 and recovering around **7.9 MNm³ of biogas**.

HIGH-QUALITY COMPOST PRODUCTION

The **Orvieto Ambiente** plant hub produced **approximately 4,328 tonnes in 2023**; in the scope of the experimentation already underway, a new agronomic programme was shared with the University of Tuscia, on additional crops based on the excellent results that had been achieved [202](see the specific information box).
Acea Ambiente[203] has **two other active composting plants**: one in **Aprilia**, the other in **Monterotondo Marittimo**. The **Aprilia plant** can recover up to 120,000 tonnes/year of organic waste, with production of electricity and thermal energy integrated with the pre-existing composting section. After the compost bagging line and the SRF production line (from the waste from the same plant) became operational in 2022, transferring the waste to the San Vittore del Lazio plant, in 2023, the Lazio Region authorised[204] the implementation of **additional improvements at plant and management level**, which will make the plant more efficient.
The Monterotondo Marittimo plant has a recovery capacity for the organic fraction of municipal solid waste, garden waste (grass cuttings and material from pruning), and sludge, of 70,000 t/year. **Anaerobic digestion and composting facilities** are active at both sites, enabling the **recovery of electricity and thermal energy**. For details on the quantities of biogas and energy produced, see the *Energy Business* chapter and the *Environmental Report*.
In 2023, Monterotondo Marittimo and Aprilia produced around **43,200 tonnes of quality compost**.

THE USE OF COMPOST IN AGRICULTURE

At the Orvieto Ambiente hub, studies are currently being conducted with the University of Tuscia to better understand the effects of **using compost in agriculture**, from a production and responsible consumption perspective. The land adjacent to the plant has been cultivated in this regard, using 0 km compost produced at the plant. Based on the excellent results achieved, the collaboration with the University of Tuscia was renewed in 2023 for the two-year period 2023-2024, which was also confirmed with the EMAS award won in 2022. The objectives include understanding the role of compost in the chemical, physical and biological fertility of the soil and its repercussions on certain crops relevant to the Province of Terni and Viterbo, and to circulate the outcomes achieved.

INTERMEDIATION AND TRANSPORT OF WASTE

In 2023, Aquaser, which **loads, transports, recovers and disposes of waste produced by treatment plants**, managed around **395,000 tonnes of waste** (of which, approximately 250,000 t of liquid waste and about 145,000 t of solid waste). With regard to intermediation, during the year Aquaser took charge of approximately **161,000 tonnes of waste**, of which **127,000 tonnes of sludge** is attributable to the **Group's water companies**[205], and in particular approximately **75,000 tonnes to Acea Ato 2, AdF, Acea Ato 5**. The dried and dewatered sludge coming from the three Companies was sent to the following end destinations:

- 66.7% to material recovery operations (pretreatments aimed at agricultural use and composting);
- 16.8% to recovery of energy (waste-to-energy);
- 16.5% for disposal.

Also this year, due to regulatory constraints direct spreading was not used in agriculture.
Aquaser used its **own means to transport approximately 38,200 tonnes of non-hazardous waste**. Of this, about 33,200 t referred to transporting waste produced by the Group's water companies, Acea Ato 2, Acea Ato 5, AdF, Umbra Acque, Acque and Publiacqua, where Aquaser also acts as a broker. The remaining 5,000 t referred to the transporting of non-hazardous waste produced by third parties or other Group Companies (Acea Ambiente).

SELECTION AND SEPARATION OF MULTI-MATERIAL WASTE

The **Demap** plant, located in the province of Turin, carries out **selection and implementation of recycling for plastic and plastic/metal packaging**. In particular, it handles the storage, selection, sorting and separation of single and multi-material waste originating from separate waste collection, such as plastic material and metal packaging, **for subsequent recovery**. The Demap plant is affiliated with the Corepla Consortium, a group of companies established pursuant to Italian Legislative Decree 22/1997 to organise and manage post-consumption plastic packaging, and performs its activity on the basis of a contract for the selection of waste plastic packaging with the Consortium itself.

202 The main aim of the project is to provide experimental evidence of the absence of contraindications on the use of compost and the benefits it can generate as a fertiliser and by increasing soil organic matter.

203 Transfers of waste were suspended at Acea Ambiente's Subaidia plant as from 31 October 2019, to undertake extraordinary maintenance work. The liquid waste treatment facility at the same plant is currently inactive and studies, analyses and technical and economic assessments are currently underway to identify possible new industrial uses for the site.

204 Based on Resolution no. G02538 of 24.02.2023.

205 The data detailed here for the sake of completeness concerns sludge for which Aquaser has managed the entire supply chain, from loading to transport and final disposal, originating from the following Group Companies: Acea Ato 2, Acea Ato 5, AdF, Umbra Acque, Publiacqua, Acque.

In 2023, approximately **30,150 tonnes of material** entered the plant and was processed for separation and recovery.

TREATMENT OF LIQUID WASTE

Acque Industriali carries out brokering and liquid waste treatment services for private and public companies, as well as activities related to the integrated water cycle, mainly consisting of the **recovery and disposal of organic sludge**, through the management of **several platforms**. In 2023, the sites at Poggibonsi, Pisa Nord and Pontedera were inactive[206]; treated waste decreased and amounted to approximately 25,205 tonnes of liquid waste (-50% compared to 2022). In addition, the Company provided brokerage services for approximately 30,000 tonnes of waste during the year (-19% compared to 2022).
Acque Industriali uses technologies that **support recovery of raw materials contained in waste, energy saving and the efficient use of resources**, such as stripping/absorption of ammonia in a closed cycle that enables the **recovery of ammonium sulphate**, which can be used as an agricultural conditioner, of which **22,000 kg**[207] was produced in 2023. The Company also provides services for the design, creation and management of plants for the treatment of wastewater for third parties, decontamination of polluted sites and environmental consulting for the management of plants.
For details on the incoming waste, the types of resources used, the waste produced and other specific information, see the *Environmental Report*.

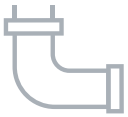
The **Berg** plant is a **polyfunctional platform for the storage and processing of hazardous and non-hazardous waste**, authorised for the sale and brokerage of waste and the creation of plants for treatment and processing of liquid waste.
Specifically, the plant has two departments: storage and treatment of liquid waste and storage and treatment of solid waste. In 2023 **approximately 131,900 tonnes of waste, both solid and liquid**, was processed, with almost zero tonnes of intermediated waste.
The Chiusi plant[208] handles the chemical/physical and biological treatment of **non-hazardous liquid waste**[209] **and the treatment of sewerage**. In 2023 approximately **96,300 tonnes of liquid waste** were processed and approximately 86,900 m^3 of wastewater.

WATER BUSINESS

SCOPE

The scope includes the companies Acea Ato 2, Acea Ato 5, AdF, Gori and Gesesa.
Some water companies - Acque, Publiacqua and Umbra Acque - not included in the scope of the *Consolidated Non-Financial Statement* (pursuant to Legislative Decree no. 254/2016) have been included only in the water graphs, with evidence of their contribution, and in a few other global data (water fed into the system and analytical calculations). Specific data concerning these Companies are provided in a separate chapter: *Water company data sheets and overseas activities*.

1.1% reduction in total lost water resources by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa compared to 2022



almost **34,730 km of drinking-water network** managed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa

768,757 analytical tests on drinking water (Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa)

The Acea Group is a leader in Italy in terms of the number of citizens it serves and is one of the primary operators in the water sector.
The **management of water resources**, which includes the collection, supply and distribution of water for civil use, sewerage and wastewater treatment are carried out with an increasing focus on preserving and safeguarding water and natural ecosystems, from springs to bodies of the water where the water returns to the environment. Safeguarding of water resources is also expressed through **recovering leaks** (see the section *Attention to water consumption*), the **circular economy**, activities to combat **climate change**, **protection**

206 In addition to the two platform closures (Pisa Nord and Pontedera) in 2022, the platform at Poggibonnsi suspended operations in June 2021 pending the issue of the standard operation permit.

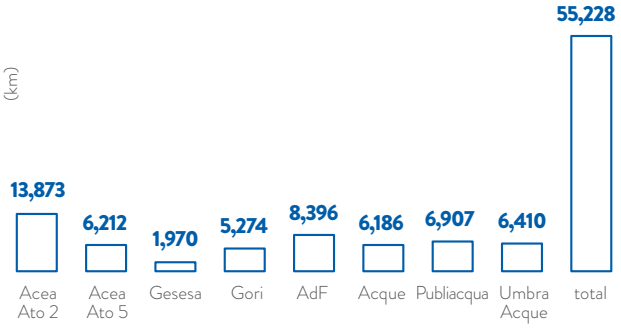
207 Estimated value.

208 The Chiusi plant fell under Società Bio Ecologia Srl, which merged with Acea Ambiente in May 2021.

209 The quantities of liquid waste authorised for treatment (excluding wastewater) have a maximum limit of 99,900 tonnes/year.

of springs and other sites of interest at an EU, regional or local level and natural parks (see section *Safeguarding of land and biodiversity*) and also **monitoring** of internal water consumption, with the goal of reducing consumption.
The **total** pool of users served in Italy **by the Group**[210] is over 8.8 million residents, with **volumes of drinking water fed into the network** in 2023 equal to 1,274 million cubic metres. The distribution networks of the main Group Companies operating within the integrated water service stretches 55,228 km (see Chart no. 54).

Chart no. 54 – The water distribution network of the main Group Companies in Italy (2023)



Note: the kilometres of network include the aqueducts.

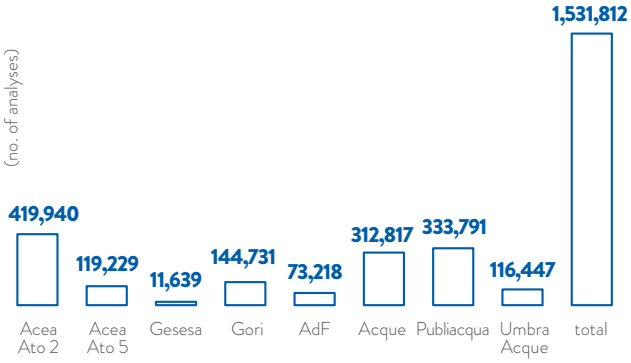
The **volumes of drinking water drawn and fed into the grid by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa**, during the year, was **1,005 million cubic metres**, with a total delivery[211] of 480 million cubic metres to the **6.3 million residents** served. The specific data on the three Companies, are provided in the *Environmental Accounts*. 99.9% of the volumes drawn are fresh water, with the remainder, at approximately 760,000 m^3 seawater and drawn in Tuscany by AdF. The supply sources are located in areas at potential risk of water stress, as defined by the *Aqueduct Water Risk Atlas*, drawn up by the *World Resources Institute* (WRI), which illustrates countries' water availability, taking into account physical global data[212]. The Companies within the Water Business implement various initiatives to mitigate the impacts associated with these risks, for example, defining and implementing **Water Safety Plans** (see the section "Water Safety Plans - WSPs"), actions to **minimise leaks** on distribution networks and investments to secure water supplies.
In **ATO 2 - Lazio Centrale**, which includes Rome and 112 other municipalities[213], at 31 December 2023, Acea Ato 2 managed the entire integrated water service[214] for 90[215] municipalities, thanks to the completion of the acquisition in 2023 of Rignano Flaminio.

The **volume of water drawn and issued from and to the network**, serving approximately 4 million citizens, was approximately **670 million cubic metres**[216].

WATER QUALITY

As shown in Chart no. 55, water quality is monitored by companies in the Water Business. The **analytical checks**, in addition to those performed by the Local Water Authorities, are performed on a scheduled, ongoing basis and regard drinking water supplied to users, essential due to the **associated health effects**, and water returned to the environment following treatment, both of which are **functional to monitoring the environmental quality of the region**. Compliance with drinking water analyses for all companies within the scope of reporting is between 96% and 100%.

Chart no. 55 – Analytical checks on drinking water, total and by company (2023)



In **Rome**, the qualitative characteristics of the resource collected and distributed are monitored through **continuous testing**, with instruments located along the water systems and through **daily sampling** at the collection points and in the distribution network. In Lazio, there are certain volcanic areas where groundwater contains mineral elements, such as fluoride, arsenic and vanadium in concentrations higher than permitted by law. In these areas, for some time, Acea Ato 2 has been working to resolve these issues, such as by decommissioning some local sources of supply and replacing them with higher quality springs. In 2022-2023, in particular, **Acea Ato 2** built new drinking water plants and upgraded/expanded existing plants in the municipalities of Allumiere, Ariccia, Rignano Flaminio, Manziana.
Monitoring of the chemical-biological parameters of the water in

210 The data for total number of citizens served by the water business, volume fed into the network, and size of the networks and checks on the water (shown in specific charts) include the main Operating Companies of the Group, including those outside the scope of the *Consolidated Non-Financial Statement:* Acque, Publiacqua and Umbra Acque.

211 This refers to the total amount of drinking water dispensed and billed by the Companies within the scope.

212 As per the Standard GRI 303, the *Aqueduct Water Risk Atlas,* available on the website *World Resource Institute: https://www.wri.org/aqueduct* was used in this regard using open-source, peer reviewed data to map water risks, such as flooding, drought and stress.

213 On 14.07.2021 with Regional Council Resolution no. 10, which followed Regional Executive Resolution no. 752 of 03.11.2020, Optimal Territorial Area no. 2, Central Lazio-Rome, was modified including in it the Municipality of Campagnano di Roma, which previously belonged to OTA no. 1 North Lazio-Viterbo.

214 Acea was entrusted with the running of the capital's aqueduct service since 1937, the water treatment system since 1985 and the entire sewerage system since 2002, effective 1 January 2003.

215 In 16 other municipalities the integrated water service was managed partially.

216 The water balance items for the last three years were determined using the calculation criteria provided by ARERA. The figure does not include the municipalities subject to exemptions in 2023 for the macro-indicator M1 pursuant to ARERA Resolution 917/2017/R/idr. See also the *Environmental Accounts*.

the distribution network of the water system allows a high quality and safety level to be achieved. Overall in 2023, **419,940 analyses were conducted in the area managed by OTA 2**, for a total of 14,412 samples ofdrinking water. In addition to the analyses conducted to **check water quality**, performed by Acea Ato 2, with the support of Acea Infrastructure, analyses were performed by Acea Infrastructure for **study and research purposes** aimed at continuous improvement of monitoring of the drinking-water system.

Acea Infrastructure, **accredited pursuant to the ISO/IEC 17025 standard**[217], performs and certifies chemical and microbiological analyses in different substrates, including water (see Table no. 59 for the analyses performed on Rome drinking water). **AdF**, which outsources analyses to Acqua SpA, took 3,841 samples in 2023, identifying representative withdrawal points in the context of districts, with equivalent characteristics, into which the entire network of the aqueduct is divided. All withdrawal points are georeferenced using the GPS system and area available in a WebGis. Furthermore, having launched its own analysis laboratory last year, the internalisation of its wastewater samples was completed in 2023 and **accreditation for the main testing methods was obtained**, which was applied to the water matrices intended for human consumption.

Table no. 59 – Analytical determinations in Rome (2021-2023) and main quality parameters of the drinking water distributed in Lazio, in Campania and in Tuscany (2023)

ANALYSES PERFORMED BY ACEA INFRASTRUCTURE ON DRINKING WATER – ROME HISTORICAL NETWORK (2021-2023)							
withdrawal area	no. withdrawal points	no. samples			no. analyses		
	2023	2021	2022	2023	2021	2022	2023
collection	13	344	307	330	15,267	15,180	16,820
water system and water feed pipes	12	104	116	105	3,997	4,736	4,335
tanks/water centres	18	198	135	189	7441	5,321	7,423
distribution networks	544	3,379	3,102	4,041	107,709	101,580	131,502
total	**587**	**4,025**	**3660**	**4,665**	**134,414**	**126,817**	**160,080**

MAIN AVERAGE CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS OF THE DRINKING WATER DISTRIBUTED IN LAZIO, IN CAMPANIA AND IN TUSCANY (2023)							
parameters	measurement unit	average value – Acea Ato 2	average value – Acea Ato 5	average value – Gori	average value – Gesesa	average value – AdF	parameter Legislative Decree no. 18/23
chlorides	mg/l Cl	11.9	6.0	45	18.2	28.0	<250
sulphates	mg/l SO_4	14.9	7.7	26	17.8	41.0	<250
calcium	mg/l Ca	87.2	70.7	115	exempt (*)	53.5	not applicable
magnesium	mg/l Mg	17.1	15.6	27	exempt (*)	10.3	not applicable
sodium	mg/l Na	10.3	4.5	31	16.2	18.0	<200
potassium	mg/l K	7.5	1.6	14	exempt (*)	2.4	not applicable
calculated fixed residue	mg/l	385.9	286.4	563	336.5	267.0	not applicable
nitrates	mg/l NO_3	5.8	3.7	19	14.3	3.9	<50
fluorides	mg/l F	0.27	0.08	0.47	0.2	0.3	<1.50
bicarbonates	mg/l HCO_3	360.2	271.2	476	exempt (*)	175.0	not applicable

(*) In accordance with Legislative Decree no. 18/23 and in agreement with the health authority, Gesesa is exempted from supplying the parameter.

In 2023, **Gesesa** continued a project for the creation of an **activated-carbon filtration system** for treatment of drinking water for the water plant in Benevento, in the Pezzapiana area[218].

With regard to the **processing of drinking water**, at the Grottarossa and Montanciano plants of **Acea Ato 2**, monitoring and analysis activity continued on treatment processes (such as chemical conditioning and pre-oxidisation, clariflocculation, sand filtration, and others), evaluating the efficiency of the removal of pollutants, specialised parameters for emerging organic species, both microbiological and sub-products of disinfection, in relation to the main management parameters of the plant. In addition, with reference to **forecasting the availability of water resources**, during 2023 Acea Ato 2 implemented and continued to develop a **machine learning algorithm** to identify **meteorological proxies** (temperature and/or precipitation) **or management proxies** (volumes drawn) correlated to **the variability of the state of preservation of the resource, with reference to the different collection sources (springs, well fields, etc.)**

In addition to scheduled checks, the water companies also carry out **extraordinary checking**, on the request of utilities, Local Health Authorities (ASL) etc., to monitor specific parameters like **radioactivity and PFAS** (poly and perfluoroalkyl compounds). In 2023, as happened in the previous two-year period, Acea Ato 2 and Acea Ato 5 subscribed to the campaign launched by the Lazio Region to monitor and check radioactivity in water intended for human consumption.

217 In February 2023, the laboratory was successful in renewing its accreditation pursuant to UNI CEI EN ISO/IEC 17025:2018. The next inspection is scheduled for January 2024.

218 The filtration plant will provide adequate water resources for the city of Benevento, maintaining the values for the substances tetrachloroethylene and trichloroethylene below the Contamination Concentration Limits (CCL) defined by Italian Legislative Decree 152/2006.

WATER SAFETY PLANS (WSPS)

The implementation of Water Safety Plans (WSP)[219] enables the **prevention and reduction of the risks inherent in the drinking water service**, by analysing dangerous events along the entire water supply chain, from collection to treatment and distribution, and through to the user's meter. The risk is calculated on the basis of the severity and probability of the pollution event or water shortage, defining **risk mitigation actions**, **monitoring systems**, the **operating procedures** under normal and emergency conditions, the **water quality control** plan, and methods for **informing the public and competent authorities**.

