3

RELATIONS WITH THE ENVIRONMENT

ENVIRONMENTAL SUSTAINABILITY AND THE PRIMARY CHALLENGES

According to the surveys conducted each year by the World Economic Forum, including the most recent Global Risk Report 2023[142], environmental risks are among the top long-term global threats. The major challenges everyone is facing include the continuous rise in global temperature, as well as other extreme events related to intensifying climate change, land use and declining biodiversity (see the boxes "Climate Change at COP27" and "Biodiversity: Policies and Instruments for Protection").
After the pandemic, which also persisted through some of 2022, the global scenario became characterised by international tensions and conflict, the energy crisis, and rising inflation.
Against this backdrop, Italy is implementing its National Recovery and Resilience Plan (NRRP), published in 2021, in line with the **European Green Deal** and the "**Next Generation EU**" recovery package. As well as outlining the challenges in the near future, particularly for environmental sustainability, the **NRRP supports and promotes** Italy's ecological transition by allocating major investments to several strategic sectors, such as the **circular economy**, **renewable energy**, **energy efficiency, the national electricity grid to support mobility, territorial protection** and **water conservation**.
Operating in a sphere of interdependence between the environment, the territory and the community, Acea takes into account the UN Sustainable Development Goals and is a major player in the ecological transition, implementing development projects aimed at promoting the circular economy and the smart city concept, promoting the use of renewable energy sources to replace fossil fuels, increasing the resilience of electricity and water distribution infrastructure, and increasing the focus on water conservation and technological innovation applied to infrastructure management.

As regards **climate change**, the Group continues to develop its executive-level scenario analyses and is committed to lowering GHG emissions with energy efficiency and energy saving measures, as well as other initiatives to **promote adaptation and mitigation processes**. This is evidenced by the Group's level of compliance with the requirements of the first two climate objectives under Regulation 2020/852 (see the chapter on Information required by the European Taxonomy) and the publication, in 2022, of the Group's first Climate-related Disclosure[143], in accordance with the recommendations of the Task Force on Climate-related Financial Disclosure, as well as the additional project on the subject carried out during the year (see box).

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.
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 Segment). For example, the waste processing and disposal company Deco (included in the reporting boundary as of 2022) 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 2022, 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 PROJECTS AT ECOMONDO 2022

The Acea Group took part in Ecomondo, held in Rimini from 8 to 11 November 2022. The event aimed to represent **all sectors involved in the ecological transition**: integrated waste recovery services and solutions, the integrated water cycle, land reclamation and regeneration, renewable energy, mobility and green infrastructure, circular economy models, and protecting natural resources.
Acea had a 200 m^2 **Group stand** at the event, where it presented its most recent initiatives. These include the **Waidy Wow App**, which maps over 50,000 geo-located water sources and promotes the responsible use of water to reduce the environmental impact, the **DepurArt project**, developed during the renovation of the Fregene treatment plant operated by **Acea Ato 2**, which transformed the site into a cultural attraction, and the ***Conoscenza Comuni* shared knowledge project,** an intuitive online platform that enables users to consult detailed information on the water management services provided by Acea Ato 2 for each Municipality. **Acea Ambiente**, which discussed the topic of plastic recycling, signed a **memorandum of understanding** with the Metropolitan City of Turin and Turin Polytechnic University for a **pilot project on the use of recycled polymers** in road surfaces with a view to identifying innovative solutions to transform polymers into high-quality and sustainable asphalt. **Acea Innovation** illustrated the systemic approach and the holistic and integrated vision that underpins Acea's commitment to the ecological transition.

142 From the Global Risk Report 2023, published by the World Economic Forum in January 2023: the findings of the Global Risks Perception Survey again place the failure to mitigate and adapt to climate change at the top of the list of "top ten global risks" as the greatest long-term (ten-year) threats, followed by natural disasters and extreme weather events, and biodiversity loss and ecosystem collapse.

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

Acea Elabori promoted the topic of **circular communities** as new production and sustainable consumption models. It also presented some of its research:

- "*H2020 PROMISCES: cost-effective PFAS analysis in complex matrices*", an analysis to identify how industrial pollution prevents the full development of the circular economy in the EU and strategies that could help to overcome the barriers identified;
- a study developed in collaboration with IRSA-CNR to examine the opportunity to produce high value-added material using **recovered organic waste**;
- an analysis to demonstrate the effectiveness of an **advanced monitoring system** to determine **odorous impacts**;
- a study conducted in collaboration with ISS, ENEA and La Sapienza University of Rome showing the results of the development of an analytical method for measuring plastics in water intended for human consumption;
- a study of Lake Bracciano that analysed the monitoring methods, the results of isotopic analyses and surveys, satellite data and the complete numerical model that could be used to **draw up long-term scenarios**.

ENVIRONMENTAL AND CLIMATE RISKS: IN-DEPTH ANALYSIS AND DISCLOSURE

CLIMATE RISKS

Although the COVID-19 pandemic has represented the priority emergency in recent years, the current geopolitical situation is forcing us to confront an unprecedented energy crisis, while the intensification of climate change is having serious impacts locally and globally. These two factors have resulted in a slowdown of the world's leading economies.

As noted earlier, climate change is one of the most significant environmental and social challenges of our era. The Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change, held in Sharm el-Sheikh in November 2022 (see box for more details), confirmed the goal ratified in 2021 in Glasgow to maintain global temperatures below a 1.5°C increase on pre-industrial levels.

However, according to the latest IPCC Report published in 2022, the average global temperature increase since 1850 has been around 1°C[144]. Despite the current containment measures in place, keeping the global temperature rise below 1.5°C will require further commitments.