Acea Ato 2 began implementation of the WSPs in 2018 with a pilot project, completed in 2019, for the water system connected with the emergency drinking water plant for water from the Tiber River, in the Grottarossa area, under the supervision of the Istituto Superiore di Sanità (ISS)[220]. The Company then **launched 10 WSPs for main aqueduct systems under its management**, covering an area of approximately 640 km. In 2021, the WSPs for the Peschiera-Capore, Appio Alessandrino, Marcio, New and Old Simbrivio, Laurentino, and New Vergine aqueducts were submitted to the Italian Ministry of Health, followed by the WSP for the Doganella aqueduct system in 2022. In 2023, Acea Ato 2 completed and submitted the WSPs for the Municipalities of Albano Laziale, Manziana and Marcellina, and has begun drafting the Risk Management Plan (RMP) for the CoBIS treatment plant, in accordance with Regulation (EU) 2020/741 which is being implemented in Italy.

Following the issuing of Italian Legislative Decree 18/23, which transposes (EU) Directive 2020/2184 and requires the implementation of 100% of the WSPs by 2029 along the entire managed drinking water supply chain, the Company continued working on implementing the WSPs, preparing those relating to the supply and distribution systems for the Municipalities of Grottaferrata, Palestrina and Rignano Flaminio, based on the new national Guidelines (ISTISAN Report 22/33).

In 2023, **AdF** continued with the planned implementation of the WSPs according to a multi-year programme that will enable their full realisation across all water systems in the area by the end of 2028. More specifically, AdF developed the WSP for the **78 WSZ** (*Water Supply Zone*) water system, corresponding to a resident population of **163,444 people**, the equivalent of **43.2% of the total**. In 2023, the Company **further developed the application (*PSApp*)**, created in 2022 to standardise WSP implementation methodologies, which makes it possible to store data and **automatically calculate the risk index** for each plant and network, for each hazardous event identified and for each type of risk, both in relation to current scenarios as well as project scenarios referring to the priority risks identified. With this system, it will be possible to update evaluations and view the implementation status of control measures, providing full traceability and information to the competent authorities and monitoring the progress of each project against the project time line. After creating a cloud environment, also with Control Bodies, for the sharing of information on the drinking-water supply chain and useful for the implementation and approval of WSPs,and then drawn up operating instructions and procedures for managing documents, cloud access and the **operating instruction manual for risk management** in 2022, **Gori established a new multi-disciplinary team** in 2023, which also extended to Asl, Arpac, the Campania Region and other entities. In line with the work already done, the pilot project has seen the WSP applied across all the infrastructure in the Municipality of Siano. The Wsp is being completed with regard to infrastructure in the Municipality of Castel San Giorgio and inspections have begun to compile the relative check-lists for the Municipality of Bracigliano. Gori organised training courses for 142 people to disseminate the WSP objectives and support its effective implementation.

In 2023, **Gesesa** continued with training plans and authorisations on the draining necessary to manage WSPs, which will be prepared in collaboration with the University of Sannio.

Acea Ato 5 drafted the WSP for the Anagni Tufano spring in 2023, which was shared with the Asl in Frosinone and ARPA Lazio.

WATER LEAKS

The issue of **minimising losses on distribution networks**, with all Group Companies in the segment involved, forms the basis for the sustainable management of water. Each year, **intensive activity is carried out to identify leaks**, with the aim of recovering the greatest possible quantity of water. The process of **dividing the network into districts** is used to optimise operating pressures and reduce losses, with activities focusing on losses in the **most critical districts**. With greater control of the individual parts of the network, it is possible to reduce losses, promptly identifying them or picking up on other anomalies.

Overall, **Acea Ato 2** has created **759 measurement districts for over 13,000 km of** georeferenced network. The activity consisted of surveys, flow and pressure measurements, map production, user analysis and water balancing, creation of measurement stations, installation of shut-off and adjustment elements, mathematical modelling and searches for leaks. The results of efficiency actions were imported into the geo-referenced systems. In addition, 2023 saw optimisation of the quality of process measurements, through verification and calibration of meters installed on sources and drinking water plants, and progress in survey activity and georeferencing of networks. The measures **reduced the volume of lost water resources by 2%** compared to 2022 (a reduction of about 19% compared to 2019[221]). In addition, the work to make the service more energy efficient, based on the same scope as 2019, has reduced total leaks to around 38.4%[222] (at 38.9% in 2022), with the total leaks for the Rome network also decreasing to 27.8% (at 27.9% in 2022). Data and reductions in losses for 2021-2022 are presented in the *Environmental Report* and for 2019 in the *2020-2024 Sustainability Plan* in The Corporate Identity chapter. In 2023, Acea Ato 5 completed district planning for the networks of **9 new municipalities** and improved efficiency in previously established districts to optimise the distribution service. The Company has created **54 new districts**

219 The implementation of a Water Safety Plan (WSP) is required pursuant to the Decree of the Italian Ministry of Health of 14/06/2017, in implementation of EU Directive 2015/1787, which adopted the WSP methodology developed by the World Health Organization (WHO). In Italy, the Istituto Superiore di Sanità (ISS) has adopted WHO guidelines and approves WSPs.

220 For the WSP in question, in 2020 the initial draft of the Plan was finished and submitted to the Ministry of Health.

221 See also the 2020-2024 Group Sustainability Plan.

222 Value calculated in line with the reporting boundary for total losses in 2019, the reference year for the targets defined in the 2020-2024 Group Sustainability Plan.

covering **405 km of network**. Active control of pressures has continued, with the installation of meters, reducers and flow-control valves at strategic points (**11 hydro valves** installed during the year), with the dual objective of reducing flows into the networks and improving pressure management over 24 hours. Thanks to the measures implemented, **leakage volumes decreased** from 70.7 million m^3 in 2022 to **67.4 million m^3 in 2023**, reducing the total amount of water entered into the system from 109.8 million m^3 to 105.6 million m^3, an immediate savings of approximately **4.2 million m^3**. Losses fell in 2023 to 63.8% (64.3% in 2022).

AdF conducted intensive activity to search for system leaks on its own water networks, making considerable improvements to efficiency thanks to the provision of advanced technology to all operators, and inspecting around 2,000 km of the distribution network in 2023. Particular attention was paid to municipalities with higher water losses. The measures carried out led to **reductions in water leaks** from 21.9 million m^3 in 2022 **to 20.8 million m^3** in 2023, decreasing water losses to 36.2% in 2023 (37.2% in 2022).

During the year in question, **Gori** continued its leak detection activities. Thanks to the call for "Expressions of Interest on the formulation of Project Proposals under Axis IV" (React - EU)[223], and based on a Framework Agreement, the Company pursued the district networking and regulating of pressure regimens and the detection of leaks in the 17 most critical Municipalities from a water leaks' perspective. In the scope of the tender, leak detection activities were carried out over **1,672 km of the water distribution network**, with the installation of 123 pressure control valves and the **replacement** of around **76 km of damaged pipes**. At the same time, Gori conducted conventional systemic leak detection controls and in response to faults, with the help of internal resources, **for an additional 1,300 km of water network** detected in the entire managed area. This combined action enabled a recovery of water resources estimated at approximately **426 l/s over the entire Water District Zone**. After the measures taken, total losses fell from 47.8% in 2022 to 42.9% in 2023, with a **14.1 Mm^3 reduction in losses**.

Gori also made use of the ***Internet of Things*** **(IoT) and advanced sensoring** to collect data in real time, on the status of the water network. The installation of IoT sensors continued in 2023, bringing to 900 the total number of monitored network points. The sensors remotely provide data, which is subsequently processed using water balance software and modelling, which will be essential in detecting and eliminating network losses. Finally, the increase in withdrawals from the managed area's more important sources (Santa Maria La Foce Spring in Sarno and Santa Marina di Lavorate Spring in Nocera Superiore), for more natural availability, resulted in a consistent reduction in withdrawals from underground water, contributing to **preserving groundwater reserves**.

In **Gesesa**, the **Recovery Plan for water resources**continued in 2023 in the city of Benevento and other managed Municipalities, which involves the replacement of damaged pipes, application of a system to reduce water leaks and reduction of operating pressures on the network. Losses for the year were 55.91% of total water fed into the aqueduct system (55.94% in 2022), **reducing lost volumes** from 10 million m^3 in 2022 to 9.8 million m^3 in 2023. Actions will continue in 2024, involving all the Municipalities.

Overall, thanks to the actions taken by the Company, **losses fell by 1.1%** in the year, from 437.8 Mm^3 (consolidated figure) in 2022 to 433.1 Mm^3. When compared to 2020 data (507.5 Mm^3), this reduction was **14.7%**. For details on this issue and the individual water balances, see the *Environmental Report*.

SEWERAGE SERVICE AND TREATMENT SYSTEM

14,565 km of sewerage network and **490 treatment plants** managed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa, for **798 Mm^3** of water treated

approximately **154,900 t of sludge produced** by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa, of which **81% recovered** (+18% compared to 2022)

Once it has been used for civil purposes, wastewater is **collected through the sewer system** and **sent to the treatment plants**. The treatment process enables the **removal of solids and pollutants via physical processes** (filtering, sedimentation, flocculation) and **biological methods** (aerobic and/or anaerobic decomposition of the organic substance with bacteria), and the production of sludge.

With **864 treatment plants** (of which **490** managed by Acea Ato 2, Acea Ato 5, AdF, Gori and Gesesa), the total volumes of water processed by the Group main companies[224] in 2023, were **978 Mm^3**, of which **798 Mm^3** by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa[225]. The total number of treatment plants has come down in recent years, from 895 between 2019 and 2023, to 864 plants,

223 Gori was awarded a €50 million grant. The contracted works funded by the grant were delivered on 9 September 2022.

224 Data relating to the number of treatment plants, the volumes treated, the size of the networks and the controls refer to the main Group companies operating in the water sector, including three subsidiaries not consolidated on a line-by-line basis. Acque, Publiacqua and Umbra Acque.

225 Gesesa started installing the first flow meters on certain plants in 2020 and estimating the quantities of wastewater treated; this activity continued in 2023 as well.

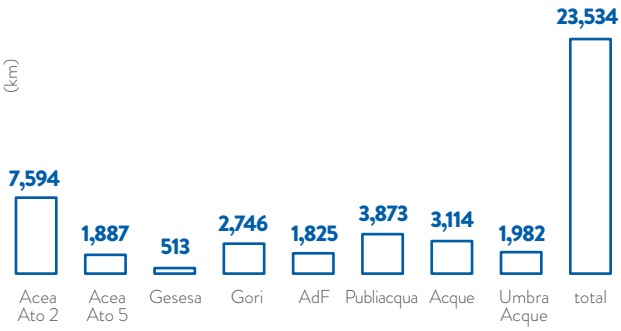
on the basis of the progressive **centralisation of the treatment of wastewater**, where possible, with the improvement of certain purification plants and decommissioning of others, from a perspective of rationalising and making the service more efficient (see also the information box on Acea Ato 2).
The volumes of wastewater treated and the percentage coverage of sewerage and treatment services, out of the total number of users served by the aqueduct, for Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa are shown in Tables 60 and 61. The sewerage networks managed in 2023 total **23,534 km**, of which **14,565 km** relate to the five Companies listed.

Table no. 60 – Volumes of wastewater treated by Water Companies operating in Lazio, in Campania and in Tuscany (2021-2023) (mm^3)

company	2021	2022	2023	destination
Acea Ato 2	601.5	589.5	603.9	99.8% returned to the environment (river/channel), sea (0.2%) and soil (0.01%).
Acea Ato 5	25.0	24.8	24.9	surface water body (river)
Gori	124.0	117.5	142.0	surface water body and sea (in sea, in 2023, 22%, equal to approximately 30.6 million cubic metres[226])
AdF	25.9	25.6	25.3	surface water body and sea (0.5% in sea)
Gesesa (*)	2.3	1.8	2.1	surface water body (river)

(*) Since 2020, Gesesa began installing flow meters at the entry to treatment plants. Installations continued in 2023. The data is estimated.

Chart no. 56 – Sewer networks of the main Group Companies in Italy (2023)



The water in output from the plants cited, after having undergone the purification treatments described, **has chemical and biological properties compatible with the life of the receiving body of water** and in accordance with the parameters established (as per Italian Legislative Decree no. 152/2006).
Almost 100% of the wastewater treated, which can be defined entirely as "fresh water", containing less than 1,000 mg/l of total dissolved solids, **flows into bodies of surface water**. In 2023, only 0.2% of the water treated by Acea Ato 2, 0.5% of the water treated by AdF and 22% of the water treated by Gori is discharged into the sea, representing approximately 4% of total water treated[227]. The portion of water discharged into the sea from Gori travels through underwater pipes, following treatment at the coastal purification plants on the Sorrento Peninsula (Sorrento, Massa Centro and Marina del Cantone), the island of Capri (Gasto, Occhio Marino and La Selva) and Foce Sarno.
The main basins affected by the discharge from the 490 plants[228] are presented in Table No. 62.

Table no. 61 – Percentage coverage of the sewer and purification services for total user accounts of the Water Companies in the NFS (2021-2023)

company	2021		2022		2023	
	sewer	purification	sewer	purification	sewer	purification
Acea Ato 2 (*)	91.5%	88.1%	91.6%	88.5%	91.5%	88.5%
Acea Ato 5	67.1%	57.7%	69.6%	60.7%	69.1%	60.3%
Gori	86.7%	76.1%	87.5%	77.6%	88.7%	81.2%
Gesesa	80.6%	34.8%	82.9%	34.6%	84.6%	34.9%
AdF	84.1%	74.8%	84.1%	76.3%	84.3%	77.1%

(*) The 2023 data include an estimated percentage of users in newly acquired municipalities not yet migrated to Acea Ato 2's commercial systems.

226 Plants that discharge into the sea for the Company Gori are those on the islands of Capri, the Sorrento Peninsula and that of Foce Sarno.

227 The discharge of water, as for intake, occurs in areas at potential risk of water stress, as defined by the cited Aqueduct Water Risk Atlas.

228 The wastewater treatment plants for the NFS companies, Acea Ato 2, Acea Ato 5, AdF, Gori and Gesesa total 490. By also including Acque, Publiacqua and Umbra Acque, the number goes up to 864.

Table no. 62 – Hydrographic basins affected by discharges of COMPANIES within the scope of NFS

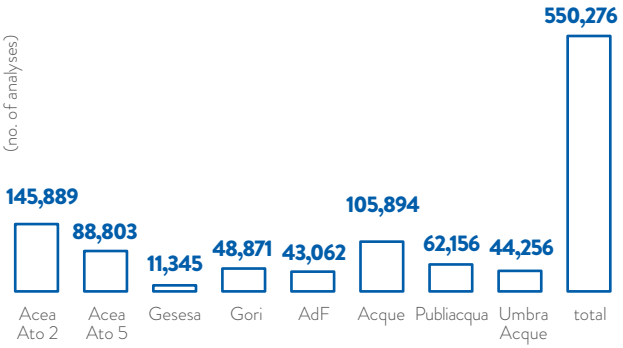
company	hydro graphic basins affected
Acea Ato 2	basins of rivers Tiber, Aniene, Mignone and Arrone
Acea Ato 5	basins of rivers Gari, Sacco, Cosa and Liri, Fosso della Maddalena, tributary of the River Sacco, Fosso del Diluvio, tributary of Lago di Canterno
Gesesa	basins of rivers Calore, Sabato, Isclero and Tammaro
Gori	basins of the river Sarno and Regni Lagni canals
AdF	basins of the rivers Ombrone, Orcia, Fiora, Albegna, Elsa, Pecora

CENTRALISATION PLAN FOR THE ACEA ATO 2 TREATMENT PLANTS

To improve the quality of treated water, Acea Ato 2 has defined a Centralisation Plan for treatment plants aimed at streamlining the service, centralising treatment, where sustainable, at a limited number of sites identified through analysis of the land from a geo-morphological and urban-planning perspective. In fact, with a high number of small and medium-sized treatment facilities and sewage systems managed (127 treatment plants with capacity below 10,000 P.E.), service coverage is guaranteed primarily by large and medium-large treatment plants (44 treatment plants with capacity above 10,000 P.E.). **In the last three years (2021-2023), 13 small and medium-capacity treatment facilities were decommissioned**. The reduced fragmentation in favour of medium-large plants, combined with integration of sewerage collector systems, has allowed **greater control of treatment efficacy** and optimisation of management and energy costs. Acea Ato 2 has therefore prepared a rationalisation plan, which it keeps up to date, choosing between centralisation and upgrading of small plants on a case-by-case basis. The optimal solution depends on many factors that must be carefully evaluated for the specific case. In 2023, the Centralisation Plan reached the goal of **eliminating a further 3 minor treatment plants** (Giustinianella, Trigoria e Case and Campi in the Municipality of Rome), **in addition to one medium-large plant** "Palmarola" again in the Municipality of Rome.

Water companies manage treatment processes in line with the authorisations required for each plant and on the basis of the regulatory context in which they operate. **The discharge limits each plant** are established through an authorisation issued by the **competent administrative body**, which, on the basis of technical and environmental assessments during the evaluation stage, **may set stricter parameters** compared to those applicable nationally. In this regard, for example, the regulatory framework in which **Acea Ato 2** operates is characterised by prescriptive standards for discharge which are **generally higher** than the national regulatory reference level, while **Acea Ato 5** is subjected to stricter authorisations regarding the **quality of water discharged** than those established by sector-wide regulations. This is a **precautionary approach**.
The companies that perform analyses to verify the proper treatment of water report the **percentages of non-compliance** with discharge limits, which are **very low** relative to the total quantities analysed: 2.2% for Acea Ato 2, approximately 0.6% for Acea Ato 5, 0% for Gori, 3.6% for AdF and 0.2% for Gesesa[229].

Chart no. 57 – Analytical checks on wastewater, total and by company (2023)



The **145,889 controls** conducted by **Acea Ato 2** on **wastewater** confirmed the high purification standards achieved by the treatment process.
In the "historic" area managed by Acea Ato 2, which includes **Rome and Fiumicino**, the **main treatment plants** in 2023, **treated approximately 515 million of cubic metres of wastewater**, a figure that is slightly lower than the previous year (510 million cubic metres). Considering the 171 smaller treatment systems and the plants of the municipalities acquired in OTA 2, this makes a **total volume of 604 million cubic metres of wastewater treated** (589 Mm3 in 2022).

229 The percentages correspond to the M6 value, as defined by ARERA, but still in the consolidation stage, except for Gesesa, which reports non-compliances according to an alternative calculation method and where the M6 data was not available at the time of publication.

Table no. 63 shows the figures of the most important parameters from the main treatment plants of Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa. The section *Sustainability performance: Water Business* in the *Environmental Report* details other treatment efficiency indicators.