CLIMATE CHANGE AT COP27

The 27th Conference of the Parties (COP27) to the United Nationals Framework Convention on Climate Change was held in Sharm el-Sheikh from 6 to 18 November 2022, against a backdrop of global crisis. The negotiations focused on **five key topics**: decarbonisation, climate adaptation, nature, food, and water.

Meanwhile, on 16 November during the G20 Summit in Bali, these issues were incorporated into the updated "G20 Action Plan on the 2030 Agenda, adopted in 2016.

COP27 ended with the issuing of a final decision, the **Sharm el-Sheikh Implementation Plan**. The plan **maintains the agreements ratified in the Glasgow Climate Pact (COP26)**, under which the signatory countries undertake to maintain the global temperature increase to below 1.5°C compared to pre-industrial levels.

The Agreement highlights the need to **transition to an economy based on renewable sources** and to **reduce the use of fossil fuels**. Efforts to gradually eliminate coal were encouraged, favouring low-emission sources and promoting the elimination of fossil fuel subsidies. As regards the **Nationally Determined Contributions - NDC**, countries that had not yet presented their decarbonisation commitments were encouraged to do so, while those that already have were asked to update them by the end of 2023.

The main change involves the **introduction of the "loss and damage" principle**, which calls for the payment of indemnities to the most vulnerable developing countries for climate damage suffered. This principle will be implemented by establishing a specific Fund to be defined at a later date. The next conference, COP28, will be held in Dubai from 30 November to 12 December 2023.

Acea has continued **its climate-change mitigation and adaptation strategy** i) with an increase in the energy efficiency of Companies and, regarding water, with the reuse of purified wastewater in agriculture ii) implementing actions aimed at increasing the resilience of infrastructure, and iii) adopting a plan to significantly increase **generation from renewables**[145], and with 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 shown in Table no. 63 on energy intensity indices and in Table no. 69 on emission 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). After an initial project conducted in previous years, in 2022 Acea worked **in synergy with the main Group companies**[146] to **analyse** the main climate-related risks on its business areas (see box for more details).

144 Available on the Intergovernmental Panel on Climate Change website.

145 In particular, in 2022 the output of the photovoltaic plants of the investee company reached 92.8 MW. Added to the 7.8 MW of Acea Production, total installed capacity stood at 100.6 MW.

146 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.

THE 2022 ACEA PROJECT 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**, most recently 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 scope of the **2022 project** was extended to include the **main Group companies** operating in the water, energy production, energy distribution, and waste treatment and recovery sectors in the process to **identify physical risks and the necessary transition**.

The project also involved **certain key departments of the Parent Company**, particularly in the process to **prioritise the identified risks**.

Once the **priority risks** to be evaluated and compared with the more representative scenarios and parameters were identified, the in-depth analysis began. For most Companies involved, the risk of drought and water stress was identified as one of the critical **physical risks**. Other risks analysed included extreme precipitation and flooding (Acea Produzione, Areti and Gori), heat waves (Areti) and, during the first project, the risk of lightning strikes (Acea Ambiente and Acea Produzione). In terms of **transition risks**, carbon pricing was identified as the most representative risk by most of the Companies involved.

The outcome of the analyses, finalised at the end of the year, will be incorporated into Acea's climate-related disclosure, updating the first edition on FY 2021 published in 2022.

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 has adopted an **Integrated Management System with Quality, Environment, Safety and Energy systems** that facilitates environmental *compliance* and a **Management and Sustainability Systems Policy** aimed at promoting the respect and protection of the environment, also in line with the main principles of the *Code of Ethics*, and updated in 2022.

The UNI EN ISO 14001:2015 **Environmental Management System** offers greater capacity to identify and manage the impacts that the Company has or could have on the **environment** by promoting compliance with the regulations in force.

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"[147]. Furthermore, all 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 sector, 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 hub, and the waste-to-energy plants in Terni and San Vittore del Lazio. The waste-to-energy plants have also adopted the **Eco-Management and Audit Scheme** (EMAS), an instrument used to evaluate and improve environmental performance and report it to stakeholders.

The Group's operating companies are committed to ensuring the continued efficiency of the Environmental Management System through the correct management of impacts and regulatory compliance. This commitment, however, does not prevent the emergence of situations, usually caused by contingent circumstances, that may lead to cases of **non-compliance** that can be challenged by the competent control bodies and authorities (see the box on Investigations, Awards and Sanctions in the *Institutions and the Company* chapter). During the year the companies included within the scope of the NFS received **approximately 60 environmental fines**, with the consequent payment of **approximately € 272,500**[148]. An additional 56 **environmental disputes** are currently being settled.

Environmental problems of greater significance are forwarded to the Units responsible, which establish the facts reported and request the necessary action, as well as providing feedback to the Bodies involved. Exceptionally, it may happen that the Company receives significant reports from individual persons; 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. However, this concerns **installations indispensable 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 legislation[149]. 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 Risk & Compliance and Safety Unit **carries out the instrumental checks** in response to the disputes. **In 2022 8 complaints were processed**, which have not yet been closed as the counterparties have submitted appropriate appeals to the relevant Courts.

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

148 The data includes fines received in previous years but paid in 2022. With reference to Acque, Publiacqua and Umbra Acque, which are not included in the reporting boundary of the NFS, the fines paid were, respectively: €43,555; €58,500 and €150,000.

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

SAFEGUARDING OF LAND AND BIODIVERSITY

Areas connected to conservation and the promotion of biodiversity have an increasingly important role in the environmental agenda of leading international institutions. These are set out in the UN Sustainable Development Goals (Agenda 2030) and, taking into account the European Green Deal, focus on on the main causes of biodiversity loss, including land use, habitat fragmentation, exploitation of natural resources and pollution. The European Union, which in 2020 published the EU Biodiversity Strategy for 2030 (COM (2020) 380 final), aims to define binding targets to restore damaged ecosystems, improve the condition of habitats and protected species, reduce pollution and promote the "greening" of urban environments. Furthermore, Regulation 2020/852 (the "European Taxonomy") lists the "*Protection and restoration of biodiversity and ecosystems*" among its six key environmental objectives (see *Communicating Sustainability: Methodological Note*).