Table no. 63 – Output parameters of the main treatment plants managed by Acea Ato 2, Acea Ato 5, Gori, AdF And Gesesa (2023)

	Acea Ato 2	Acea Ato 5	Gori	AdF	Gesesa (Benevento)	concentration limits in surface water (Legislative Decree no. 152/06)
parameter			**average of values (mg/l)**			
BOD_5	4	3	9	7	10	≤ 25
COD	22	9	17	36	10	≤ 125
SST	6	5	20	14	10	≤ 35
nitrogen (ammoniacal, nitrate, nitrous)	6	3	7	12	5	-
phosphorous	2	1	1	3	1	-
			quantity output (t)			
COD	15,902	1,136	2,410	610	30	-
SST	4,641	221	2,826	246	9	-

The sludge produced during the treatment process **is** mostly *sent for* **recovery of material** (see *Intermediation and Transport of Waste* in the *Environment Business*, and the chapter on Waste).
In 2023, work continued to reduce the **sludges produced by treatment plants** managed by Group companies[230] and make treatment processes more efficient (see *Management and minimisation of waste produced* in the chapter *Waste*).
Acea Ato 2, completed the **upgrading** of two **plants producing biomethane** in 2023, which is fed into the gas distribution network managed by Italgas Reti, **from the biogas produced by the anaerobic digestion processes** at the Roma Nord and Roma Est treatment plants.

THE USE OF MATERIALS, ENERGY AND WATER

energy efficiency (Areti, the Environment Segment and the Water Segment): **36.9 GWh** and approx. **11,620 t** of **CO_2 not emitted in total**

around **316 GWh of electricity consumption** of the Group Companies **from renewable energy** with guarantee of origin, equal to approximately **99,580 t** of **CO_2 emissions avoided**

approximately **65,340 m^3** of water recovered in the Environment Business: **34%** of the total used in industrial processes in the same segment

THE CONSUMPTION OF MATERIALS AND ENERGY

CONSUMPTION OF MATERIALS

The main materials used in production processes differ according to the business sector. For the **Companies in the Environmental Business**, the most important resources include **incoming waste for the production of compost and electricity** (waste-to-energy from pulper waste and SRF); Thermoelectric plants, managed by **Acea Produzione**, use **fossil fuels (natural gas and diesel) to produce electricity**. For the electricity distribution process, **Areti** uses the gas sulphur hexafluoride (SF_6) **in medium and high-voltage**

230 It is noted with regard to AdF that the production of sludges increased for a specific reason: the urban wastewater treatment plant IDL S. Giovanni - at Pianetto in the Municipality of Grosseto - stopped hydrolysis treatment in January 2023 and restored aerobic treatment, as had been done in the past. This was in the context of criminal proceedings, where the Preliminary Investigations Judge ordered the preventative seizure of only the areas intended for the surplus transfer of sludge. Investigations are still ongoing. ADF complied with all the prescriptions issued by the Judicial Authorities and Administrative Authorities.

plants for its specific electrical and thermal insulation properties. The **Companies in the water segment**, use the **chemical products** required for process management, such as reactants for drinking water processing, the disinfection and treatment of wastewater. Finally, **Acea Energia** as well as the structures managing commercial activity for the **Water Companies**, whilst all committed to digitalisation of processes, all use **paper** for customer invoicing. Please see Table no. 64 and the *Environmental Accounts* for details of resources used by each area.

Table no. 64 – Type and consumption of materials by the main Group Companies (2021-2023)

materials	u.m.	2021	2022	2023
incoming waste for composting and landfill	t	249,867	556,003	637,020
pulper	t	99,730	97,796	82,217
SRF	t	307,391	289,550	294,174
methane	Nm^3 x 1,000	23,912	24,131	22,667
diesel (Montermartini power station)	l	646,730	883,290	260,756
SF_6	t	22.9	22.8	23.0
various chemicals of water companies	t	22,995	21,976	19,665
paper	t	341	320	312

Note: data on incoming waste includes waste at the Orvieto Ambiente landfill, waste entering the Deco and Ecologica Sangro landfills (both since 2022), and waste processed for the production of compost (sludge, green, OFMSW and other agrifood waste). Pulper and SRF for waste-to-energy are resources with a renewable component linked to the biodegradable fraction of the waste. In 2023, the renewable and biodegradable portions of pulper waste and SRF were respectively 44% and 47%. The net decrease in diesel consumption in 2023 is attributable to the Montemartini power station coming into operation. The SF6 data refer the total used Areti and Acea Produzione; data on paper use is associated with invoicing activities of the companies Acea Energia, Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa. Some values for the previous two-year period have been adjusted for consolidation.

ENERGY CONSUMPTION

Total energy consumption amounts to approximately **12,281 TJ**, decreasing compared to 2022 (-5%). Net of energy sold, consumption stood at 8,896 TJ (see Table 65).
The decrease in consumption refers to various factors occurring during the production processes, for example, higher rainfall, which resulted in lower energy expenditure for lifting systems used by the Company in the water segment, which at the same time, increased the availability of gravity collected water; consumption at the waste-to-energy plants were more contained due largely to the Terni plant being stopped in November for revamping work. The many interventions to increase energy efficiency also contributed to reducing consumption.

Electricity consumption of the main Companies, connected to the distribution of drinking and non-drinking water, treatment processes and internal consumption at work sites, **originates partly from renewable sources with a Guarantee of Origin**, **for a total of approximately 316 Gwh**[231], which, despite the decrease on the previous year[232], was equal to **46% of specific consumption (690.8 GWh)** in 2023 (Table 65).

Table no. 65 – Energy consumption by source (2021-2023) (*)

energy per source	2021	2022	2023
		TJ (GWh)	
SRF and pulper waste (waste-to-energy) – non-renewable share	2,770.1 (769.5)	3,012.7 (836.9)	2,972.0 (825.6)
biogas (100% renewable – waste management and water business)	424.1 (117.8)	608.7 (169.1)	687.7 (191.0)
photovoltaic	3.4 (0.9)	9.4 (2.6)	9.6 (2.7)
GO electricity	1,498.5 (416.3)	1,256.4 (349.0)	1,138.1 (316.1)
total fuel and electricity consumption from renewable sources	**4,696.1 (1,304.5)**	**4,887.3 (1,357.6)**	**4,807.4 (1,335.3)**
SRF and pulper waste (waste-to-energy) – non-renewable share	3,659.0 (1,016.4)	3,883.4 (1,078.7)	3,362.5 (934.0)
methane (for electricity generation, district heating, processes, water business dryers and heating for offices)	1,331.6 (369.9)	1,278.8 (355.2)	1,266.0 (351.7)

231 Acea Energia estimated data.

232 The additional rise in the cost of electricity certifications from renewable sources was deemed no longer sustainable by certain Group companies.

diesel (for electricity generation, other uses, composting plants and road haulage)	176.0 (48.9)	184.0 (51.1)	161.6 (44.9)
LPG (heating, road haulage and processing)	2.1 (0.6)	2.2 (0.6)	0.7 (0.2)
petrol (road haulage)	18.0 (5.0)	28.5 (7.9)	33.6 (9.3)
LSC oil for process (disposal of Acque Industriali wastewater)	1.3 (0.4)	0.0 (0.0)	0.0 (0.0)
electrical energy losses on the distribution networks and transport	1,112.0 (308.9)	1,015.5 (282.1)	963.3 (267.6)
own use of electricity for the implementation of distribution and transmission activities	110.5 (30.7)	104.2 (28.9)	100.4 (27.9)
consumption for public lighting	242.4 (67.3)	242.7 (67.4)	236.8 (65.8)
non-GO electricity for internal use (water systems, environmental processes, laboratories and offices)	1,124.2 (312.3)	1,359.1 (377.5)	1,348.8 (374.7)
total fuel and electricity consumption from non-renewable sources	**7,777.1 (2,160.4)**	**8,098.3 (2,249.5)**	**7,473.8 (2,076.0)**
total fuel and electricity consumption	**12,473.1 (3,464.8)**	**12,985.6 (3,607.1)**	**12,281.1 (3,411.4)**
total energy sold	**3,758.8 (1,044.1)**	**3,107.8 (863.3)**	**3,385.2 (940.3)**
energy consumed	**8,714.3 (2,420.7)**	**9,877.8 (2,743.8)**	**8,896.0 (2,471.1)**

(*) Certain 2021 figures were adjusted for energy data consolidation; Ecologica Sangro was included in the 2022 figures, for the purposes of comparability with the last two-year period, and other figures were adjusted for the consolidation.
Note: data on energy produced by the companies' plants, energy fed into the network and energy sold are illustrated in the *Environmental Report* (Products – Energy business).

Table no. 66 shows the **energy consumption intensity** indices. Public lighting decreased slightly, due to improved lamp efficiency; regarding the two water service indicators, the first came down due to the decrease in volumes issued, which depend on the efficiency of the IIS, including the decrease in leaks, as well as the lower consumption of electricity, which mainly depends on the higher contribution from gravity sourced water; the second came down due to increased operational efficiency: electricity consumption increased for sewerage and treatment plants, but not as much as the increase in treated wastewater.

Table no. 66 – Energy intensity indices (2021-2023)

ENERGY CONSUMPTION INTENSITY INDEX	u.m.	2021	2022	2023
electricity consumed for public lighting per lamp	TJ/lamp	0.00106	0.00105	0.00102
total electricity consumed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa/water issued into aqueduct systems	TJ/Mm^3	2.471	2.557	2.475
electrical energy consumed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa for sewer service and treatment/water treated	TJ/Mm^3	1.263	1.282	1.268

ENERGY CONSUMPTION ALONG THE SUPPLY CHAIN

Acea works to increase awareness and constantly monitor its supply chain in relation to environmental and specifically energy issues. Since 2015, it has been monitoring **energy consumption**, requiring a representative panel of suppliers to fill out a specific questionnaire. In December 2023 the questionnaire was **sent to 100 suppliers**, **the principal parties in terms of value of orders for the year**. Thanks to the results **from 51 suppliers**(equal to 31% of the total Acea expenditure for the procurement of goods/services and works), the total energy consumption for all suppliers was estimated at approximately 418,428 GJ[233]. The questionnaire has included a specific section on water consumption (see the section *Attention to water consumption*, further on in the document).

233 The figure is obtained by readjusting the consumption of respondents relative to the total purchased during the year.

ENERGY SAVING

Ecogena is the organisation registered to develop **energy-efficiency initiatives for the Group Companies** and report their results to the Gestore dei Servizi Energetici (GSE) for the **awarding of Energy Efficiency Certificates** (EECs). From their activation to 31 December 2023, the cogeneration plants managed by Ecogena received a total of 9,661 **EECs** under the Ministerial Decree of 5 September 2011, of which **531 were in 2023**. Furthermore, the energy efficiency initiatives implemented by the Acea Group, reported by Ecogena and validated by the GSE, received a total of **26,438 EECs**, of which **7,424 in 2023**.

Areti, in its capacity as a distribution company, is required to reach a quantitative annual primary energy saving target defined by the authorities in terms of EECs. In this regard, in 2023 the Company cancelled 38,668 EECs, of which 16,729 were related to the 2022 quota and the remaining 21,939 to the previous quota.

ENERGY EFFICIENCY ACTIONS

Every year, Acea **implements measures to improve energy efficiency**, aimed specifically at **Companies operating in the Water and Environment Business and Areti**.

In 2023, considering the **photovoltaic systems** at the plants of Acea Ato 2, AdF, Deco, Orvieto Ambiente and Terni, total energy consumption (on-site self-consumption) was **2,670 MWh**, with a consequent approximately **840 tonnes of CO_2 emissions avoided**.

In the water sector, the Company implemented the following **energy efficiency measures** in 2023:

Acea Ato 2 achieved **a total saving of 35.1 TJ** (9.8 GWh). The most significant efficiency gains, amounting to **31.3 TJ** (8.7 GWh), concerned two water centres, while for the water treatment sector, specific optimisation work was carried out at two treatment plants, with a resulting efficiency gain of **approximately 3.5 TJ** (0.96 GWh). Additionally, further savings related to reduced water losses. For **Acea Ato 5** increases in efficiency, corresponding to **3.7 TJ** (1.0 GWh), are mainly attributable to replacing the pumps used for withdrawal at springs and well fields, installing inverters, and increasing the efficiency of the treatment system.

Gori implemented measures to increase efficiency for total savings of **61.7 TJ** (17.1 GWh), primarily through the use of more energy efficient water sources, the use of higher-efficiency electric pumps, and increasing the efficiency of certain processes at treatment plants. Specifically, the reduction in sourcing from underground water, and consequent less use of certain lifting devices that are more costly from an energy perspective, resulted in a consistent reduction in electricity consumption[234].

AdF achieved efficiencies for approximately **10.2 TJ** (2.8 GWh) by increasing efficiencies at the collection plant, district planning, management of pressure levels and leak detection and the energy optimisation of a treatment plant. **Gesesa** has achieved a savings by improving the efficiency of **0.5 TJ** (0.2 GWh) resulting from actions to manage pressure in the context of the current district planning process.

Overall, thanks to the measures referred to above, the **Water Business avoided over 9,700 t di CO_2**.

In the **Environment Business**, actions to improve energy efficiency in 2023 included the works at the **San Vittore del Lazio plant** to optimise combustion on three lines which led to annual efficiency gains of approximately **19 TJ** (5,300 MWh of electricity). At the composting sites in Aprilia, Monterotondo and the compost line at the Orvieto Ambiente plant, additional energy efficiencies were introduced to optimise processes based on the use of an inverter and other specific management improvements, which resulted in savings of **0.8 TJ** (213 MWh). In total, **CO_2 avoided** at sites in the Environment segment, including the two waste-to-energy plants, amounted to approximately **1,700 t**.

In the Energy Infrastructure segment, **Areti** continued with energy efficiency measures on the managed electricity distribution networks in 2023, specifically **by replacing 105 MV/LV traditional transformers** with the same number of **ultra-low loss transformers**, reducing electricity consumption by 136 MWh, and working on the HV/MV/LV distribution **network** to optimise the MV network structure and upgrade the HV and LV lines, for a total of 514 MWh of savings, as estimated to date (including the use of transformers). In total, **in 2023**, there was an **energy saving** of approximately **1.9 TJ** (0.5 Gwh), thus **avoiding 162 tonnes of CO_2**[235].

Consumption for public lighting in 2023 was slightly down at **237 TJ (66 Gwh)** (-2.4% compared to 2022). The ratio of LED lamps to total lamps was **92%**.

In 2023, Areti's operating personnel used a total of **87 electric vehicles** (35 via car sharing, and 52 vehicles assigned individually to operating personnel and work teams). According to monitoring by Areti, total journeys amounted to approximately 207,570 km, consumption was around 33 MWh and a net saving of approximately **21,060 kg** of CO_2 was achieved thanks to the avoidance of diesel-powered vehicles.

234 The overall reduction recorded in 2023 compared to 2022, on the same scope, was approximately 9,500 MWh, the equivalent of a 4.4% total reduction in overall consumption recorded in 2022.

235 Calculations for estimation of CO_2 emissions avoided in the entire section Relations with the environment have been carried out using the 2021 Terna location-based conversion factor, equal to 0.315 tonnes of CO_2/MWh. In the Sustainability Plan reporting, the same estimate is made using the 2019 conversion factor, in line with the calculation for definition of the 2024 target.

ATTENTION TO THE USE OF WATER RESOURCES

Water resources are used in a number of industrial processes, such as the generation of electricity and thermal energy, the compost producing processes, as well as clean treatment plant tanks and anaerobic digestion tanks. Water is also used in small quantities for laboratory activity.
Group companies are committed to reducing drinking water withdrawals and implement measures to enable the use of recycled water. In this regard, there has been a gradual increase in the quantity of recovered water, from around 2.2 million m^3 in 2021 to almost **2.7 million m^3** in 2023, **an increase of 21%**. Specifically, in 2023 certain companies in the water sector developed initiatives to reuse treated water within the treatment plants themselves. The treatment plans currently managed by **Gori**for example, **re-use the treated effluent** The wastewater used for this purpose, defined as "technical wastewater", is distributed within plants through specific pipes and used for washing equipment (screens, units for thickening and drying of sludge), backwashing of certain parts of the treatment plant (membranes, fabric or sand filters), and washing of sand and screens. The first reused water-flow meter was installed at the Scafati plant; additional flow gauges are expected to be installed in 2024 with the implementation of *water audits* to assess water withdrawals and consumption from treatment processes and identify strategies to increase savings and reuse possibilities.
Acea Ato 2, for some years now, has implemented restructuring and integration in the industrial water network based on a logic of sustainable and circular water management of the water resource, so as to optimise the internal uses of drinking water (non-drinking water, recovered from the output of the treatment process for urban wastewater) at the main treatment plants: **"Roma Sud"**, **"Roma Nord"**, **"CoBIS"** and **"Ostia"**. In 2023, the Company further extended the industrial water networks at the **Roma Sud** treatment plant, so that industrial water could be used in the new thermal dryer and at the **Ostia treatment plant**, making it possible to reuse the treated water at the new *soil washing* plant under construction[236]. The programme of interventions underway has already increase the volume of treated water reused internally as process water, by about 1.8 million m^3 in 2022 **to approximately 2.1 million m^3 in 2023**, **corresponding to around 52% of the total water used**. At **Acea Ato 5** approximately **534,600 m^3** of treated water was used in the same treatment plants for the services relating to their operation (washing of screen systems and filtration, service water to operate the drying systems, irrigation of green areas, etc.)

The **Companies in the Environment segment** limit the use of drinking water, mainly using **water from wells**. In addition, at the **plants of San Vittore del Lazio, Orvieto Ambiente, Aprilia**, **Monterotondo Marittimo** and **Terni**, there are active **systems for the recovery of rainwater**. At the Terni plant, for example, rainwater is collected in **two tanks** equipped with a filtration system and storage tanks, before industrial use. The **Aprilia composting plant** also has a system for treating **residual water from unprocessed waste**, allowing it to be reused in production processes. The **Monterotondo Marittimo** plant also has a **rainfall recovery system** that, after phytodepuration, enables collection of the water in special aerated reservoirs as a reserve for fire-fighting and as a reserve of industrial water for process use[237].
At the **waste-to-energy** plant in San Vittore del Lazio, rainwater goes through a special chemical/physical treatment process to produce demineralised water, which is then entirely reused within the same system as part of a closed cycle, with no water discharge to the environment. The **Orvieto Ambiente plant hubcollects rainwater** from the roofs of certain buildings and transfers it to underground storage tanks serving the fire-fighting reserve. The **Chiusi plant** of Acea Ambiente, recovers water from the final effluent: the recovered water is used to wash surfaces at the plant. Thanks to the various solutions described, **a volume of approximately 65,339 m^3 was recovered from the Environment segment** in 2023.
A project is underway at the **Tor di Valle** thermoelectric power station to reuse water after treatment for industrial purposes in the district heating network.
Water withdrawals of the main Group companies associated with industrial processes and civil use are illustrated in Table 67. While withdrawals **were slightly up** during the year, the measures detailed above have **significantly increased the amount of re-used water over the three-year period**.
The reuse of treated waste water **is an effective response to water stress** in Acea's areas of operation, but specific regulatory interventions are required to further expand its potential. In this sense, the recent European Regulation 2020/741 on the reuse of treated water in agriculture, in addition to setting the provisions that will be adopted with national regulations, facilitates the option of increasing this reuse.