BIODIVERSITY CRISIS: POLICIES AND TOOLS FOR BIODIVERSITY PROTECTION

Growing biodiversity loss and the progressive reduction of natural areas were addressed at the 15th **Conference of the Parties on Biological Diversity (COP15)**, held in Montreal from 7 to 19 December 2022. During COP15 the **Kunming-Montreal Global Biodiversity Framework - GBF** was adopted, an agreement that establishes **four macro-objectives and 23 targets to be achieved by 2030** to halt and reverse biodiversity loss. None of the 20 objectives defined previously by the Global Strategic Plan for Biodiversity 2011–2020, also known as the Aichi Biodiversity Targets, were fully achieved. The implementation of the GBF provides for the following by 2030: the protection of 30% of the Earth's land and water (mainly through regulated systems of protected areas), the restoration of 30% of degraded ecosystems, the recognition and respect of the rights of local and indigenous communities, and the reduction of the risk from pesticides by at least 50%. The GBF also enshrined the commitment of developed countries to allocate $20 billion per year from 2025 and $30 billion from 2030 in aid to developing countries and small island states. As a result, all 196 signatory countries were requested to update or, where not already defined, prepare **National Biodiversity Plans and Strategies**.
The aims established at COP15 are in line with the EU proposals issued in June 2022. In the context of the European Green Deal and the **EU Biodiversity Strategy for 2030**, the European Commission has proposed the so-called **Nature Package**, containing the **Nature Restoration Law**. This is the first European law that explicitly aims to restore nature by setting binding targets for Member States. The restoration of ecosystems, habitats and species will help to increase biodiversity, strengthen nature's resilience, contribute to the achievement of the European climate change mitigation and adaptation goals, and meet international commitments. The proposed law provides for the restoration of at least 20% of all land and ocean in the EU. Specifically, in order to combine the restoration of biodiversity with climate action, the law identifies ecosystems with the greatest potential for storing carbon and preventing and reducing the impact of extreme events as priority areas for intervention.
In line with European guidelines, Italy, which has the highest rate of biodiversity in Europe but with a mostly critical conservation status of protected species and habitats, introduced in 2022 "the protection of the environment, biodiversity and ecosystems" into the **fundamental principles of Article 9 of its Constitutional Charter**[150]. Furthermore, the **National Forestry Strategy to Protect Biodiversity** and the **National Biodiversity Strategy (NBS) for 2030** were approved. The former is a strategic tool to outline the forestry policies and plans, while the latter, which confirms the vision to 2050 of the previous NBS 2020, identifies two strategic objectives for terrestrial and marine environments: the construction of a network of protection areas and the restoration of ecosystems. This is structured into eight specific objectives, including deliver a 50% reduction in the number of national Red List species threatened by invasive alien species by 2030, and protect at least 30% of terrestrial environments and 30% of marine environments through an integrated system of protected areas, Natura 2000 and other legally protected areas.

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 **safeguarding 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 environmental 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.

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**, in line with sector-specific BATs or BEMPs[151] 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 the preservation of the water flow**.

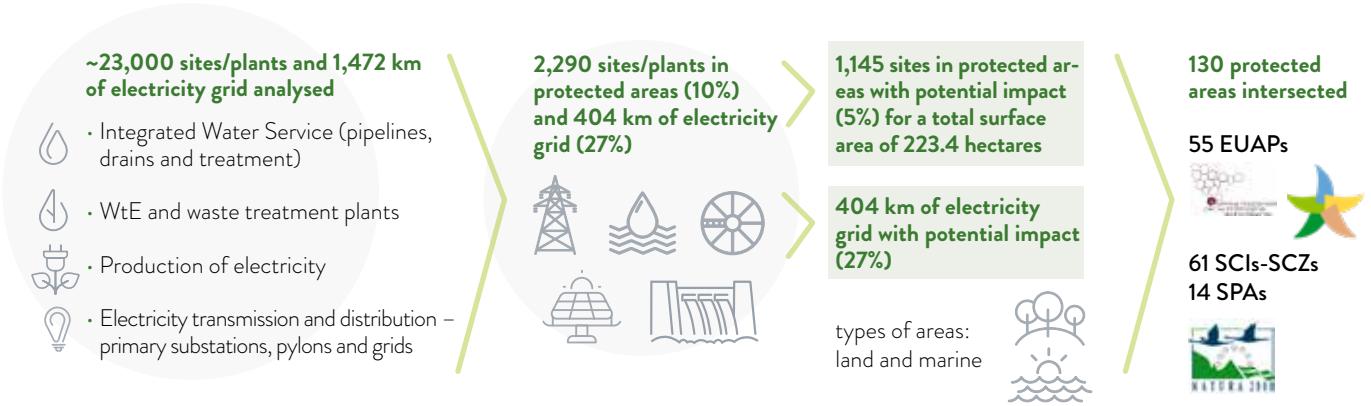
150 The Constitutional law also regulates the methods and types of protections for wildlife and specifies that private economic activity may not occur in a way that harms human health and the environment.

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

Likewise, with **treatment activities**, the primary goal is that **discharges**, after appropriate treatment, comply with the limits established by regulations in the sector and are therefore **compatible with 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). As regards waste-to-energy plants, **Acea Ambiente** manages atmospheric emissions 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).
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. In addition, 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.
Other plants in the **energy sector**, which generate electricity using fossil fuels and waste-to-energy, **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)[152] established at European level, through **mapping of the infrastructure of the main operating companies** (Acea Ato 2, Acea Ato 5, Gori, Gesesa, AdF, Acea Ambiente, Acea Produzione and Areti)[153]. Analysis **conducted** in 2020[154] **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)[155] for a **total area of 223.4 hectares**.

Chart no. 48 – 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.

In the areas affected, there are many **animal and plant species**, including some on the **International Union for Conservation of Nature (IUCN) Red List of Threatened Species** (in the categories "vulnerable", "endangered" and "critically endangered")[156], i.e. at risk of extinction in the short or medium term. These species therefore represent a conservation priority.

152 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".

153 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.

154 The analyses are based on infrastructure data of the main Group companies as at 2020. As of 2022, no significant changes had occurred.

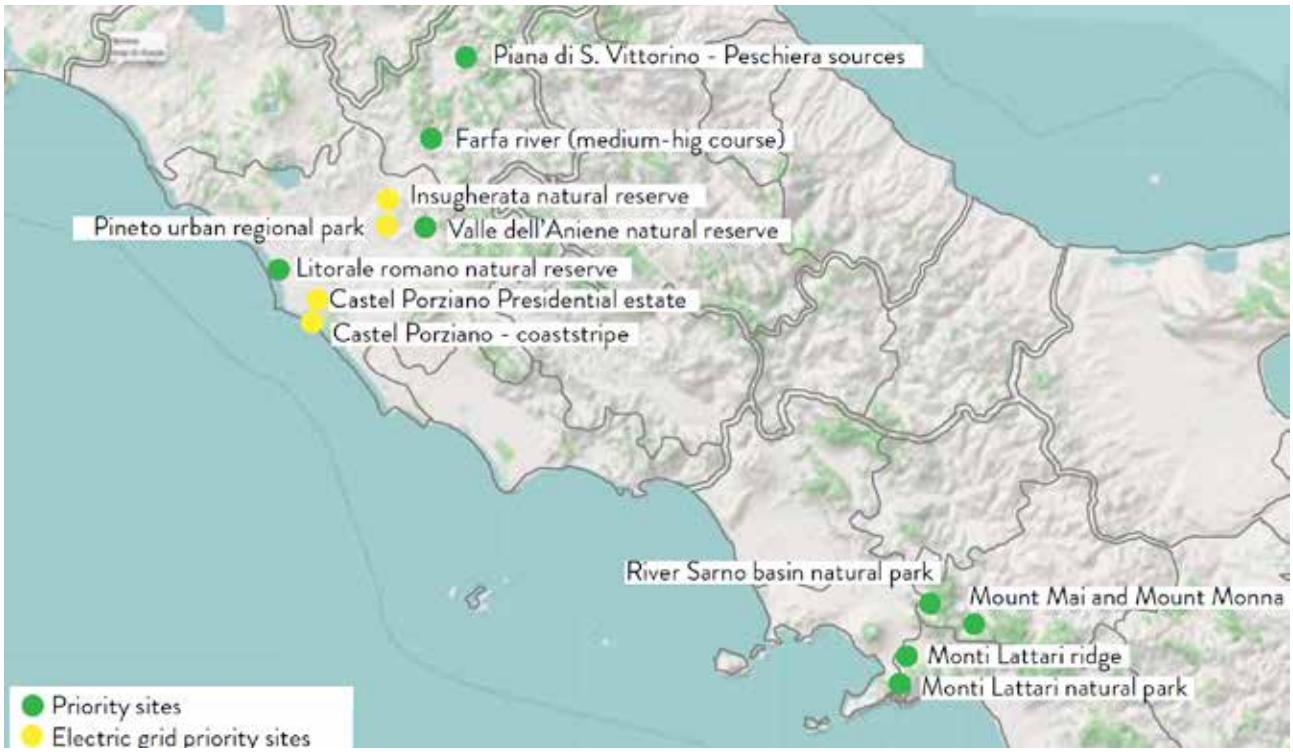
155 Where SCIs/SCZs and SPAs coincide, the areas are counted once amongst SCIs/SCZs.

156 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), Endangered (EN) and Critically Endangered (CR).

A total of 45 IUCN Red List species are potentially affected. Specifically, there are **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. 49 for details).

Chart no. 49 – Number of species listed in the IUCN Red List with habitat in the protected areas intersected

Following a **further in-depth study**, carried out in 2021 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)**[157]**, a tool** designed to assess, for each protected area impacted, the different habitats included and the portion of land occupied, the fragility of the habitat and the type of sites/plants present[158]. This led to the identification of **12 biodiversity-rich zones** considered as **priority areas** due to their increased vulnerability. In **eight** of these — Monti Lattari regional natural park, Monti Lattari ridge, Piana di S. Vittorino - Peschiera sources, Valle dell'Aniene natural reserve, Farfa river (medium-high course), River Sarno basin regional natural park, Mount Mai and Mount Monna, Litorale romano natural reserve — **sites/plants** have potential impacts , while **four** may be affected by interference from **electricity distribution networks** (Pineto urban regional park, Castel Porziano -coaststripe, Castel Porziano - Presidential estate, Insugherata natural reserve).



157 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.