236 Located at the Ostia treatment plant, the new sand washing treatment plant, will make it possible to recover up to 80% of the incoming solid material, with the aim of generating three types of products that can be used on the market as secondary raw materials (sand, gravel and pebbles) in the building or road works sectors. In addition to the recovery of waste made up of solid-sandy materials generally destined for disposal, *soil washing* exploits the synergy with the nearby Ostia treatment plant, from which it receives the treated water to use in its washing process, and returns the process water ad forecourt water for treatment, thus optimising the water usage.

237 A non-substantial amendment to the integrated plant authorisation was approved during 2023, which requires various improvements to reorganise the water recovery system, including the recovery of rainwater coming from the roofs. The high quality and quantities of water from the roofs will further reduce the network's consumption of drinking water.

Table no. 67 – Water withdrawal and recovery (2021-2023)

	2021	2022	2023
		(Mm³)	
Withdrawals (*)			
industrial processes (district heating, thermoelectric generation, Ambiente plants, Water companies) (**)	**0.215**	**0.343**	**0.293**
of which aqueduct	*0.107*	*0.199*	*0.166*
of which well	*0.104*	*0.120*	*0.108*
of which river water (***)	*0.003*	*0.023*	*0.019*
water consumption for civil use (****)	**2.535**	**2.516**	**2.612**
total water withdrawals (*****)	**2.750**	**2.858**	**2.905**
Recovery			
water recovered and used in industrial processes	**2.222**	**2.393**	**2.691**

Note: intake of freshwater occurs in areas at potential risk of water stress, as defined by the Aqueduct Water Risk Atlas, the map drawn up by the World Resources Institute (WRI).
(*) The figures for the 2021-2022 two year period have been adjusted following consolidation and changes to the calculation method.
(**) Water withdrawn for industrial use was partly used in processes totalling 0.090 Mm³ in 2021, 0.179 Mm³ in 2022 and 0.148 in 2023; the discharge of water withdrawn for industrial use over the three-year period was 0.009 Mm³ in 2021, 0.007 Mm³ in 2022 and 0.001 in 2023.
(***) The data refers to river withdrawals for the Orvieto Hub and sites managed by Deco.
(****) Water withdrawn for civil/sanitary use from aqueducts, representing 99.9% of total withdrawal for this purpose, is discharged into the public sewerage system after reuse and returned to the environment.
(*****) Out of the total water withdrawn, water consumption in the three-year period was 8% in 2021, 12% in 2022 and 10% in 2023.

The Group promotes informed and careful use of water resources, **also throughout the supply chain**, raising awareness among suppliers through issue of a questionnaire (see also the sub-section *Energy consumption along the supply chain*).

WATER INTAKE OF PANEL OF SUPPLIERS MONITORED

Since 2020, to raise awareness along the supply chain of the importance of safeguarding water resources, the Sustainability Planning & Reporting Unit, with the support of the Procurement and Material Management Function, has sent a request to a panel of suppliers for environmental data, which includes information on water intake, divided by process and civil uses. **45 suppliers** out of 100 suppliers invited to replied to the section on **water resources**, corresponding 28% of the total expenditure of the Acea Group for procurements of goods, services and labour. Water intake for the above suppliers in 2023 equalled 32,971 m³, divided into 26,682 m³ for industrial uses and 6,288 m³ for civil uses[238]. Acea intends to continue to send this questionnaire in the coming years, with the goal of raising awareness about the topic among its suppliers and improving the quality of the surveys.

Discharges of water withdrawn and used occur within the scope of **authorised and closely controlled processes**. For example, at the **Terni waste-to-energy plant**, residual water from production processes is **first treated by internal treatment plants**, and then discharged into public sewerage. Water used in the waste-to-energy process at the **San Vittore del Lazio** plant is collected and stored in special underground tanks and then disposed of as waste, as it may contain substances that make it unsuitable for normal discharge. Wastewater from toilet facilities on the production lines and at the relevant offices is collected in septic tanks and subsequently disposed of, while the sewage from the administration building is collected and conveyed to an Imhoff tank with a sub-irrigation system for subsurface clarification.
Water intake for industrial uses in activities connected to the integrated water service, and in particular water treatment, undergoes the **same treatment as waters transported via public sewerage**, i.e. it is retreated at the treatment plants and sent to the locations described in the section *Sewerage service and treatment system*, in the chapter *Water Business*. The civil water intake from the aqueduct ends up directly in the sewer network.

238 Suppliers' water data parametrized in relation to the portion of work/services sales for Acea.

EMISSIONS

continuous analysis of waste-to-energy emissions: **values of pollutants significantly lower than legal limits**

decrease in absolute terms of indirect Scope 2 **emissions:** **328,701 t** (-5.7%)

improved intensity index for emissions under *Scope 1:* gross electricity produced at **366 g/kWh** (-20%)

ATMOSPHERIC EMISSIONS

Atmospheric emissions from production activities **are monitored in a planned and constant manner**. The plants are managed according to UNI EN ISO 14001 and UNI EN ISO 45001 management standards. Acea Ambiente also applies the UNI EN ISO 50001 management system, while the waste-to-energy plants, the Orvieto Ambiente plant and the Deco and Ecologica Sangro sites are also **registered under the European EMAS III scheme**, extended until 2024[239].

The main **macro-pollutants** from the Acea Ambiente and Acea Produzione plants, are monitored through Continuous Emission Monitoring Systems (CEMs). In 2023, macro-pollutants were recorded at very low values and are decreasing compared to previous years (see Table 68).

Table no. 68 – Total atmospheric emissions of pollutants from the main Group plants (2021-2023)

emissions	2021	2022	2023
	(t)		
CO	7.68	5.95	5.16
NO_x	198.11	191.30	171.85
SO_x	1.60	1.51	1.03
particles (particulate matter)	0.74	0.36	0.25

Note: the emissions refer to the plants of Acea Ambiente – waste-to-energy and Acea Produzione.

Specifically, monitoring conducted at the **waste-to-energy plants** is carried out using fixed and mobile stations that **sample and analyse the fumes coming out of the chimneys**, measuring concentrations for multiple parameters that are periodically checked by internal personnel and certified by qualified external laboratories. As in previous years, in 2023, these concentrations were **significantly below the legal limits** (see Table No. 69).

At the **San Vittore del Lazio plant**, the monitoring campaigns carried out for PM10, PM2.5[240], heavy metals (fixed and mobile survey stations) and PAHs (polycyclic aromatic hydrocarbons), dioxins and furans (mobile only) did not detect any critical values. Other actions in the year including the monitoring of diffuse and fugitive emissions and the continuation of a biomonitoring campaign using bees as bioindicator insects (see *Safeguarding of Land and Biodiversity*, in the chapter *Environmental Sustainability and the Main Challenges*). Finally, each waste-to-energy line has systems to monitor emissions from the chimney, enabling continuous tracking for concentrations of pollutants 24/7, with availability of data on the Group website (www.gruppoacea.it).

Environmental monitoring is carried out at all plants. For example, at the Aprilia plant, an **experiment was conducted using drones and the "Acea Nose" control unit**. At the same time, **a ground survey campaign was undertaken on certain parameters**, including hydrogen sulphide (H_2S), odours, volatile organic compounds (VOC),nitrogen oxide (NO_2) and methane (CH_4), etc. The outcome of this campaign found that the **impact** of the relative composting plant on the surrounding urban areas **was zero** in terms of gas and odour emissions.

239 In the case of Deco, the EMAS registration is valid from 2022 to 2025.

240 PM10 refers to particles with a diameter less than or equal to 10 μm. The term PM2.5 refers to particles with a diameter less than or equal to 2.5 μm.

Table no. 69 – Concentrations of atmospheric emissions generated by waste-to-energy plants (2021-2023)

		San Vittore del Lazio plant (*)				Terni plant (*)			
pollutant	**u. m.**	**scope of reference (**)**	**2021**	**2022**	**2023**	**scope of reference (**)**	**2021**	**2022**	**2023**
HCl	mg/Nm^3	8	0.064	0.139	0.314	8	3.701	3.919	4.267
NO_x	mg/Nm^3	70	29.488	29.560	30.087	180	120.644	122.070	122.45
SO_2	mg/Nm^3	40	0.310	0.310	0.269	25	0.928	0.563	0.520
HF	mg/Nm^3	1	0.016	0.020	0.015	1	1.040	0.854	0.888
CO	mg/Nm^3	40	1.083	0.910	0.699	25	0.049	0.093	0.155
total particles (particulate)	mg/Nm^3	3	0.049	0.040	0.042	25	0.760	0.468	0.216
PAH (polycyclic aromatic hydrocarbons)	mg/Nm^3	0.01	0.000007	0.00001	0.00001	0.01	0.00002	0.000005	0.000007
dioxins and furans (PCDD +PCDF)	ng/Nm^3	0.1	0.0023	0.0032	0.0024	0.1	0.0000	0.0000	0.0000
heavy metals (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)	mg/Nm^3	0.5	0.0315	0.0372	0.0168	0.3	0.04	0.03	0.02
Hg	mg/Nm^3	0.05	0.0022	0.0020	0.0010	0.05	0.0018	0.0008	0.0003

(*) The analysis of PAH, dioxins and furans and heavy metals and their composites are four-monthly and discontinuous. The "<" symbol identifies the concentration values that are equal to or below the thresholds that the devices used by the laboratory are capable of measuring.
(**) Reference parameters, Legislative Decree no. 46/2014, 2000/76/EC and IEA, are separate for each waste-to-energy plant.
Note: For San Vittore del Lazio, over the years the recorded concentrations of the parameters HCl, SO_2, dust and HF were close to the instrument's detection limit. Therefore, in these measurement areas deviations are to be considered insignificant for absolute changes in concentrations and masses.

Monitoring carried out on installations at risk[241] has shown **the absence of emissions** in significant quantities **of substances responsible for reducing the ozone layer** (for consumption see the section *Resources used*, in the *Environmental accounts*).

GREENHOUSE-GAS EMISSIONS

CO_2 emissions are quantified by **monitoring and evaluating the carbon footprint of the individual macro production processes** according to the guidelines of the *GHG protocol*[242] which requires reporting in the **direct** (**Scope 1**) and **indirect** (**Scope 2 and Scope 3**) categories.

Direct Scope 1 emissions **mainly come from** the Group's **two waste-to-energy plants** and the **thermoelectric power stations**. As of 2022, two plants are subject to the **Emission Trading Scheme (ETS)**, specifically the Montemartini and Tor di Valle power stations. As of March 2022 and with retroactive[243] effect, the Terni waste-to-energy plant is no longer included in the scope of application of the ETS Directive.
The allowances assigned according to the NAP (National Allocation Plan) are lower every year and essentially very small, compared to the actual emissions recorded. Data for the three-year period 2021-2023 is presented Table no. 70.

Table no. 70 – CO_2 emission allowances as per the National Allocation Plan (NAP) and actual emissions by plant (2021-2023)

	2021		2022		2023	
plant			(t)			
	assigned by NAP	**actual**	**assigned by NAP**	**actual**	**assigned by NAP**	**actual**
Tor di Valle (*) (**)	3,564	51,839	3,472	54,443	3,380	50,125 (***)
Montemartini	0	1,712	0	2,338	0	690

(*) As with previous years, in 2023 the applicable legislative framework allowed the Tor di Valle plant to benefit from free of charge emission allowances (3,380 t) as it serves a district-heating network.
(**) The 2022 figures for actual emissions have been updated with the certified figures.
(***) Estimated emissions, pending certification by the responsible body.

241 This is primarily air conditioning equipment using refrigerant gases subject to the 1987 Montreal protocol, particularly chlorofluorocarbons.

242 See www.ghgprotocol.org for more information.

243 In March 2022, following an exemption request submitted to the MISE, with Resolution 66/22 the National Committee for the management of Directive 2003/87/EC and for support in the management of project activities of the Kyoto Protocol, determined, with retroactive effect, the exclusion of the Terni plant as of 31 December 2020.

Scope 1 emissions include other components deriving from certain processes of plants in the Environment Segment (composting, treatment and disposal of liquid waste), from drying at treatment plants, from petrol and diesel vehicles in the fleet, from leaks of sulphur hexafluoride (SF6) that may arise at Areti plants, from combustion processes for heating of premises and offices, and finally from leaks of freon gases from air-conditioning units.
The amount of CO_2 emitted by waste-to-energy plant in 2023 **decreased compared to 2022, by -13%** (see Table no. 71); this was mainly attributable to the stoppage of the Terni plant in November, which had in fact produced less electricity compared to 2022 (-17.5%).
The reduction in the CO_2 emissions also produced by Acea Produzione thermoelectric power stations refers to lower production of thermoelectric power, and consequently, to less use of fuel; the other Scope 1 emissions were essentially stable in relation to 2022.

Scope 2 greenhouse gas emissions from electricity consumption in 2023 were down compared to 2022 (approximately -6%). Rendering the water business more efficient, for example, combined with lower consumption due to less pumping, due to more abundant rainfall and more intense usage of gravity-based water sources, all contributed to this improvement. For more details see the paragraph on Energy Saving. Emissions due to technical losses on the electricity network came down (by about -5%) due to reduced demand on the network (-2.6%) and interventions to increase efficiency.

Scope 3 emissions (see Table no. 71) include those deriving from gas and electricity sales, electricity consumption by suppliers of purchased goods, services and works, business travel and the main subsidiaries[244] (Scope 3 category "Investments").
In 2023, similarly to the previous year, **business travel emissions rose again**, with the end of the restrictions caused by the pandemic and resumption of normal business travel, also considering that less employees were working remotely over the last year.
Scope 3 emissions associated with the purchase of goods, services and labour are calculated using monitoring data for energy consumption outside the Group, requested from a **representative panel of suppliers** using a questionnaire (see the section *Energy consumption outside the Group)*. In particular, the data requested refers to energy (consumption of fuels, electricity and vehicle fuels) and data relating to refrigerant gases used in-house, which contribute to this category of *Scope 3*.

To reduce emissions from **electricity sales** (calculated in the table using both the location-based and market-based methods), Acea Energia offers customers GO-certified green electricity commercial rates. Since 2021, all new retail customers on the free market are exclusively offered GO-certified green energy, with the gradual roll-out to contracts signed before this date. The "sustainable" rate also covers gas thanks to offsetting through the purchase of VER (Verified Emission Reduction) certified carbon credits. The carbon credits purchased for 2023 contributed to funding projects to reduce carbon dioxide emissions in Peru and Vietnam with tangible benefits for the local communities. See also the Chapter *Customers*, paragraph *Customer care*.
In 2023, Acea Energia **sold more "green" energy**[245], to customers on the free market, estimated at 3,000 GWh, **increasing by over 18%** compared to the volumes consolidated in 2022 (at 2,536 GWh). The **share** of this item out of the **total energy sold** in the year to free market customers (around 5,369 GWh, see also *Environmental Accounts*) **reached 56%** (42% on the 2022 consolidated figures).
The **sale of electricity with GO certification** has therefore led to a **saving of approximately 945,000 t of CO_2 in the Scope 3 category**.
For gas sales in 2023, offsetting measures are expected to cover **approximately 120 MSm3** (estimated figure; 54 MSm^3 in 2022), corresponding to approximately **238,900 t of CO_2**.

INTENSITY INDICES FOR GREENHOUSE GAS EMISSIONS

The emissions intensity index linked to value added improved, decreasing by 15% compared to 2022. Total Scope 1 plus Scope 2 emissions came down by 9%, while value added increased by 7% (see Table 71). The performance of the **Scope 1 emissions on energy produced (-20%)**[246] improved. The indicator stands at 366.1 g/kWh (326.2 g/kWh considering also the photovoltaic production of the subsidiary not consolidated on a line-by-line basis), with a decrease due to increased electricity production from hydroelectric (+27% compared to 2022 production) and the reduction in *Scope 1* emissions already referred to. The indices for greenhouse-gas emissions under ***Scope 2***, resulting from **losses on the electricity distribution networks compared to the total electricity issued**, recorded a **decrease of around 2% compared to 2022**: going from 0.0088 t/MWh (updated figure after consolidation) to 0.0086[247].

244 Acque, Publiacqua and Umbra Acque.

245 As in previous years, the figure for G.O. certified green energy sold in 2024 by Acea Energia and AEMA also includes the main Group companies' internal consumption (contributing for around 316 GWh).

246 The index is calculated using emissions from production (Acea Produzione's thermoelectric power stations, Ecogena plants, waste-to-energy plants) as numerator and total energy produced by the Group's plants as denominator.

247 The figure is estimated.

Table no. 71 – Environmental indicators: CO_2 emissions, greenhouse gas intensity indices (2021-2023)

EMISSIONS OF CO_2				
SCOPE 1 EMISSIONS				
FROM ENERGY PRODUCTION PLANTS				
	u.m.	**2021**	**2022**	**2023**
emissions of CO_2 from Acea Produzione thermoelectric power stations(*)	t	53,551	56,781	50,815
emissions of CO_2 from Ecogena plants	t	7,829	5,191	6,110
emissions of CO_2 from Acea Ambiente waste-to-energy plants(*)	t	325,684	327,670	284,746
FROM WASTE MANAGEMENT, ENERGY DISTRIBUTION, HEATING PLANTS AND VEHICLE FLEET				
emissions of CO_2 from waste-management plants(**)	t	1,895	2,028	1,991
emissions of CO_2 from water-plant processes of the IWS (***)	t	7,486	8,152	7,876
emissions of CO_2 from heating	t	881	758	792
emissions of CO_2 from vehicle fleet	t	10,533	11,077	11,460
emissions of CO_2 from Areti and Acea Produzione plants (from SF_6) (****)	t	7,045	4,959	5,370
emissions of CO_2 from refrigerants (HCFC) (*****)	t	0	2	0
TOTAL SCOPE 1 EMISSIONS	**t**	**414,904**	**416,618**	**369,160**
SCOPE 2 EMISSIONS				
location-based Scope 2 emissions (market based) (******)	**t**	**357,669 (271,973)**	**348,443 (291,578)**	**329,997 (285,073)**
of which CO 2 emissions from network leaks	t	97,301	88,853	84,291
SCOPE 3 EMISSIONS (*******)				
CO_2 emissions deriving from the purchase of goods/services and works (********)	t	31,701	26,674	30,183
emissions of CO_2 from business travel	t	38	143	185
emissions of CO_2 from gas volumes sold	t	346,567	337,895	348,557
CO_2 emissions from the sale of electricity, location based (market based)	t	2,447,005 (2,555,276)	2,323,676 (2,210,141)	1,691,148 (1,082,862)
emissions of CO_2 from Investee operating companies ("investments")	t	38,224	39,183	39,266
INTENSITY INDICES FOR GREENHOUSE-GAS EMISSIONS				
intensity indices of the GHG emissions	**u.m.**	**2021**	**2022**	**2023**
emissions of CO_2 (Scope 1+ Scope 2)Acea Group added value	(t/k€)	504.3	475.2	405.2
Scope 1 emissions of CO_2 /gross production (*********)	(g/kWh)	381.1	458.1	366.1
Scope 2 CO_2 emissions deriving from losses on the electrical energy distribution network/issued MWh	(t/MWh)	0.0099	0.0088	0.0086

Note: come figures for 2022 have been restated after consumption calculations. Emission factors for *Scope 1* emissions are taken from the standard parameters – ISPRA data 2023, DEFRA 2023 and GHG Protocol-5th Assessment Report-AR5.
(*) The 2022 figures for the Tor di Valle and Terni plants have been adjusted after the ETS certification, while the 2023 figure is estimated pending certification by a third-party body for Tor di Valle and the definitive analyses for Terni.
(**) The figure includes the emissions of the ancillary services of the waste-to-energy plants, not strictly related to the production of electricity, of Acque Industriali, Aquaser, Berg and Demap.
(***) Data refers to uses of dryers and generators.
(****) These are the tonnes of equivalent CO_2 corresponding to the emissions of insulating SF6 present in Areti's HV equipment (1 t of SF6 equates to 23,500 t of CO_2, GHG Protocol-5th Assessment Report- AR5).
(*****) In the last three years, the replenishment of HCFC fluids in the Group's plants was so small that it did not lead to significant CO_2 emissions.
(******) The indirect emissions (*Scope 2*) include all the Companies within the NFS scope. As an emission factor per unit of electricity consumed (t CO_2/MWh), for the *location-based* calculation the value of 0.315 was used for the three-year period, as per Terna's "International Comparisons" document. For the calculation of *Scope 2* emissions using the market-based method, the residual mix coefficients are the following for 2021, 2022 and 2023, respectively: 0.4586, 0.4566 and 0.4572 (Source: AIB document "European Residual Mixes"). Emissions due to technical network losses in 2022 were restated, whereas the figure for 2023 was estimated.
(*******) As of 2022 emissions from commuting are not calculated as the values are negligible.
(********) This value, estimated, refers to suppliers of goods, services and works. The 2023 figure is broken down as follows: 25,240 tonnes of CO_2 for suppliers of services and works and 4,943 tonnes of CO_2 for suppliers of goods.
(*********) *Scope 1* emissions included are those from power generation plants, including Ecogena. If the photovoltaic production of the investee company not consolidated on a line-by-basis were also taken into account, the indicator for the year would be 326.2 g/kWh.