158 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 - Peschiera sources **River Farfa (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. The project was defined to meet the requirements of the **Envision protocol**, the first rating system for sustainable infrastructure, which evaluates the economic, environmental and social sustainability of infrastructure and includes specific evaluation criteria linked to biodiversity, such as the preservation of sites of high ecological value. In the river Farfa area, the Company has engaged the University of Naples Federico II for preparation of a technical and scientific study into the natural characteristics of the Farfa river that includes 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 Nazzano regional natural reserve, Tevere-Farfa, with the aim of monitoring the evolution of the river ecosystem within the protected area.
River Sarno basin regional natural park	**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.
Valle dell'Aniene natural reserve **Litorale Romano natural reserve**	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 in Roma Nord, Roma Sud and CoBIS Ostia, located within the **Litorale romano natural reserve**, while in 2022, the Roma Est treatment plant, located in the **Valle dell'Aniene natural reserve**, was evaluated**.** 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. Similar monitoring is planned for 2023 at the Fregene treatment plant also located in the **Litorale romano natural reserve**. In the **Litorale romano natural reserve** 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 others, 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 Veio natural park, Marcigliana natural reserve and, south of Rome, Decima Malafede natural reserve, (as well as in the priority area of Litorale romano natural reserve). For details of the works performed in 2022, see the section *Energy distribution* in the chapter *Energy Segment*. The electricity distribution company and the Park Authority of **Veio natural park 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 2022, Areti supported the **Ornis Italica** project to protect **barn owls** (see the box on "Nesting of Barn Owls on Areti Sites"), while Acea Ato 2 continued its work conducted in previous years to monitor the presence of **peregrine falcons** (included on the Red List under the "Least Concern" category) at the SCI-SCZ site of **Villa Borghese and Villa Pamphili**, in a specific area around the **Acqua Vergine Springs**. As always, a community of scholars, ornithologists and enthusiasts had the opportunity to follow the lives of the birds of prey that live among the Acqua Vergine springs, **thanks to a webcam managed by Ornis Italica**, 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 2022, with the birth and development of peregrine falcon chicks.
Acea Ato 2 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 **Canale Monterano natural reserve** in which the plant is located.

In 2022, **AdF signed two river contracts** for the **Pecora and Pesa river basins**, 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.
In 2020, as a tool to monitor **ecosystem quality** in areas where its plants are located, **Acea Ambiente** developed the "**UrBees**" project, in collaboration with bee-keeping experts and the Sacro Cuore Catholic University, aimed at environmental monitoring by observing the **behaviour of bees, as bioindicator insects**, at the San Vittore del Lazio (FR) waste-to-energy plant. Biomonitoring is a 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. 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**. In 2022, the countless flights made by the bees produced 90 kg of honey from three different blends of botanical species: Honey 40 flowers, Honey 35 flowers and Honey 36 flowers. The analysis of the samples of honey produced revealed a total of 83 different species of plant, **pointing towards high floral biodiversity**.

NESTING OF BARN OWLS ON ARETI SITES

In 2022, Areti launched a partnership with the nature organisation **Ornis Italica**, a scientific non-profit association of biologists and natural scientists that aims to develop scientific knowledge on the behavioural ecology of birds and wildlife. Specifically, the Company took action to protect a specific species of bird, the **barn owl** (included on the IUCN Red List under the category "Least Concern"), whose habitat coincides with the Areti's areas of operation, and identified potential sites to install nest boxes to **promote their breeding**.
The collaboration led to the installation of **30 nest boxes on electricity substations**, some of which are located in **biodiversity-rich areas**, such as the **Litorale romano natural reserve and the Marcigliana natural reserve** protected areas.

During the first phase of monitoring, it emerged that **4 of the 30 nests installed were occupied by barn owls** and also by **little owls** and **kestrels** (also on the Red List in the "Least Concern" category). According to Ornis Italica, this is an excellent result, particularly given the short period of time between installation and nesting.

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 is composed of **seven aqueduct systems** that transport water from **14 main sources to the distribution networks** and from numerous smaller local sources (mainly wells), for a total **flow that exceeds 21,000 litres/second**. The drinking water aqueduct and distribution network extends for more than **15,700 km**[159].

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.

159 The value is higher than that added in chart no. 54, which features a geo-referenced value.

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. Analysis of precipitation and withdrawals has been performed for the years 2017-2022. In particular, in 2022, there was a **significant reduction in precipitation** for almost the entire year and, as noted above, rainfall patterns are a primary factor in refilling springs. Thanks to the method used in the study, it was possible to predict the reduced 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 for the summer period. The document is presented by the Company at the periodic meetings convened by the Permanent Observatory on the Use of Water Resources of 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 Municipalities that fall within OTA 5 Lazio Meridionale - Frosinone, **Acea Ato 5** manages **80 sources**, **75 of which are active**, with 41 wells/well fields and 34 springs. In addition to these sources, the Company purchases/sells water through exchange points with other operators and with a Municipality in a neighbouring area. 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 all users served, and totalling **6,181 km**.
Gesesa, which operates in District 1 *Calore Irpino* in the Campania Region, for the supply of drinking water, manages approximately **2,093 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" (ex OTA 6), manages the drinking water system through a network that stretches approximately **8,360 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 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 of the OTA 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 operation and correct maintenance of collection infrastructure, primary and secondary water plants, supply systems and distribution networks and user meters. Extraordinary maintenance is also performed (renovation, upgrading and/or expansion of plants and networks).
In 2022 Acea Ato 2 continued to develop the programme of works under the "**Safeguarding and modernisation of the Peschiera water system**" project (Annex 4, Art. 44, Decree Law 77/21, converted with amendments into Law 108/21). As of 2021, these works have been conducted under the authority of the Extraordinary Commissioner. In particular, the Technical Economic Feasibility Studies, produced according to the Guidelines established by Art. 48 of Decree Law 77/21, were completed and, in December 2022, authorisation and tender procedures were launched for four sub-projects to develop hydraulic works, partly financed by the NRRP (see the section Quality in the water area in the Customers and Community chapter).
The location and surface area of the **fully protected areas**[160] are shown in Table no. 50. Please note that the sources illustrated are all drawn in "areas under water stress" as defined at international level[161] by the World Resources Institute. The water drawn is freshwater[162], apart from 1.3% of the amount drawn by AdF, corresponding to approximately 0.8 million cubic metres, from marine sources. The amounts drawn by the Companies from the springs listed are indicated in the *Environmental Accounts*.

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

161 https://www.wri.org/aqueduct.

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

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 2022, **thanks to the use of a satellite to perform change detection** and additional inspections carried out along the supply and collection network, **63 violations were identified**.

Table no. 50 – The principal sources under protection

sensitive area	municipality	area (m^2) (*)
IN OTA 2 – CENTRAL LAZIO[163]		
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	80,000
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 PROVINCE OF BENEVENTO – OTA – CALORE IRPINO		
18 wells	municipalities of Benevento, Telese Terme, Castelpagano, Vitulano, Melizzano, Sant'Agata de' Goti, Cautano	9,110
Ciesco spring	Castelpoto	307
Faitillo and Orto dei Ciuffi spring	San Giorgio La Molara	2,412
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

163 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 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
S.M. Lavorate spring	municipality of Nocera Inferiore (Salerno)	5,971
S.M. La Foce spring and well field	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 SEGMENT

SCOPE

The chapter *Energy Segment* includes Acea Produzione, Areti, the Acea Ambiente, Deco and Ecogena energy production plants (Ecogena is only included for data on energy produced and Energy Efficiency Certificates). Waste-to-energy activities are also described in the chapter *Environment Segment*.

842 GWh
energy produced
(**941 GWh** including the PV plants not included in the NFS reporting scope)

64%
energy produced from renewable sources
(**68%** including the PV plants not included in the NFS reporting scope)

approximately **169,500 t** of **CO_2** saved thanks to **electricity produced** from **renewable sources** instead of conventional sources (200,300 t CO_2 including the production of the PV plants not included in the NFS reporting scope)

The 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 resilience**. The increased flexibility of the grid also responds to the trend of increasing numbers of **prosumers** connected (see also chapters *Customers and the community* and *Institutions and the Company*).

ENERGY PRODUCTION: FOSSIL AND RENEWABLE ENERGY SOURCES

GROUP PLANTS

Through **Acea Produzione** and **Acea Ambiente**, the Group **generates 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 also launched a **major programme to increase its activities in the photovoltaic sector**, in line with the 2020-2024 Business Plan, which plans for an installed capacity of around 750 MW through acquisitions and the construction of new plants. 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[164], 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 has generation plants from fossil fuel (thermoelectric) – the latter mainly through the **high-efficiency cogeneration plant** of the Tor di Valle plant, which had greater availability during the year..
The power park includes:

- **7 hydroelectric power stations** located in the Lazio and Abruzzo regions for a total of **122 MW**;
- **2 thermoelectric power stations** located within the Municipality of Rome area: Montemartini (78.3 MW)[165] and Tor Di Valle (28.5 MW), for **106.8 MWe total available installed capacity**;
- a **photovoltaic park** for a total of **7.8 MW**[166] (total capacity, including the plants owned by the investee company and not consolidated on a line-by-line basis, is **100.6 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 (renewable source) varying between 40% and 50%. The total gross electrical power currently available is approximately **58 MWe**.
In addition, the Environment Segment produces electricity using **biogas** derived from the anaerobic digestion process at the Orvieto Technology Hub, the sites managed by Deco and the 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[167] for the combined production of **electricity**, **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 **1.9 MW**, located in areas across the Lazio region.

Table no. 51 – 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 **9.4 MW**	Tor di Valle power station: high-efficiency cogeneration (CAR) section (*) (Rome) methane fuel - gross power **28.5 MW**
G. Ferraris di Mandela (Rome) power station gross power **8.5 MW**	Montemartini power station (Rome) diesel fuel - gross power **78.3 MW**
Salisano power plant (Rieti) gross power **24.6 MW**	
G. Marconi di Orte power plant (Viterbo) gross power **20.0 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 229 MW	

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

164 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.

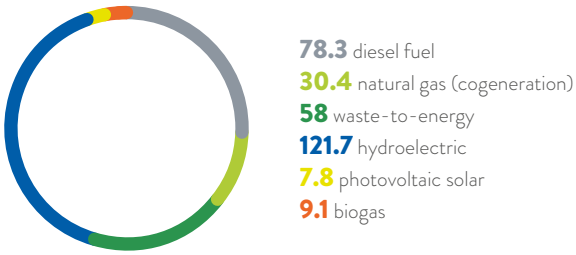
165 The power station is operational only in the event of extraordinary energy demand, and operation can also be managed remotely from the control room at the Tor di Valle Power Station.

166 Output of the Acea Produzione, Acea Solar, Acea Renewable and SF Island plants.

167 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.

Installed capacity, which totals[168] **around 305 MW** (398 MW including the Investee company not consolidated on a line-by-line basis), is represented in Chart no. 50, broken down by energy source.

Chart no. 50 – Installed power of Companies included in the NFS divided by energy source (MW) (2022)



ELECTRICITY PRODUCED

In 2022, **total gross electricity production fell by 17%**, from 1,016 GWh in 2021[169] to **842 GWh in 2022** (941 GWh, including energy produced by the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis).
The reduction is mainly due to the **lower rainfall** in the year, which impacted hydroelectric energy production (down 23%). **Biogas production increased by 16%**, partly due to the inclusion in the reporting scope of Deco (without this, the increase would have been 7%). For further details, see the *Environmental Accounts*.