WASTE

52% of waste recovered against total waste produced **(191,695 t/369,266 t)**

83% ash recovered against total produced in waste-to-energy plants **(51,479 t/ 61,805 t)**

81% of sludge recovered against total sludge produced by Acea Ato 2, Acea Ato, Gori, AdF and Gesesa **(124,782/154,903 t)**

The chapter outlines **total waste produced by companies, according to segment**. Each Company has defined the streams for **process and non-process waste**. The latter category includes waste that does not derive from production activity in a strict sense, and generally represents a minimal part of total waste, also having a very variable composition determined by non-recurring events.

Table no. 72 – Total waste produced (2021-2023)

waste produced	2021	2022	2023
		t	
total waste	**366,019**	**383,812**	**369,266**
hazardous	*67,640*	*72,352*	*69,508*
non-hazardous	*298,379*	*311,460*	*299,759*
detail by type of processing			
entirely recovered waste (*) (**)	**158,747**	**178,054**	**191,695**
entirely disposed of waste (***)	**207,272**	**205,758**	**177,571**
waste-to-energy	*2,919*	*5,580*	*6,200*
incineration	*5,351*	*5,486*	*3,235*
landfill and other disposal operations	*199,002*	*194,692*	*168,137*

(*) Waste sent for recovery in 2023 was divided as follows: 143,550 t for preparation for reuse, 44,463 t for recycling 3,682 t for other recovery operations.
(**) In 2023, hazardous waste sent for recovery amounted to 51,898 t; non-hazardous waste amounted to 139,797 t.
(***) In 2023, no hazardous waste was sent to waste-to-energy plants or incineration. Non-hazardous waste sent to waste-to-energy plants was 6,200 t, while 3,235 t was sent for incineration. 17,610 t of hazardous waste and 150,526 t of non-hazardous waste was sent to landfill and other disposal operations.

WASTE FROM THE INTEGRATED WATER SYSTEM

In the Water Business, the production of waste largely corresponds with the production of **sludge from the treatment process**, and to a lesser extent, with **sand and screens** used in the same process. The former is essentially composed of water, biomass and a portion of chemical substances used for conditioning during drying, which helps to reduce the volumes of waste outputs. Sands and screens originate from the pre-treatment of wastewater, and contain plastic, aggregates and paper materials. The remainder is composed of residual material from cleaning to maintain systems. This may include sludge from regeneration of cation-exchange resins. Chart no. 58 shows an example of waste streams for the water sector. All companies in the segment are involved in the **recovery of sludge** with **81% of all sludge produced recovered** (at 66% in 2022). Specifically, in 2023 AdF recovered 90%, Acea Ato 2 recovered 89%, Gori recovered 78% and Acea Ato 5 recovered 34%.

Chart no. 58 – Waste streams for the Water Business companies

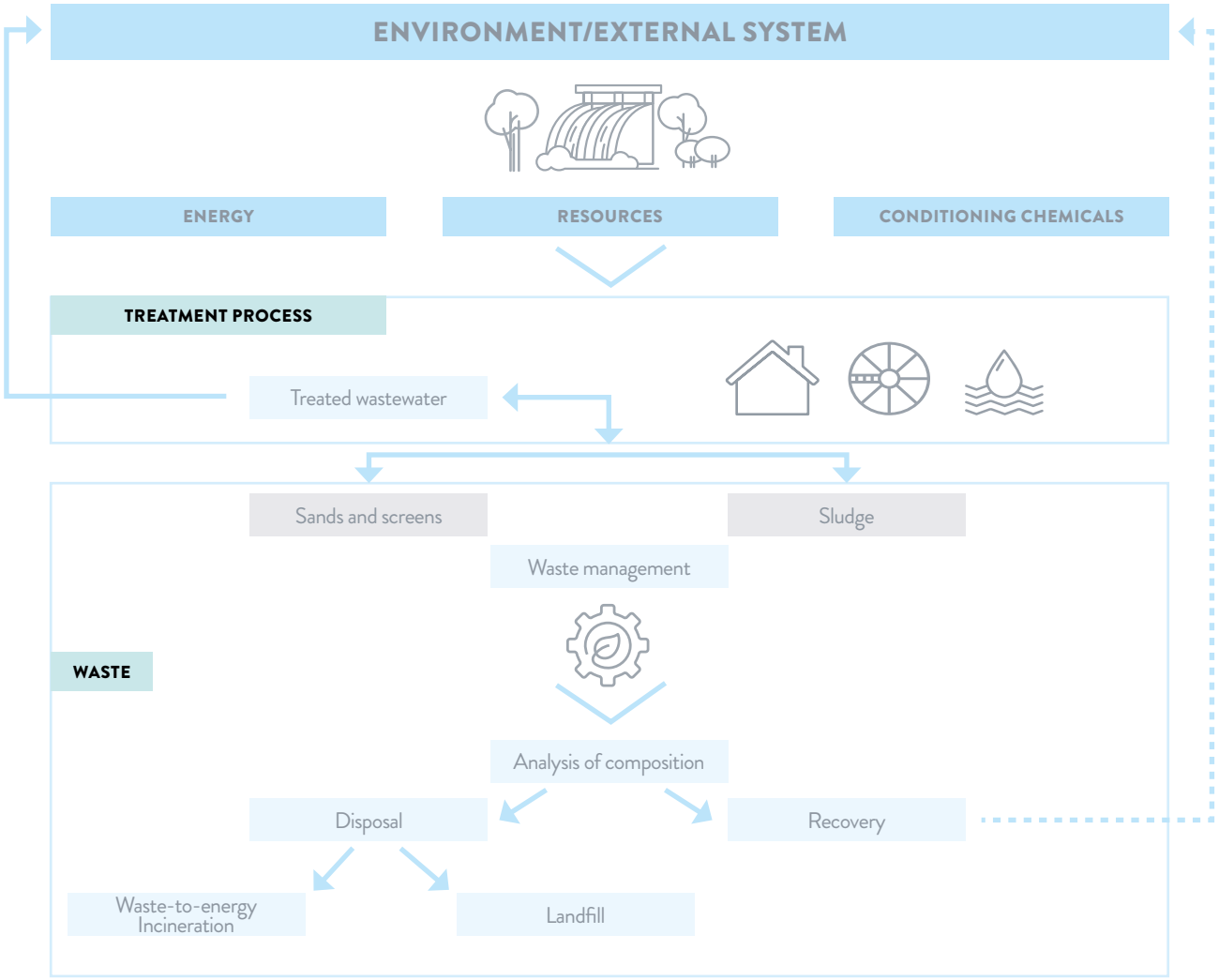


Table no. 73 – Waste produced by Water Business companies (2021-2023)

water business waste	2021	2022	2023
		t	
total waste	**176,702**	**183,562**	**182,840**
hazardous	*379*	*208*	*193*
non-hazardous	*176,323*	*183,354*	*182,646*
of which sludge, sand and screens	*167,182*	*175,711*	*173,057*
detail by type of processing			
entirely recovered waste	**110,169**	**115,181**	**134,679**
of which sludge, sand and screens for recovery (*)	*108,767*	*113,595*	*131,661*
entirely disposed of waste (*)	**66,533**	**68,381**	**48,160**
of which sludge, sand and screens for disposal (**)	*58,415*	*62,116*	*41,395*
waste-to-energy	*2,919*	*1,304*	*438*
incineration	*5,351*	*5,486*	*3,235*
landfill and other disposal operations	*58,264*	*61,590*	*44,488*

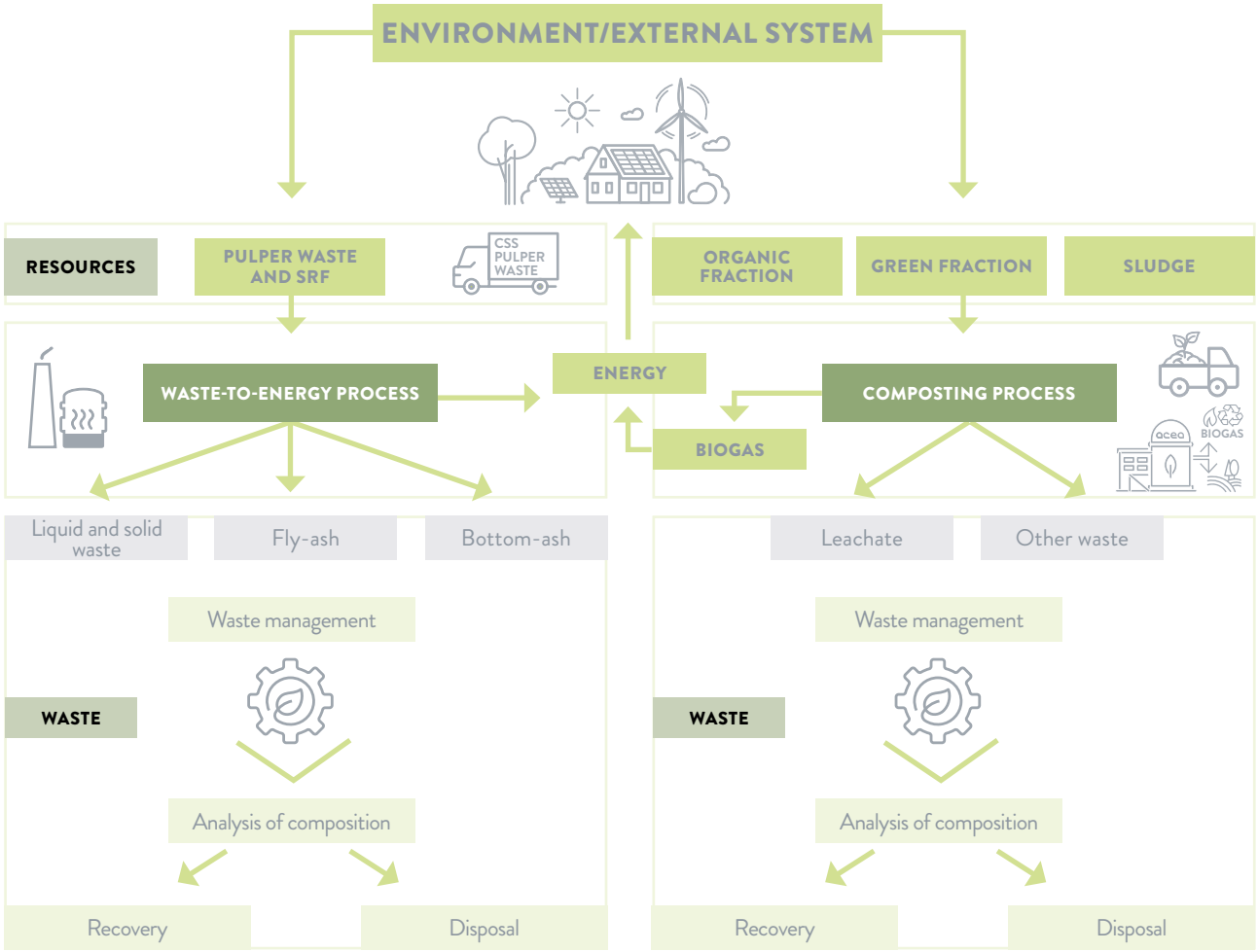
(*) In 2023, 124,782 t of sludge and 6,879 t of sand and screens were sent for recovery.
(**) In 2023, the following was sent for disposal: 30,121 t of sludge and 11,274 t of sand and screens.

Aquaser acts as a broker **for certain Group water companies** (Acea Ato 2, Acea Ato 5 and AdF), carrying out the pick-up, transport and recovery/disposal of waste (solid and liquid), with identification of final-destination sites for special waste with regard to solid materials, and providing logistical services (pick-up, transport and discharge) for liquid waste that is handed over to authorised plants.

ENVIRONMENT BUSINESS WASTE

Waste streams in the Environment business are extremely diverse due to the range of types of plants and the broad spectrum of services provided by the Companies. Business activities can be grouped in the four macro categories: waste-to-energy, composting, treatment and management of liquid and solid waste and brokerage/transport. Details are provided for the first three, whereas, with regard to transport and brokerage, reference is made to *Brokering and the Transport of Waste* in the paragraph *Waste-to-energy, composting, disposal of liquid waste and related services*. Waste-to-energy activity, with the plants of San Vittore del Lazio and Terni, produces the greatest quantity of waste, totalling 85,219 t in 2023. The majority of waste produced by these plants is fly-ash, bottom-ash and water from the buffer tank[248]. In 2023, **51,479 tonnes of ash were recovered** (approximately **83%** of the total). The Orvieto Ambiente hub, the Deco and Ecologica Sangro sites and the Acea Ambiente composting plants (Aprilia and Monterotondo Marittimo) produce leachate as their primary waste in terms of quantity, derived from stabilisation of waste and primarily sent for disposal (94%). As an example, streams of treatment, disposal and recovery for waste-to-energy and composting sites are illustrated in Chart no. 59. The treatment plants handling liquid waste of the Companies Acque Industriali, Berg and the Chiusi plant[249], which primarily produce sludge.

Chart no. 59 – Main waste streams in the Environment Business (waste-to-energy and compost sites)



248 Water from buffer tanks or "water for technical purposes", refers to liquid solutions used as a buffer for acidic components that develop during combustion of waste.

249 The waste from the Chiusi plant derive both from treatment of liquid waste and treatment of wastewater.

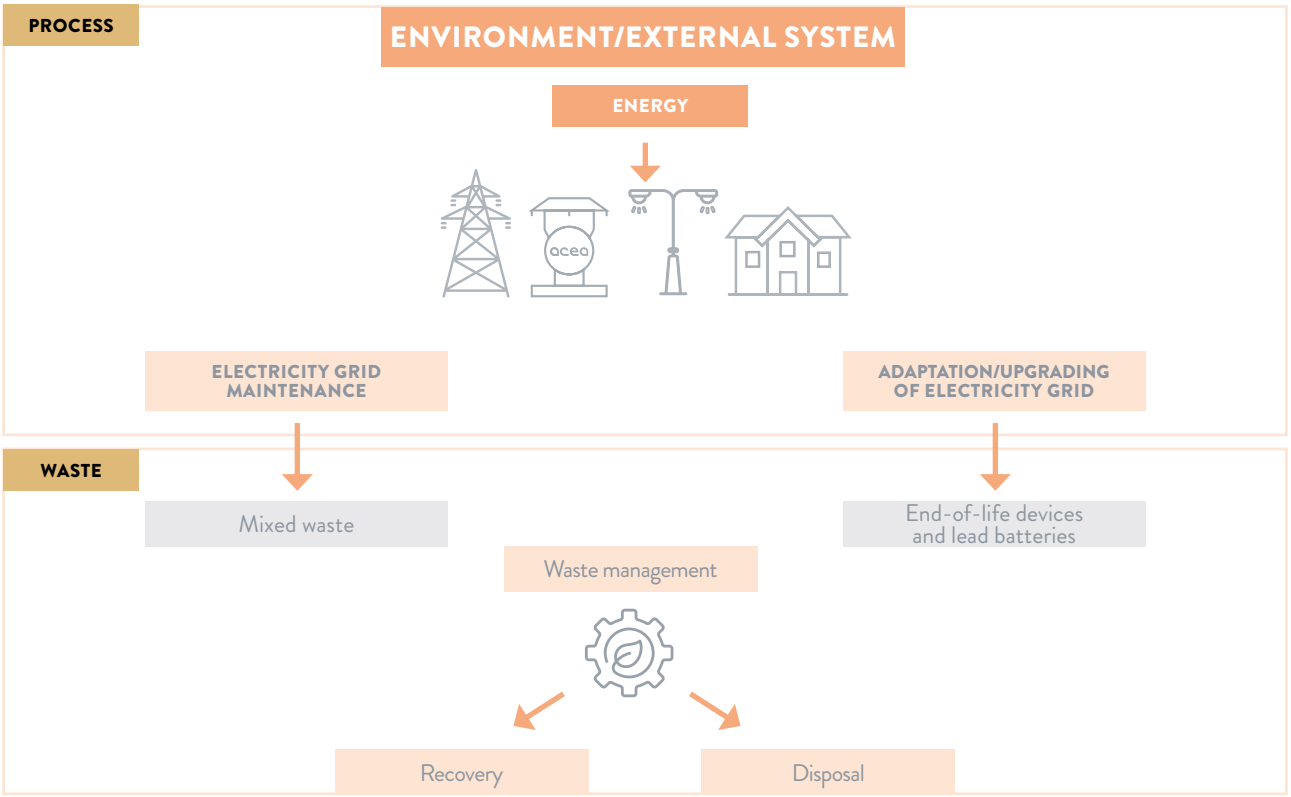
Table no. 74 – Waste produced by Environment Business companies (2021-2023)

Environment business waste	2021	2022	2023
		t	
total waste	**186,291**	**197,348**	**184,204**
hazardous	65,538	70,103	68,204
of which ash	*59,142*	*63,645*	*61,805*
non-hazardous	120,753	127,245	116,000
of which liquid waste (leachate and buffer water)	*67,741*	*61,705*	*59,656*
detail by type of processing			
entirely recovered waste	**46,859**	**60,471**	**56,384**
of which ash	*43,425*	*52,782*	*51,479*
entirely disposed of waste (*)	**139,432**	**136,877**	**127,819**
of which ash	*15,717*	*10,863*	*10,326*
of which sent to landfill and subject to other disposal operations	*139,432*	*132,601*	*122,057*

WASTE FROM DISTRIBUTION OF ELECTRICITY

Areti manages the distribution of electricity for Rome and Formello and primarily produces waste derived from the maintenance or replacement of infrastructure. No non-process waste is generally produced. Special waste, produced during activity performed by contractors, is considered under the responsibility of the same and its collection and management is also their responsibility[250]. The waste flow generated by described activities are illustrated in Chart 60.