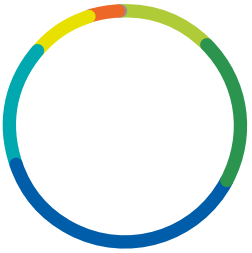
Electricity generated from renewable sources, amounting to approximately **538 GWh (636 GWh** including the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis) represents the **majority** at **around 64%**[170], with the following contributions:

- 335.3 GWh from hydroelectric power,
- 152.6 GWh from waste-to-energy,
- 36.3 GWh from biogas (Orvieto, Deco[171], Aprilia and Monterotondo Marittimo waste management plants)
- 13.5 GWh from photovoltaic plants[172] (111.9 GWh including the plants of the subsidiary not consolidated on a line-by-line basis), see Chart no. 51 and Table no. 52.

After the completion of **upgrading and energy efficiency measures in 2022**, the **revamping of the Sant'Angelo power plant** was completed, with the goal of optimising the use of available water resources, with the same specifications in terms of installed power and authorised by concession.

A significant portion of the energy **from waste-to-energy production**, as already noted, is associated with the combustion of the **biodegradable fraction of waste** used as a primary source. In particular, the **renewable share of the fuel** (SRF) of the **San Vittore del Lazio plant** was **46.8%** of the total of waste-to-energy in 2022, while at the **Terni plant** this share was **40.8%**.

Chart no. 51 – Electricity produced subdivided by primary energy source (TJ) (2022)



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

Table no. 52 – Electricity produced (by primary energy source) (2020-2022)

primary energy source	2020	2021	2022
	TJ (GWh) (*)		
ELECTRICITY PRODUCED (FOR PRIMARY ENERGY SOURCE)			
diesel fuel	5.4 (1.5)	5.9 (1.6)	7.9 (2.2)
natural gas (co-generation)	362.5 (100.7)	406.1 (112.8)	425.1 (118.1)
waste-to-energy (approximately 55% of the total in 2022)	716.8 (199.1)	730.4 (202.9)	664.2 (185.5)
total thermoelectric	**1,048.6 (291.3)**	**1,142.4 (317.3)**	**1,097.2 (304.8)**
hydroelectric	1,354.7 (376.3)	1,564.9 (434.7)	1,207.1 (335.3)
waste-to-energy (approximately 45% of the total in 2022)	529.3 (147.0)	552.7 (153.5)	549.3 (152.6)
biogas	96.9 (26.9)	113.0 (31.4)	130.7 (36.3)
photovoltaic solar (**)	269.9 (75.0)	283.0 (78.6)	48.6 (13.5) (***)
total renewables	**2,250.7 (625.2)**	**2,513.6 (698.2)**	**1,935.8 (537.7) (***)**
general total	**3,299.3 (916.5)**	**3,656.0 (1,015.6)**	**3,032.9 (842.5) (***)**

(*) 1 GWh = 3.6 TJ.
(**) Photovoltaic energy includes the production at the plants located on sites of the water area (Acea Ato 2 and Acea Ato 5) and in Orvieto, for a total of 1.7 GWh produced. Natural gas includes production by Ecogena.
(***) Including the data from the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis, the 2022 data would be solar photovoltaic 402.8 TJ (111.9 GWh), total renewables 2,290.0 TJ (636.1 GWh), overall total 3,387.1 TJ (940.9 GWh).

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

169 The data for Ecogena, previously reported separately, is now included in the 2021 data.

170 68% if including the photovoltaic plants of the subsidiary not consolidated on a line-by-line basis.

171 The Deco plants, which joined Acea Ambiente in 2022, produced 2.7 GWh.

172 This does not include the energy produced by two photovoltaic plants operated by AdF and the Terni waste-to-energy plant, which produced 12.8 and 454.3 MWh respectively, mainly for self-consumption.

THERMAL ENERGY PRODUCED

Total thermal energy produced in 2022 was **105.3 GWh**.
The **Tor di Valle** thermoelectric power plant generated **87.7 GWh of thermal energy**.
The heat generated was used to serve 40,794 residents in the area south of Rome (Mostacciano, Torrino and Mezzocammino) by means of a district-heating network which provides a volume equal to 3,668,967 cubic metres.
This thermal energy is supplemented by the **17.6 GWh** produced by the Ecogena plants in 2022.
For production data for the three-year period for Acea Produzione and Ecogena, see Products in the Energy section of the Environmental Report.

ENERGY DISTRIBUTION

THE DISTRIBUTION NETWORKS

management of the distribution grids in Rome and Formello: approximately
32,200 km

approximately
10,000 GWh
of electricity demand (Areti)

improves territorial protection (underground HV network/total HV network):
49.3% (47% in 2021)

Areti manages the **electricity distribution network** of Rome and Formello, covering **approximately 32,200 km** and capable of supplying over **2.8 million residents**. In terms of volumes of electricity distributed, about 9,400 GWh in 2022, Acea is the third largest Italian operator in the sector.
Table no. 53 presents the principal plant data of the Company, including the number of primary and secondary substations, the transformers[173] and the km of overhead and underground distribution lines.
The environmental indicator related to **protecting the land**, 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), **improved** thanks to the continuing transformation and modernisation of the high and extra-high-voltage electricity distribution grid, and stood at 49.3% in 2022 (47% in 2021).