Chart no. 60 – Waste streams for Areti



250 This management occurs according to procedure (PRO00.11QAS "Waste Management") and the quantities produced are handed over for recovery or disposed of by authorised third parties.

Table no. 75 – Waste produced by the Areti Company (2021-2023)

Areti waste	2021	2022	2023
	t		
total waste	**2,153**	**2,454**	**1,359**
hazardous	1,645	1,996	1,036
non-hazardous	508	459	323
detail by type of processing			
entirely recovered waste	**902**	**1,992**	**499**
entirely disposed of waste (*)	**1,251**	**463**	**860**

MANAGEMENT AND MINIMISATION OF WASTE PRODUCED

The **circular economy** concept drives the shared goal pursued by all Group companies, who together contribute to the effort **to reduce waste**.

At Acea SpA[251], separated waste collection in 2023, was almost double the volumes reached in 2022, both for paper and plastic, thanks to the office restructuring, with the recovery of the materials used and less use being made of plastic folders and containers. In total, **approximately 780 tonnes of paper** and **560 tonnes of plastic** were sent for separated waste collection.

For example, the water companies aim to reduce the volume of sludge produced by implementing new drying lines, latest-generation centrifuges and other specific systems. These initiatives have a major impact in terms of the circular economy: reducing the water content of the sludge optimises opportunities to use it in material and/or energy processes and reduces disposal costs. The economic, environmental and social costs of transporting sludge are also lessened.

Acea Ato 2, in 2023, continued with the "**Sludge Management Plan**" a series of structural and strategic actions with the dual objective of reducing volumes of treatment sludge produced and exploiting the solid components both in terms of materials and energy. The range of different actions, rationalising the entire treatment segment and transforming large treatment plants into *hubs* for centralised sludge processing. In this context, a number of small treatment plants were decommissioned in the year as part of the centralisation measures. During the year, Acea Ato 2 achieved **a reduction of approximately 7.5%** in the volumes of sludge produced compared to 2022, due to the new thermal dryer coming into operation at the Roma Sud plant.

At the **Gori** sites, to reduce the overall quantity of waste, a number of interventions were undertaken to strengthen the treatment plants, thus reducing the quantity of sludge requiring landfill disposal.

At **AdF**, around 90% of the sludge produced in 2023 was sent for recovery through an authorised disposal company[252].

Waste from the majority of Group Companies is sent to external sites[253].

Finally, for all Companies, waste is managed by companies outside the Group, with the exception of Acea Ato 2, Acea Ato 5 and AdF, which, as mentioned, handover their waste to Aquaser, in the role of broker with identification of final-destination sites[254]. The reliability of third parties is guaranteed by the mandatory **authorisation required by the specific regulations** to perform certain activities and by periodic checks on documentation.

The data and information on waste for the main Companies is managed with dedicated management software[255]. Quantitative data on waste disposed of derives from direct measurements taken using weighing systems, which are periodically calibrated and certified. For the Companies of the Environment business, in almost all cases there is a difference between the outgoing weights and incoming weights, due to the scales used for approximation in the systems adopted, in any case documented using the forms applicable by law. These Companies, including Acea Produzione, also conduct systematic checks on the legislative compliance of suppliers with regard to environmental issues.

In 2023, there were no significant releases of pollutants into the environment, such as mineral oils, fuels or chemical products.

251 This refers to the offices of Cedet, the headquarters in Piazzale Ostiense n.2 and the car park of the latter.

252 At Acea Ato 2, 89% of sludge was sent for recovery, with this at 78% for Gori and 34% for Acea Ato 5.

253 The Orvieto Aambiente plants and the Decoand Ecologica Sangro sites, which are plant hubs with internal waste streams and destinations, are exceptions.

254 Liquid waste from the plants of Acea Ato 2 are assigned to Aquaser solely for logistical services, being transported and discharged at plants authorised pursuant to art. 110 of Italian Legislative Decree 152/2006 managed by Acea Ato 2 itself.

255 With the exception of Gesesa and Areti, all companies have dedicated management software.

WATER COMPANY DATA SHEETS AND OVERSEAS ACTIVITIES

This chapter illustrates the activities of some Group companies not included in the scope of the *Consolidated Non-Financial Statement* (see *Disclosing sustainability: methodological note*). In particular, data and information are provided relating to the main operating Companies for the water sector in Umbria and Tuscany, consolidated using the equity method in the statutory financial statements, and to the companies that are active abroad in the same sector.

Water activities in Umbria and Tuscany

UMBRA ACQUE

Umbra Acque SpA is a company with predominantly public capital, 40% owned by Acea SpA, which manages the Integrated Water Service in the area of the Integrated Water Services no. 1 and 2 of the Umbria Region, consisting of 38 Municipalities, of which 37 in the province of Perugia and 1 in the province of Terni, with a total population of around 490,000 inhabitants served.

MANAGEMENT SYSTEMS

Umbra Acque has an **Integrated Quality, Environment and Safety Management System** (QAS), in compliance with the **UNI ISO 9001:2015, UNI ISO 14001:2015 and ISO 45001:2018** standards. It also hold the **SOA certification** for the**OG6** (in class III)[256] and **OS22** (in class II)[257] categories and **qualification for design and construction** (up to the VIII classification). The analysis laboratory is accredited according to the **UNI ISO/IEC 17025:2018** standard and for the purposes of monitoring drinking water.

QUALITY DELIVERED: MAIN INTERVENTIONS ON THE NETWORKS AND CONTROLS ON DRINKING WATER AND WASTE WATER

SIZE OF NETWORK, MAIN WORKS, METERS AND CHECKS ON DRINKING WATER AND NETWORKS (2023)

size of drinking-water network - *data in GIS*	**6,410 km** (1,379 km of supply network, 5,031 km of distribution)
type of work	
interventions due to network failure/leak detection	**18,267 interventions** (18,200 due to faults, 67 leak detection)
meter installations (new installation and replacement)	**20,917 interventions** (5,580 new installation, 15,337 replacements)
network extension	**38.0 km of expanded network**
network reclamation	**51.7 km of reclaimed network**
drinking water quality control	**6,472 samples** collected and **116,447 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2023)

size of sewerage network - *data in GIS*	**1,982 km**
type of work	
interventions due to network failure	**912 interventions**
planned interventions	**41 interventions**
network extension	**70.0 km of expanded network**
network reclamation	**24.4 km of network under video inspection** with in-house equipment and personnel
quality control on wastewater for sewerage networks	**5,305 samples** collected and **44,256 tests** performed

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2022-2023)

(no.)	2022			2023		
	men	women	**total**	men	women	**total**
composition of the staff						
executives	5	0	**5**	5	0	**5**
managers	14	2	**16**	14	2	**16**
clerical workers	77	93	**170**	76	96	**172**
workers	212	1	**213**	209	1	**210**
total	**308**	**96**	**404**	**304**	**99**	**403**
contract type						
staff with permanent contract	288	92	**380**	296	94	**390**
of which part-time staff	0	7	**7**	0	7	**7**
permanent staff	19	4	**23**	6	5	**11**
staff under apprenticeship contracts	1	0	**1**	2	0	**2**
total	**308**	**96**	**404**	**304**	**99**	**403**
changes						
incoming staff	**20**	**6**	**26**	**7**	**5**	**12**
outgoing staff	**8**	**4**	**12**	**11**	**2**	**13**
turnover rate (%)	**9.1**	**10.4**	**9.4**	**5.9**	**7.1**	**6.2**
incoming rate (%)	6.5	6.3	**6.4**	2.3	5.1	**3.0**
outgoing rate (%)	2.6	4.2	**3.0**	3.6	2.0	**3.2**

256 Aqueducts, gas pipelines, oil pipelines, irrigation and evacuation systems.

257 Drinking water and water treatment plants.

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2022-2023)

	2022	2023
accidents (no.)	13	6
total days of absence	8,072	390
hours worked (*)	658,145	661,576
frequency index (FI) (number of accidents per 1,000,000/working hours) (*)	**19.8**	**9.1**
severity index (SI) (days of absence per 1,000/working hours) (*)	**12.3**	**0.6**

(*) The 2022 figure was updated following its consolidation subsequent to the submission to ACEA.

TRAINING 2022-2023

course type, hours provided and costs

	courses (no.)		training (hours)		costs (€)	
course type	**2022**	**2023**	**2022**	**2023**	**2022**	**2023**
advanced training	1	1	42	34	0	1,425
technical-specialised	120	86	4,849	2,406	115,935	84,242
legal	8	6	65	45	2,495	2,684
managerial	9	5	71	26	3,125	1,617
safety	31	27	2,802	3,740	36,752	43,132
total	**169**	**125**	**7,829**	**6,251**	**158,307**	**133,100**

employees trained

	2022			2023		
(no.)	men	women	**total**	men	women	**total**
	308	96	**404**	304	99	**403**
breakdown of training hours by qualification						
executives	216	0	**216**	158	0	**158**
managers	313	74	**387**	244	1	**245**
clerical workers	1,468	2,029	**3,497**	858	770	**1,628**
workers	3,725	4	**3,729**	4,198	22	**4,220**

Training provided during the year covered **different topics**, such as legal requirements and responsibilities, monitoring and reporting on the National Recovery and Resilience Plan (NRRP), public tenders and contracts, sustainability, energy efficiency and water quality, biological treatment plants and water discharges-sewerage spillages, management of company waste, tariff method, water unbundling, internal control system and risk management, gender equality certification, new HR process to renew management software (Employee Central), welders' certifications and CQC. Specifically important, the commitment by the technical and management area - SAP Asset Managers - and the Commercial and Operational Segments (Sales force training execution such as Sales force field service), with technical courses on digital skills focusing on new management software.
Furthermore, every year training on is provided on **safety** in compliance with applicable laws.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS	**u. m.**	**2021**	**2022**	**2023**	**Δ% 2023/2022**
WATER BALANCE					
drinking water from the environment	**Mm³**	**56.3**	**56.0**	**54.6**	**-2.5**
from the surface	*Mm³*	*0*	*0*	*0*	-
from wells	*Mm³*	*42.8*	*45.2*	*40.3*	*-10.8*
from springs	*Mm³*	*10.2*	*8.1*	*11.9*	*46.9*
of which water from other aqueduct systems	*Mm³*	*3.3*	*2.7*	*2.4*	*-11.1*
total drinking water leaving the aqueduct system (c) = (a+b)	**Mm³**	**31.0**	**31.7**	**31.2**	**-1.6**
total drinking water dispensed and billed in the network (a)	**Mm³**	**28.6**	**28.6**	**27.2**	**-4.9**
measured volume of water delivered to users	*Mm³*	*28.6*	*28.6*	*27.2*	*-4.9*
volume consumed by users and not measured	*Mm³*	*0*	*0*	*0*	-
total drinking water authorised and not billed in the network (b)	**Mm³**	**2.4**	**3.0**	**4.0**	**33.3**
measured unbilled authorised consumption	*Mm`*	*0.7*	*0.5*	*1.4*	*180.0*
unmeasured unbilled authorised consumption	*Mm³*	*1.7*	*2.5*	*2.6*	*4.0*
LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks	Mm³	25.3	24.3	23.43	-3.6
water loss percentages	%	44.9	43.3	42.9	-0.9
TREATED WASTE WATER					
water treated in the main treatment plants (*)	**Mm³**	**59.3**	**45.5**	**43.8**	**-3.7**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water	**no.**	**116,891**	**116,419**	**116,447**	**-**
of which no. analytical tests on surface water	*no.*	*7,350*	*6,822*	*6,975*	*2.2*
no. analytical tests on wastewater (**)	**no.**	***42,404***	***42,160***	***44,256***	***4.0***

(*) The 2021 figures are estimated. Figures for the 2022-2023 two-year period were partially measured (for treatment plants above 10,000 PE in 2022 and for those above 2,000 AE in 2023). The sharp decline in 2022 is due in part to the new reporting method and in part to the modest precipitation in 2022, which reduced the quantity of mixed water input.
(**) The figure includes analyses carried out at treatment plants and industrial waste.

RESOURCES USED	u. m.	2021	2022	2023	Δ% 2023/2022
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER					
materials					
sodium hypochlorite	t	93	87	92	5.7
sodium chloride	t	222	217	210	-3.2
hydrochloric acid	t	210	214	208	-2.8
aluminium polychloride	t	11	9	4	-55.6
phosphoric acid (10%)	t	0	0	0	-
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	95	138	126	-8.7
ferric chloride (40%)	t	114	201	165	-17.9
mineral oil and fats	t	0	0	0	-
OTHER CONSUMPTION					
drinking water (*)	**m³**	**53,178**	**35,189**	**48,299**	**48.9**
drinking water consumed for non-industrial water uses (offices, outside showers, etc.)	*m³*	10,416	12,770	19,451	210.2
drinking water consumed for process water uses (washing machinery and bays, etc.)	*m³*	42,762	22,419	28,848	10.2

(*) The 2022 figures were updated following their consolidation subsequent to the submission to ACEA. The 2023 figures reflect a sharp increase in the use of drinking water relating to the progressive return of staff to the office after the health emergency in previous years.

There are no active internal water reuse processes, but the Company has supplied 278,426 m³ of non-potable water for industrial use to two local businesses.

ENERGY CONSUMPTION (*)	u. m.	2021	2022	2023	Δ% 2023/2022
FUELS					
vehicle fuels					
diesel	l	456,600	444,900	407,662	-8.4
petrol	l	5,800	4,935	12,725	157.9
ELECTRICITY					
total electricity for drinking water	**GWh**	**69.4**	**74.8**	**71.7**	**-4.1**
electricity for water pumping stations	*GWh*	*69.1*	*74.0*	*71.0*	*-4.1*
electricity for offices	*GWh*	*0.3*	*0.8*	*0.7*	*-12.5*
total electricity for waste water	**GWh**	**23.2**	**22.8**	**25.7**	**12.7**
electricity for treatment	*GWh*	*17.9*	*17.8*	*17.1*	*-3.4*
electricity for pumping stations	*GWh*	*5.2*	*4.9*	5.5	*12.2*
electricity for offices	*GWh*	*0.1*	*0.1*	*0.1*	-

(*) The figures for the 2021-2022 two year period were adjusted after rounding off.

ENERGY EFFICIENCY (2021-2023)

action	energy savings achieved (kWh)		
	2021	2022	2023
extraordinary maintenance on plants	150,000	415,000	900,000

Energy efficiency maintenance work was carried out during 2023 at the following plants:
- replacement of electrical pump at the Murelli water system, Municipality of Perugia;
- revamping Raggio water system, Municipality of Gubbio;
- revamping oxidation system Montesperello treatment plant, Municipality of Magione;
- revamping oxidation system Genna treatment plant (line 30,000 PE), Municipality of Perugia.

WASTE	u. m.	2021	2022(**)	2023	Δ% 2023/2022
SPECIFIC WASTE FROM TREATMENT OF WASTE WATER					
treatment sludge (*)	t	13,868	17,974	11,641	-35.2
sand and sediment from treatment	t	1,353	1,645	961	-41.6
WASTE EXCLUDING SLUDGE AND SAND					
hazardous waste (***)	t	8.0	16.1	11.9	-26.1
non-hazardous waste	t	3,767	3,194	2,735	-14.4

(*) The item includes liquid sludge transported to other plants for the dewatering process, for a value of 2,525 t in 2021, 5,253 t in 2022 and 827 t in 2023.
(**) Some figures for 2022 have been updated following consolidation.
(**) The increase in 2022 is due to the exceptional disposal of vehicles and company cars.

TOTAL COD IN INPUT AND OUTPUT (2021-2023)

(t/year)	2021	2022	2023
COD_{in}	13,401	12,395	15,692
COD_{out}	1,556	1,711	1,244

OUTPUT PARAMETERS FOR THE MAIN TREATMENT PLANTS (2021-2023)

parameter	average values (mg/l) 2021	average values (mg/l) 2022	average values (mg/l) 2023
BOD_5 (*)	12.3	12.9	12.3
COD	21.0	21.0	17.9
SST	12.0	13.7	8.5
NH_4^+	2.0	2.0	1.3
phosphorous	2.0	1.9	1.8

(*) The output BOD_5 value is expressed with the value of the limit of quantification (LOQ) equal to 12.3, resulting in all analytical calculations being lower than this value.

PURIFICATION EFFICIENCY OF THE MAIN TREATMENT PLANTS (2021-2023)

parameter	average values (%) 2021	average values (%) 2022	average values (%) 2023
$100x(COD_{in} - COD_{out})/COD_{in}$	88.4	91.3	92.6
$100x(SST_{in} - SST_{out})/SST_{in}$	95.7	93.4	95.8
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/NH_4^+{}_{in}$ (*)	93.8	93.1	94.8
$100x(P_{in} - P_{out})/P_{in}$ (*)	35.0	27.8	26.5

(*) Umbra Acque does not detect phosphates leaving treatment plants, as the standard does not establish a limit, but rather total phosphorus as specified in Table 2 of Annex 5 to Part III of the Consolidated Environmental Law (TUA), with more stringent monitoring of the nutrient discharged into surface water bodies.

PUBLIACQUA

Publiacqua SpA is a mixed ownership Company with a majority public interest, owned by Acea through Acque Blu Fiorentine SpA, which manages the Integrated Water Service in the area of Optimal Territorial Conference no. 3 – Medio Valdarno, with a total population of over 1.2 million citizens served.

MANAGEMENT SYSTEMS

Publiacqua has implemented the **Integrated Quality, Environment, and Safety (QAS) Management System**, which complies with **UNI EN ISO 9001:2015, 14001:2015** and **45001:2018** standards for the primary operating activities. It is certified for the **Anti-Bribery Management System UNI ISO 37001:2016**, and the analysis laboratory is accredited in accordance with **UNI ISO/IEC 17025:2005**.

QUALITY DELIVERED: MAIN INTERVENTIONS ON THE NETWORKS AND CONTROLS ON DRINKING WATER AND WASTE WATER

SIZE OF NETWORK, MAIN WORKS, METERS AND CHECKS ON DRINKING WATER AND NETWORKS (2023)

size of drinking-water network - *data in GIS*	**6,906 km** (1,233 km of supply network, 5,673 km of distribution)
TYPE OF WORK	
interventions due to network failure/leak detection	**15,304 interventions** (13,426 due to fault reporting, 1,878 due to leak detection activities)
meter installations (new installation and replacement)	**4,938 interventions** (2,698 new installation, 2,240 replacements due to faults/breakages) and **7,403 massive replacements** with contract
network extension	**2.45 km of expanded network**
network reclamation	**34.03 km of reclaimed network**
drinking water quality control	**9,294 samples** collected and **333,791 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2023)

size of sewerage network - *data in GIS*	**3,872.90 km**
TYPE OF WORK	
interventions due to network failure	**5,281 interventions**
planned interventions	**2,505 interventions**
network extension	**3.31 km of expanded network**
network reclamation	**12.05 km of reclaimed network**
quality control on wastewater for sewerage networks	**3,410 samples** collected and **62,156 tests** performed

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2022-2023)

	2022			2023		
(no.)	men	women	**total**	men	women	**total**
composition of the staff						
executives	3	1	**4**	4	1	**5**
managers	14	8	**22**	15	8	**23**
clerical workers	184	156	**340**	182	156	**338**
workers	269	3	**272**	274	3	**277**
total	**470**	**168**	**638**	**475**	**168**	**643**
contract type						
staff with permanent contract	421	153	**574**	425	160	**585**
of which part-time staff	*3*	*7*	***10***	*3*	*8*	***11***
permanent staff	6	2	**8**	10	7	**17**
staff under apprenticeship contracts	37	0	**37**	35	1	**36**
total	**464**	**155**	**619**	**470**	**168**	**638**
changes						
incoming staff	**44**	**25**	**69**	**33**	**6**	**39**
outgoing staff	**39**	**11**	**50**	**27**	**7**	**34**
turnover rate (%)	**17.7**	**21.4**	**18.6**	**12.6**	**7.7**	**11.3**
incoming rate (%)	9.4	14.9	10.8	6.9	3.6	6.1
outgoing rate (%)	8.3	6.5	7.8	5.7	4.2	5.3

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2022-2023)

	2022	2023
accidents (no.) (*)	8	10
total days of absence (**)	217	343
hours worked (***)	1,033,301	1,062,287
frequency index (FI) (number of accidents per 1,000,000/working hours)	**7.74**	**9.41**
severity index (SI) (days of absence per 1,000/working hours)	**0.21**	**0.32**

(*) Accidents with effects lasting for more than one day are considered.
(**) The value also excludes days of absence related to persistent or reopened injuries from previous years.
(***) This is the sum of ordinary and overtime hours.

TRAINING 2022-2023

course type, hours provided and costs

	courses (no.)		training (hours)		costs (€)	
course type	**2022**	**2023**	**2022**	**2023**	**2022**	2023
advanced training (*)	0	0	0	0	0	0
IT	2	4	24	104	2,100	4,887
technical-specialised	112	94	5,593	7,901	61,250	67,948
managerial	4	19	490	3,000	27,290	138,902
administrative-managerial	30	46	1,924	2,838	95,300	43,972
safety	40	42	2,725	3,183	50,823	49,066
total	**188**	**205**	**10,756**	**17,026**	**236,763**	**304,775**

employees trained (**)

	2022			2023		
(no.)	men	women	**total**	men	women	**total**
	503	180	**683**	478	168	**646**
breakdown of training hours by qualification						
executives	104	21	**125**	56	0	**56**
managers	217	191	**408**	334	487	**821**
clerical workers	1,622	1,322	**2,960**	3,593	3,462	**7,055**
workers	7,227	43	**7,263**	9,001	93	**9,094**

(*) The advanced training courses provided to employees are managed by Acea SpA, which bears the costs.
(**) Figures are higher because they also include employees who left before the year.

In addition to the mandatory training jointly decided with the Prevention and Protection Service Manager (RSPP), an investigation was conducted when drawing up the Plan, involving organisational structure managers to assess their requirements.
The changes included, a course for managers on the topic of ***Diversity & Inclusion***, outlining international and external scenarios, starting with **inclusive leadership**. In this context, all staff was offered a detailed online training course on **inclusive communication**, dealing with stereotypes and prejudices, as well the corporate inclusive vision and mission.
Team building events were also held, involving around 150 people, including the entire structure staff component, with a maximum of 25 people per function, and representative groups for the larger functions. All functions undertook an external training day on emotional development, collaboration and nurturing team spirit.
Additional training courses were provided during the year on the following topics: ***Cyber Security*** and ***Data Protection***; **specialist training** referring to amendments to legislation for the different organisational functions; updates and applications referring to legislation on the new **Public Contracts Code**; **safety** and **first aid**; **Italian Legislative Decree no. 231/anti-corruption**.
Finally, a course was held on the secure use of **ABB Drive Service devices**, which have made it possible for the company to become independent in managing, maintaining, operating and replacing the technical equipment supplied on an exclusive basis by the relevant company.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS	u. m.	2021	2022 (*)	2023 (**)	Δ% 2023/2022
WATER BALANCE					
drinking water from the environment	**Mm³**	**147.0**	**143.9**	**141.2**	**-1.9**
from the surface	*Mm³*	*93.5*	*93.0*	*91.2*	*-1.9*
from wells	*Mm³*	*43.5*	*41.1*	*40.4*	*-1.7*
from springs	*Mm³*	*9.3*	*9.1*	*8.9*	*-2.2*
of which water from other aqueduct systems	*Mm³*	*0.66*	*0.70*	*0.71*	*1.4*
total drinking water leaving the aqueduct system (e) = (a+b+c+d)	**Mm³**	**87.9**	**86.9**	**86.4**	**-0.6**
total drinking water dispensed and billed in the network (a)	**Mm³**	**78.8**	**80.1**	**79.1**	**-1.2**
measured volume of water delivered to users	*Mm³*	*78.1*	*79.2*	*78.2*	*-1.3*
volume consumed by users and not measured	*Mm³*	*0.66*	*0.95*	*0.95*	*-*
total drinking water authorised and not billed in the network (b)	**Mm³**	**0.4**	**0.53**	**0.56**	**5.7**
measured unbilled authorised consumption	*Mm³*	*0*	*0.13*	*0.16*	*23.1*
unmeasured unbilled authorised consumption	*Mm³*	*0.4*	*0.4*	*0.4*	*-*
drinking water exported (sub-distributors) (c)	**Mm³**	**0.9**	**0.005**	**0.008**	**60.0**
measured process losses (d)	**Mm³**	**7.8**	**6.3**	**6.7**	**6.3**
LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks (***)	Mm³	59.1	57.0	54.8	-3.9
water loss percentages	%	40.2	39.6	38.8	-2.0
TREATED WASTE WATER					
water treated in the main treatment plants	**Mm³**	**98.3**	**93.0**	**91.2**	**-1.9**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water	**no.**	**296,620**	**319,572**	**333,791**	**4.4**
of which no. analytical tests on surface water (****)	*no.*	*24,949*	*29,435*	*31,953*	*8.5*
no. analytical tests on waste water	**no.**	**38,676**	**55,794**	**62,156**	**11.4**

(*) Some figures for 2022 have been updated following consolidation.
(**) The 2023 figures are estimated.
(***) The value of the water losses coincides with the "total lost volume (WLtot)" and includes the unmeasured treatment losses, the supply losses and the total distribution water losses.
(****) Analysis of crude surface water (untreated).

RESOURCES USED	u. m.	2021	2022 (*)	2023	Δ% 2023/2022
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER					
materials					
sodium hypochlorite	t	1,097	1,160	959	-17.3
sodium chloride	t	349	409	478	16.9
hydrochloric acid	t	402	429	491	14.4
flocculant	t	5,015	4,590	4,341	-5.4
purate	t	414	345	323	-6.4
sulphuric acid	t	608	528	522	-1.1
oxygen	t	76	19	27	42.1
acetic acid	t	112	65	85	30.8
carbon dioxide (excluding drinking fountains)	t	648	740	712	-3.8
ferrous chloride	t	37	27	36	33.3
phosphoric acid	t	18	16	20	25.0
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	307	323	113	-65.0
sodium hypochlorite	t	64	48	60	25.0
peracetic acid, caustic soda, polyamine/anti-foaming agent	t	12	12	6	-50.0
polyaluminium chloride (PAC)	t	4,122	3,196	3,329	4.2
lime	t	693	568	56	-90.1
acetic acid 80%	t	684	765	868	13.5
OTHER CONSUMPTION					
drinking water	**m³**	**275,109**	**191,432**	**199,125**	**4.02**

(*) Some figures for 2022 have been updated following consolidation.

ENERGY CONSUMPTION	u. m.	2021	2022 (*)	2023	Δ% 2023/2022
FUELS					
process fuels - wastewater					
methane	Sm^3	90,195	93,889	66,882	-28.8
biogas produced	m^3	593,478	562,421	494,273	-12.1
heating fuels					
methane	Sm^3	60,641	63,125	48,130	-23.7
diesel fuel	l	5,000	4,125	4,000	-3.0
lpg	l	1,750	2,170	2,150	-0.9
vehicle fuels					
diesel	l	360,131	363,564	345,133	-5.1
petrol	l	26,172	28,515	31,690	11.1
ELECTRICITY					
total electricity for drinking water	**GWh**	**71.2**	**72.6**	**71.7**	**-1.2**
electricity for water pumping stations	*GWh*	*69.6*	*70.6*	*69.9*	*-1.0*
electricity for offices	*GWh*	*1.6*	*2.0*	*1.8*	*-10.0*
total electricity for waste water	**GWh**	**35.0**	**35.8**	**35.1**	**-2.0**
electricity for treatment	*GWh*	*30.5*	*30.5*	*30.7*	*0.7*
electricity for pumping stations	*GWh*	*4.4*	*5.2*	*4.3*	*-17.3*
electricity for offices	*GWh*	*0.1*	*0.1*	*0.1*	-

(*) Some figures for 2022 have been updated following consolidation

In 2023, energy efficiency work was carried out to reduce consumption on distribution networks.

ENERGY EFFICIENCY (2021-2023)

	energy savings achieved (kWh)		
action	**2021**	**2022**	**2023**
network efficiency improvement	3,195,000	1,500,000	830,000
Soa Coverciano – Power quality *management*	-	3,990	-
offices *relamping*	-	250,000	-

WASTE	**u.m.**	**2021**	**2022 (*)**	**2023**	**Δ% 2023/2022**
SPECIFIC WASTE FROM TREATMENT OF WASTE WATER					
treatment sludge	t	30,873	29,731	24,572	-21.0
sand and sediment from treatment	t	1,296	1,054	1,406	33.4
waste pursuant to Italian Legislative Decree no. 152/06 excluding sludge and sand					
hazardous waste	t	83.6	26.6	49.6	86.5
non-hazardous waste	t	8,009	7,591	9,035	19.0

(*) Some figures for 2022 have been updated following consolidation.

TOTAL COD IN INPUT AND OUTPUT - SAN COLOMBANO TREATMENT PLANT (2021-2023)

(t/year)	**2021**	**2022 (*)**	**2023**
COD_{in}	14,851	13,755	13,696
COD_{out}	1,691	1,468	1,233

(*) Some figures for 2022 have been updated following consolidation.

OUTPUT PARAMETERS – SAN COLOMBANO TREATMENT PLANT (2021-2023) (*)

parameter	**average values (mg/l) 2021**	**average values (mg/l) 2022**	**average values (mg/l) 2023**
BOD_5	2.1	2.3	2.7
COD	15.6	15.8	13.5
SST	4.9	4.9	7.0
NH_4^+	1.0	0.8	0.8
phosphorous	0.7	0.8	0.7

(*) The San Colombano waste water treatment plant (600,000 population equivalent) treats about half of Publiacqua's global waste water.

OUTPUT PARAMETERS FOR THE MAIN TREATMENT PLANTS (2021-2023) (*)

parameter	**average values (mg/l) 2021**	**average values (mg/l) 2022 (**)**	**average values (mg/l) 2023**
BOD_5	2.1	2.3	2.5
COD	17.1	16.5	13.5
SST	4.7	4.8	6.2
NH_4^+	1.1	1.1	0.9
phosphorous	0.8	0.9	0.8

(*) The figures include 39 treatment plants, including San Colombano, which treat a total of 98% of wastewater and 96% of the organic load (COD) of Publiacqua.
(*) Some figures for 2022 have been updated following consolidation.

PURIFICATION EFFICIENCY SAN COLOMBANO TREATMENT PLANT (2021-2023)

parameter	**average values (%) 2021**	**average values (%) 2022**	**average values (%) 2023**
$100x(COD_{in} - COD_{out})/COD_{in}$	93.2	87.4	89.9
$100x(SST_{in}-SST_{out})/SST_{in}$	92.3	91.2	88.4
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	95.8	97.3	96.8
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	72.7	73.7	74.6

PURIFICATION EFFICIENCY OF THE MAIN TREATMENT PLANTS (2021-2023) (*)

parameter	**average values (%) 2021**	**average values (%) 2022 (**)**	**average values (%) 2023**
$100x(COD_{in} - COD_{out})/COD_{in}$	88.4	89.3	91.0
$100x(SST_{in}-SST_{out})/SST_{in}$	93.9	92.7	90.8
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	95.8	96.7	96.7
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	73.0	73.4	74.3

(*) The figures include 39 treatment plants, including San Colombano, which treat a total of 98% of wastewater and 96% of the organic load (COD) of Publiacqua.
(**) Some figures for 2022 have been updated following consolidation.

ACQUE

Acque SpA manages the Integrated Water Service in the area of Optimal Territorial Conference 2 Lower Valdarno on the basis of the concession agreement issued by the Autorità Idrica Toscana (AIT), consisting of 55 Municipalities in the provinces of Pisa, Lucca, Florence, Pistoia and Siena, with a total population of over 761,000 user accounts served.
During the year, the merger by incorporation took place of Acque Servizi Srl into Acque SpA, following which, the 2023 figures referring to human resources, training, accidents and energy consumption include the information for Acque Servizi SpA.

MANAGEMENT SYSTEMS

Acque has implemented and certified an **Integrated Management System for Quality, Environment, Safety, Energy Efficiency and Social Responsibility, Road Safety and the Prevention of Corruption**. In addition, the laboratory is accredited pursuant to the **UNI CEI EN ISO/IEC 17025:2018** standard and the Pagnana treatment plant in Empoli has **EMAS IV registration**.

QUALITY DELIVERED: MAIN INTERVENTIONS ON THE NETWORKS AND CONTROLS ON DRINKING WATER AND WASTE WATER

SIZE OF NETWORK, MAIN WORKS, METERS AND CHECKS ON DRINKING WATER AND NETWORKS (2023)

size of drinking-water network - *data in GIS*(*)	**6,186 km**
TYPE OF WORK	
interventions due to network failure/leak detection	**12,821 interventions** (11,888 due to faults, 933 leak detection)
meter installations (new installation and replacement)	**28,408 interventions** (6,438 new installation, 21,970 replacements)
network extension	**4.8 km of expanded network**
network reclamation	**45.5 km of reclaimed network**
drinking water quality control	**11,177 samples** collected and **312,817 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2023)

size of sewerage network (*) - *data in GIS*	**3,114 km**
TYPE OF WORK	
interventions due to network failure	**3,748 interventions**
planned interventions	**1,685 interventions**
network extension	**26 km of expanded network**
network reclamation	**8.5 km of reclaimed network**
quality control on wastewater for sewerage networks	**8,723 samples** collected and **105,894 tests** performed

(*) Estimated figure equal to the figure for 2022.

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2022-2023)

	2022			2023		
(no.)	men	women	**total**	men	women	**total**
composition of the staff						
executives	2	2	4	3	2	**5**
managers	8	4	12	9	5	**14**
clerical workers	103	167	270	141	178	**319**
workers	157	1	158	260	1	**261**
total	**270**	**174**	**444**	**413**	**186**	**599**
contract type						
staff with permanent contract	259	173	432	396	181	**577**
of which part-time staff	*2*	*34*	*36*	*3*	*39*	***42***
permanent staff	1	1	2	3	5	**8**
staff under apprenticeship contracts	10	0	10	14	0	**14**
total	**270**	**174**	**444**	**413**	**186**	**599**
changes						
incoming staff	**30**	**15**	**45**	**28**	**10**	**38**
outgoing staff	**14**	**6**	**20**	**13**	**6**	**19**
turnover rate (%)	16.3	12.1	14.6	9.9	8.6	**9.5**
incoming rate (%)	11.1	8.6	10.1	6.8	5.4	**6.3**
outgoing rate (%)	5.2	3.5	4.5	3.1	3.2	**3.2**

The increase in the staff component from 444 units in 2022 to 599 in 2023, mainly refers to the merger of Acque Servizi Srl into Acque SpA referred to above. Certain activities were also internalised by Le Soluzioni Scarl, with the consequent acquisition of staff and new hires.

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2022-2023)

	2022	2023
accidents (no.) (*)	7	5
total days of absence (**)	317	178
hours worked	667,351	943,191
frequency index (FI) (number of accidents per 1,000,000/working hours)	**10.49**	**5.30**
severity index (SI) (days of absence per 1,000/working hours)	**0.48**	**0.19**

(*) Considering typical occupational accidents and other accidents due to causes not pertaining to work (excluding commuting). In 2023, there was one occupational related accident, with the others referring to causes not pertinent to work or taking place in places not relevant to the workplace (e.g. public roads).

(**) The value also excludes days of absence related to persistent or reopened injuries from previous years.

TRAINING 2022-2023

course type, hours provided and costs (*)

course type	courses (no.)		training (hours)		costs (€)	
	2022	2023	2022	2023	2022	2023
IT	4	8	1,000	1,046	1,320	0
new hires	1	1	2,162	3,495.75	0	0
technical-specialised	35	72	1,857	4,791.75	29,600	16,176
managerial	4	10	311	1,470.5	2,800	3,900
safety	27	40	3,325	6,268.5	21,208	31,860
environment	3	1	50	4	2,701	110
cross-cutting	9	12	311	452.5	6,386	4,780
training pursuant to Legislative Decree no. 231/01	1	3	41	190	0	1,336
e-learning training	11	1	77	124	0	0
total	**95**	**148**	**9,134**	**17,843**	**64,015**	**58,162**

employees trained (no.)	2022			2023		
	men	women	total	men	women	total
	274	161	**435**	406	180	**586**
breakdown of training hours by qualification						
executives	99.5	70.5	170	217	130	347
managers	229.5	112.5	342	564	216.5	780.5
clerical workers	3,251	3,610	6,861	3,761.75	6,423.5	10,185.25
workers	1,740	21	1,761	6,508.75	21.5	6,530.25

(*) Emergency tests are excluded; by new hires, we mean the coaching of new staff by more experienced workers. E-learning training and training on the integrated management system accessible via the Acea Group *On-Boarding*.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS	u. m.	2021	2022	2023	Δ% 2023/2022
WATER BALANCE (*)					
drinking water from the environment	**Mm³**	**74.4**	**73.5**	**73.5**	**-**
from the surface	*Mm³*	*3.1*	*3.1*	*3.1*	-
from wells	*Mm³*	*57.5*	*57.7*	*57.7*	-
from springs	*Mm³*	*6.3*	*5.5*	*5.5*	-
of which water from other aqueduct systems	*Mm³*	*7.5*	*7.2*	*7.2*	-
total drinking water leaving the aqueduct system (e) = (a+b+c+d)	**Mm³**	**47.3**	**47.0**	**47.0**	**-**
total drinking water dispensed and billed in the network (a)	**Mm³**	**44.2**	**43.3**	**43.3**	**-**
measured volume of water delivered to users	*Mm³*	*43.9*	*43*	*43*	-
volume consumed by users and not measured	*Mm³*	*0.3*	*0.3*	*0.3*	-
total drinking water authorised and not billed in the network (b)	**Mm³**	**0.3**	**0.3**	**0.3**	**-**
measured unbilled authorised consumption	*Mm³*	*0.1*	*0.02*	*0.02*	-
unmeasured unbilled authorised consumption	*Mm³*	*0.2*	*0.3*	*0.3*	-
drinking water exported to other systems (c)	**Mm³**	**1.2**	**1.2**	**1.2**	**-**
measured process losses (d)	**Mm³**	**1.6**	**2.2**	**2.2**	**-**

LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks	Mm^3	27.1	26.8	26.8	-
water loss percentages	%	36.7	36.5	36.5	-
TREATED WASTE WATER					
water treated in the main treatment plants	**Mm^3**	**44.6**	**41.9**	**45.2**	**7.9**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water (including analytical tests on surface water)	**no.**	**297,342**	**362,759**	**312,817**	**-13.8**
no. analytical tests on waste water	**no.**	**122,803**	**116,775**	**105,894**	**-9.3**

(*) The figures for 2022 have been restated after the consolidation. The 2023 figures are estimated to be equal to those for 2022.

RESOURCES USED	**u. m.**	**2021**	**2022**	**2023**	**Δ% 2023/2022**
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER (*)					
materials					
laboratory reagents (chemical section and microbiological section)	t	2	2	2	-
sodium hypochlorite	t	231	240	258	7.5
hydrochloric acid	t	339	343	445	29.7
potassium permanganate	t	4	5	4	-20.0
aluminium polychloride	t	194	210	198	-5.7
DREFLO 908 PG powder	t	0	1	0.85	-15.0
salt in bags	t	1	0	1	-
sodium chloride	t	362	341	407	19.4
caustic soda	t	1	2	1	-50.0
citric acid	t	1	0	0.71	-
alifons L	t	0	0.05	0.09	80.0
oxalic acid	t	0	0.025	0	-100
sodium hydroxide sol. 30%	t	0	0.25	2	300.0
DRYFLOC™ Polyelectrolyte EM494SFC	t	0	0.10	0.90	800.0
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	194	194	151	-22.2
aluminium polychloride	t	8	6	0	-100
ferric chloride for sludge dehydration	t	546	570	392	-31.2
sodium hypochlorite for final disinfection	t	11	42	105	150.0
acetic acid	t	0.05	0	0	-
sulphuric acid	t	0	0	0	-
caustic soda (sodium hydroxide) - Solvay	t	1	0	0	-
citric acid removed	t	0.05	0.15	0	-100
biotek base L - biological reactivator	t	0	0	0	-
biotek clar – biological reactivator	t	0.3	0	0	-
desmell Bio L – odorogenic emissions treatment	t	0.1	0.1	0	-100
nutrients	t	1,320	867	912	5.2
hydrochloric acid 9%	t	0	0.5	0.3	-40.0
OTHER CONSUMPTION (*)					
drinking water	**m^3**	**295,508**	**320,865**	**320,865**	**-**
drinking water consumed for non-industrial water uses (offices, outside showers, etc.)	*m^3*	225,835	306,135	306,135	-
drinking water consumed for process water uses (washing machinery and bays, etc.)	*m^3*	69,673	14,730	14,730	-

(*) The 2022 figures have been restated following consolidation and differ from those previously published. The 2023 figures are estimated to be equal to those for 2022.

In 2023, Acque **reused** approximately **448,094 m³** of water, equally divided between **recovered water for washing the sheets** of the sludge dehydration equipment (belt presses) and **water used for backwashing the filters** at the Pollino (LU) water plant. Because it was not possible to determine the quantity of reused water during the last year at the Pollino plant due to a fault with the meter, the figure for this year has doubled.

ENERGY CONSUMPTION (*)	u.m.	2021	2022	2023	Δ% 2023/2022
FUELS					
process fuels - drinking water/non-drinking water					
diesel fuel	l	2,050	1,100	2,500	127.3
process fuels - wastewater					
diesel fuel	l	500	550	0	-100
heating fuels					
methane	Sm^3	55,583	49,576	55,559	12.0
lpg	l	17,847	11,130	9,128	-18.0
vehicle fuels					
diesel	l	240,882	247,012	569,628	130.6
petrol	l	26,950	44,215	51,884	17.3
methane	kg	15,308	9,589	13,573	41.5
ELECTRICITY (**)					
total electricity for drinking water	**GWh**	**51.0**	**53.3**	**52.8**	**-0.9**
electricity for water pumping stations	*GWh*	*50.3*	*52.6*	*52.1*	*-1.0*
electricity for offices	*GWh*	*0.7*	*0.7*	*0.7*	-
total electricity for waste water	**GWh**	**31.9**	**30.3**	**30.5**	**0.7**
electricity for treatment	*GWh*	*24.5*	*23.9*	*24.5*	*2.5*
electricity for pumping stations	*GWh*	*7.0*	*6.0*	*5.6*	*6.7*
electricity for offices	*GWh*	*0.4*	*0.4*	*0.4*	-

(*) The 2023 figure referring to energy fuels includes consumption for Acque Servizi Srl based on the aforementioned merger with Acque SpA.
(**)The 2023 figures are estimated, based on the invoices received at 31.01.2024.

A project was launched towards the end of 2022 to improve the procurement of energy via renewable sources. The following objectives were achieved in 2023:

- work was undertaken to install a turbine at the Montecatini water plant, which should be completed by the end of February 2024;
- the design of a photovoltaic field was completed for the Paganico (LU) water plant, with the tender awarded.
- the necessary information was obtained to apply for white certificates and the preliminary assessment application was sent to the GSE.

ENERGY EFFICIENCY (2021-2023)

action	energy savings achieved (kWh)		
	2021	2022 (*)	2023 (**)
Pieve a Nievole (PT) inter-municipal treatment plant: implementation of microbubbles oxidative section Line 2	303,095	331,916	0
treatment plant via Hangar Pontedera (PI): implementation of microbubbles oxidative section	208,020	198,328	0
La Fontina (PI) treatment plant: replacement of air distribution plates lines 1 and 2	472,605	589,760	0
C.le Caldaccoli (PI) – replacement pumps S. Giuliano T.me network	-	-	35,609

(*) The figures for 2022 have been updated following consolidation.
(**) Work on the treatment plants no longer provide energy savings.

WASTE	u.m.	2021	2022	2023	Δ% 2023/2022
specific waste from treatment of waste water					
treatment sludge	t	20,247	18,660	17,560	-5.9
sand and sediment from treatment	t	1,413	1,359	1,083	-20.3
WASTE EXCLUDING SLUDGE AND SAND					
hazardous waste	t	16.8	20.2	32.98	63.3
non-hazardous waste (*)	t	63,778	59,025	51,060	-13.5

(*) Installations with a treatment capacity greater than or equal to 10,000 population equivalent are considered.

TOTAL COD IN INPUT AND OUTPUT (2021-2023) (*)

(t/year)	2021	2022	2023
COD_{in}	22,021	16,860	17,430
COD_{out}	1,212	988	756

(*) Installations with a treatment capacity greater than or equal to 10,000 population equivalent are considered.

OUTPUT PARAMETERS FOR THE MAIN TREATMENT PLANTS MANAGED BY ACQUE (2021-2023) (*)

parameter	average values (mg/l) 2021	average values (mg/l) 2022	average values (mg/l) 2023
BOD_5	4.7	7.2	4.0
COD	24.3	32.0	23.0
SST	5.9	8.3	5.3
NH_4^+	3.3	3.9	2.6
phosphorous	2.2	2.6	2.5

(*) Installations with a treatment capacity greater than or equal to 10,000 population equivalent are considered.

TREATMENT EFFICIENCY OF THE MAIN TREATMENT PLANTS MANAGED BY ACQUE (2021-2023) (*)

parameter	average values (%) 2021	average values (%) 2022	average values (%) 2023
$100x(COD_{in} - COD_{out})/COD_{in}$	95.4	94.1	95.7
$100x(SST_{in}-SST_{out})/SST_{in}$	98.2	97.3	98.4
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	92.7	91.9	94.2
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	68.3	71.3	72.5

(*) Installations with a treatment capacity greater than or equal to 10,000 population equivalent are considered.

Overseas activities

Acea operates abroad, in the water sector[258], with regards to **technical aspects or the commercial management of the service**. In particular, it is present in Honduras, Dominican Republic and Peru through companies created **in partnership with local and international stakeholders**, in an area with approximately 10 million people.

AGUAS DE SAN PEDRO

Aguas de San Pedro SA holds a 30-year contract and operates the integrated water service in San Pedro Sula in Honduras, which began in 2001, and, in 2023, it continued with the projects for the **expansion, treatment and improvement of the water service and sewerage network** in the city. The water network stretches 2,186 km and the sewerage network 1,281 km.
The Company has a **Quality Management System** certified according to the **UNI ISO 9001:2008** standard and the laboratories accredited according to the **UNI ISO/IEC 17025:2005** standard. In 2022, it also obtained a certificate for the **Anti-bribery Management System** according to the **UNI ISO 37001:2016** standard.

AGUAS DE SAN PEDRO SA – MAIN COMPANY AND OPERATING DATA

country (area)	Honduras (San Pedro Sula)
users	124,384
inhabitants served	801,287 (estimated figure)
customer	municipal administration
duration of the contract	01.02.2001 – 01.02.2031
purpose of the project	concession of the integrated water service for the town of San Pedro Sula
shareholders	Acea International 60.65%, IRETI SpA 39.35%
no. of employees	419
turnover (in € thousand)	46,347

258 Overseas activities have a limited incidence from an economic and financial viewpoint, in terms of consolidation percentage, but a brief description of them is given here because of their social importance.

With the aim of enhancing and developing people's skills, in 2023, the Company provided **training courses** including virtually, on a variety of subjects, such as Quality Management Systems (for ISO 9001:2015 and 17025 certifications), on the prevention of corruption, environmental sustainability, health and safety in the workplace, and courses on medical assistance and psychological-physical well-being.
66 courses were provided on the Human Resources Management Plan aimed at **skills development**, involving 1,037 people. Compared to last year. 15 activities were added in this context to consolidate Knowledge Management.
Furthermore, during the year, **13 initiatives** were undertaken to promote **female empowerment**, **gender equality**,'**equality** and **inclusion**, for a total of 573 attendances. The initiatives aimed at promoting equality and inclusion, involved employees with disabilities in corporate culture promotion campaigns, such as the rational use of water and the promotion of inclusion (sign language).
To promote a culture of **health and safety**, **78 training courses** were provided, with 7,051 attendances. On average, in 2023, every employee participated in 17 activities focusing on health protection, provided via educational meetings, on psychological-physical health, health at the workplace and activities aimed at ensuring a safe and healthy work environment.

In addition, during the period under review, the Company supported **community and environmental initiatives**, especially in the **El Merendón Nature Reserve**, which has been designated a protected area for water production in San Pedro Sula. In this area, the Company has implemented the reforestation project "*Un millón de árboles para el Merendón (One Million Trees for el Meredón)*, which was launched in 2006 to restore degraded areas of the reserve, with the target of planting **1,113,106 million fruit and timber trees** on **981.6 hectares** achieved in 2023. Support was provided to 356 producers in 2023, in the scope of the Aguas de San Pedro project: 95 producers received technical assistance, 261 benefited from the creation of 105.3 hectares of fruit and timber trees planted and agro-forestry systems. Producers are spread across 39 rural communities within the reserve.
The **fire prevention/extinguishing** activities continued: thanks to the observation towers built in the past, a dedicated team managed to intercept and stop the outbreak of several fires. Of the 19 bush fires that broke out in the reserve in 2023, the teams at Aguas de San Pedro were directly involved in managing 12 bush fires that affected 111.54 hectares.
With regard to the **rural communities in Merendón**, specifically the communities in the micro-basins of the Manchaguala, Frío and El Palmar rivers, Aguas de San Pedro organised **18 workshops** to understand the phenomena of climate change and global warming, as well as other information workshops on environmental issues.
Finally, 3 new Children's Health Committees were established, and monitoring continued on the existing committees.

ACEA DOMINICANA SA

Acea Dominicana deals with the commercial management of the water service **in the northern and eastern areas of Santo Domingo** in the **Dominican Republic**. The activities include the management of customer relations, the billing cycle and cost estimates, the installation of new meters, maintenance of existing meters and directing the works for new connections.
The Company implemented a **Quality Management System** certified according to the **UNI ISO 9001:2015** standard, which covers all activities performed.

ACEA DOMINICANA SA – MAIN CORPORATE AND OPERATING DATA

country (area)	Dominican Republic (north and east Santo Domingo)
users served	198,301
customers	Corporación del Acueducto y Alcantarillado de Santo Domingo (CAASD) and Corporación de Acueducto y Alcantarillado de Boca Chica (CORAABO)
duration of the contract	01.10.2003 - 30.09.2023 CAASD 01.10.2013 - 30.09.2024 CORAABO
purpose of the project	commercial management of the water service
shareholders	Acea International 100%
no. of employees	134 in September 2023, 40 in December 2023
turnover (in € thousand)	4,102

Acea Dominicana provides **training** on a number of topics to promote the development of employees' skills, such as the management of wages, writing and spelling, internal audits and the Microsoft Excel tool, for a total of 1,881 training hours.
To improve relations with customers and promote digital services, a **chat** was developed for customer services on the CAASD project.

OPERATING COMPANIES IN PERU

The Consortia operating in Lima (Peru) manage part of the water services on behalf of the local, publicly owned water company SEDAPAL (drinking water and sewerage service in Lima) with projects defined in their calls for tenders. This refers to **Consorcio Agua Azul**, **Consorcio Acea**, **Consorcio Acea Lima Norte**, **Consorcio Acea Lima Sur e Acea Peru with the PTAR Norte contract**.
The company **Consorcio Servicio Sur**, which was responsible for the extraordinary maintenance necessary for the operation of the water and sewerage service, improving sanitation and environmental conditions, ended operations in August 2022 and is currently being liquidated.

MAIN CORPORATE AND OPERATING DATA

country (area)	Peru (Lima)
customer	Sedapal (Drinking water and sewerage service in Lima, state owned)
duration of the contracts	**Consorcio Agua Azul:** 07.04.2000 – 18.06.2027 **Consorcio Acea:** 5.12.2020 – 5.12.2023 (contract extended for an additional 10 months) **Consorcio ACEA Lima Norte:** 7.01.2021 – 7.01.2024 **Consorcio Acea Lima Sur:** 18.12.2021 – 18.12.2024 **PTAR Norte - Acea Peru:** 8.08.2022 – 08.08.2024
shareholders	**Consorcio Agua Azul:** Acea SpA (44%), Marubeni Co. (29%), Inversiones Liquidas S.A.C (27%) **Consorcio Acea**: Acea Peru SAC (99%), Acea Ato 2 (1%) **Consorcio ACEA Lima Norte:** Acea Peru SAC (99%), Acea Ato 2 (1%) **Consorcio Acea Lima Sur:** Acea Peru SAC (99%), Acea Ato 2 (1%) **PTAR Norte - Acea Peru:** contract with Acea Peru SAC
no. of employees	**Consorcio Agua Azul:** 31 **Consorcio Acea:** 1,014 **Consorcio ACEA Lima Norte:** 537 **Consorcio Acea Lima Sur:** 210 **PTAR Norte - Acea Peru:** 127
turnover (in € thousand)	**Consorcio Agua Azul:** 15,716 **Consorcio Acea**: 8,493 **Consorcio ACEA Lima Norte:** 12,639 **Consorcio Acea Lima Sur:** 6,432 **PTAR Norte - Acea Peru:** 2,357

Specifically:

- **Consorcio Agua Azul**, a subsidiary of **Acea International**, manages the treatment and supply of drinking water in the **northern area of Lima**.
- To this end, using the surface and underground waters of the Chillón river it built a water treatment plant capable of satisfying the drinking water needs of the area, which it will manage until 2027, when it will be transferred to the State;
- **Consorcio Acea**, controlled by **Acea Peru** manages 262 pumping stations for drinking water serving the **Ate, Breña and San Juan de Lurigancho areas in the central area of Lima**;
- The **Consorcio Acea Lima Norte**, owned by Acea Peru, manages maintenance for the drinking water and sewerage infrastructure for the **Comas and Callao areas in the northern part of Lima**;
- the **Consorcio Acea Lima Sur**, a subsidiary of **Acea Peru**, carries out corrective maintenance activities on the drinking water and sewerage systems for the **Surquillo area in the southern area of Lima**.
- the **PTAR Norte** contract, incorporated into the company **Acea Peru**, includes the maintenance and upkeep of the Wastewater Treatment Plants (PTAR) in the areas north and east of Lima.

Below is some significant information from the standpoint of sustainability relating to the various Consortia operating in Peru.

The **Consorcio Agua Azul** has adopted an **Integrated Quality and Environment System** according to **UNI ISO 9001:2015** and **UNI ISO 14001:2015.** aimed at optimising production processes and reducing the environmental impact through energy efficiency and the limited use of materials.

The Consortium has continued its **occupational safety and first aid training programme**, which has made it possible to **maintain the result of zero accidents at work** in 2023. In addition, specialised staff training continued, including support for the **undergraduate and graduate education** of two employees.

In 2023, in the scope of activities aimed at consolidating relations with the community, Consorcio Agua Azul completed the implementation of **new hygiene services in 7 schools** in the area. In the same schools, **2,288 educational kits were delivered** with the goal of **boosting school attendance and contributing to education**. For the Christmas holidays, children at local schools and the children of employees were delivered toys and Christmas packages.

The consortia administering the management and maintenance contracts for the water network, namely **Consorcio Acea, Consorcio Acea Lima Norte, Consorcio Acea Lima Sur and PTAR Norte**, follow the regulations referring to the certified management systems obtained by the parent company Acea Peru. Specifically, Acea Peru has an **Anti-bribery Management System** according to the **UNI ISO 37001:2016** standard, a **Quality System** according to the **UNI ISO 9001:2015** standard, and an **Occupational Health and Safety Management System** according to the **UNI ISO 45001:2018** certification. The first two certificates cover the activities of Consorcio Acea Lima Norte and Consorcio Acea Lima Sur, while the third covers the activities of Consorcio Acea Lima Norte and Consorcio Acea.

In 2023, the Consortia continued with **employee training initiatives on inclusion and organisational wellness**, covering subjects such as gender equality and healthy nutrition, as well as **occupational health and safety**.

In the scope of **health prevention and raising awareness on vaccinations**, 38 training hours were provided by Consorcio Acea, 22 hours by Consorcio Acea Lima Norte, 16 hours by Consorcio Acea Lima Sur and 12 hours by PTAR Norte – Acea Peru.

To protect the land, Consorcio Acea, Consorcio Acea Lima Norte and Consorcio Acea Lima Sur have taken measures to lessen their environmental impact by disposing of 100% of electromechanical, uniform, and PPE waste appropriately.