Table no. 53 – Number of plants and overhead and underground distribution lines (2020-2022)

Areti				
systems and output				
	u. m.	**2020**	**2021**	**2022**
High-Voltage/High-Voltage – HighVoltage/Medium-Voltage primary substations	no.	70	70	70
High-Voltage/High-Voltage and High-Voltage/Medium-Voltage transformers	no.	171	170	169
transformation power	MVA	7,881	7,921	7,757
substations in use	no.	13,292	13,309	13,347
Medium Voltage/Medium Voltage - Medium Voltage/Low Voltage transformers	no.	12,897	12,893	12,914
transformation power	MVA	6,298	6,313	6,347
overhead and underground networks				
high voltage network – overhead lines	km	282	275	247
high voltage network – underground lines	km	243	244	240
medium voltage network – overhead lines	km	421	420	420
medium voltage network – underground lines	km	10,211	10,269	10,357
low voltage network – overhead lines	km	1,642	1,642	1,595
low voltage network – underground lines	km	18,511	18,829	19,396

173 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 2022, 114 transformers with PCBs above 50 ppm but below the threshold of 500 ppm, with 41 reported to ARPA, with a PCB quantity of 6,398 ppm and a weight of approximately 46 tonnes, all of which were recovered.

The activities defined in the **Plan to modernise the high-voltage (150 kV) electricity distribution network**[174], 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:

- works continued to dismantle decommissioned HV lines, with removal of a total of 49 pylons for 150-kV and 60-kV lines;
- 5.4 km of 60 kV high-voltage lines in EPR underground cable (Castel Romano HV lines 1 and 2 leaving PS Laurentina towards Via Gadda terminal area) were decommissioned;
- the new 150 kV Selvotta - Castel Romana line (comprising a 5.8 km overhead section with 24 pylons and a 2 km underground section) was completed and entered into operation;
- works to modernise the existing 150 kV Capannelle - Cinecittà/O HV line began (laying of 1.6 km of new HV cable and subsequent removal of two sets of three HV cables extending for 2.7 km).

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 2022, **grid losses** amounted to **6.5% of total issued power**, in line with the previous year (6.0%). 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 launched by Areti, such as PlatOne, G.I.M.M.I.** and **Be Flexible**, are particularly significant. The PlatOne project also involves Acea Energy and aims to effectively manage the expected increase in distribution network loads by actively involving customers. The G.I.M.M.I. project focuses on developing a system that improves grid monitoring and maintenance.

The third project, launched in September 2022, tests the use of flexibility services, as well as synergies between the electricity system and other sectors, to promote network stability and security. For more details, see the section "The Commitment to Research and Innovation" in the *Institutions and the Company* chapter.

ENVIRONMENT SEGMENT

SCOPE

The chapter refers to Acea Elabori for the Smart Comp project. The activities of the waste treatment hubs, waste-to-energy plants and composting plants, all within Acea Ambiente, and the activities of Aquaser, Acque Industriali and the Bio Ecologia plant (the latter within Acea Ambiente), the companies Berg and Demap and, as of 2022, the company Deco[175].

36,976 t of quality compost produced:
+31%
compared to 2021

36 GWh of energy produced from approx.
20,207 kNm³
of biogas

waste-to-energy:
387,346 t
of waste input and approximately
93,820 t of waste output:
24% (output/input)

Awards
EMAS 2022
in the Circular Economy category awarded jointly to Acea Ambiente and Berg for the **reuse of ash** and to Acea Ambiente (Orvieto) for the use of **compost as fertiliser**

Acea has continued to expand its capabilities in management of the final part of the waste cycle, **for optimised recovery, recycling and reuse** and, where possible, **recovery of energy**. The Group manages the following activities: 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 that recovers the energy portion of the waste** and reduces the landfill required for disposal, and the **production of high quality compost** for agricultural use.

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

175 Deco also manages other plants that have merged directly into the company Acea Ambiente. For more details see the section *Integrated Waste Treatment - Orvieto hub and Deco sites*.

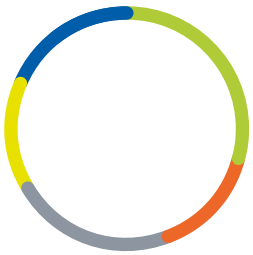
The management of solid and liquid waste is performed at plants using advanced technology and in recent years, in order to improve and renew processes and increase recovery of materials and/or energy, some of them have been upgraded or expanded.
The Companies that operate in that area **conduct research**, also in collaboration and partnerships with university institutions and companies operating in the circular economy field. Included in this context is the Acea Smart Comp local composting activity carried out by Acea Elabori.
The **Acea Smart Comp project** continued in 2022 with the support from the University of Tuscia and Enea. Going beyond the logic of waste transition, since 2020, the project has proposed a new organic waste management model that shifts management in large plants to **decentralised waste management**. This project, which has enabled the Company to become organic waste free and patent the control system for electric composters, involved several different companies. In fact, the technology adopted involved areas such as wireless sensor technology, involving partnerships with start-ups such as Nature 4.0, air filtration with photocatalysis, automated bin rotation, with an integrated waste weighing system, predictive maintenance, which involves hardware that can be installed on Smart Comp systems to interface with an IoT platform, and optical waste recognition, which involved a partnership with Keybiz to define the algorithms and process the video streams. The project also involves the strategic introduction of the solution into the **new concept of circular communities and smart apartment buildings**. In this regard, pilot projects were launched on different types of potential circular communities, or community aggregators, such as barracks, parishes, district markets and universities.

During the Ecomondo event, Acea Ambiente presented various plastic recycling initiatives, including the innovation plant currently being constructed in Cittaducale designed to **sort and recover plastic waste** from separated urban waste collection (for more details see the "Ecomondo" box in the Environmental Sustainability and the Main Challenges chapter).
The following paragraphs provide further details of operational aspects of activities in the circular-economy field.

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

Chart no. 52 illustrates the types of processing and recovery of materials or energy for the Environment Segment.

Chart no. 52 – Incoming volumes of waste managed by type of plant/activity (t) (2022)



387,346 waste-to-energy (pulper and SRF)
194,858 compost (including Orvieto)
295,554 waste entering the Orvieto hub (landfill)
198,273 intermediation and selection
241,634 liquid waste and leachate

WASTE-TO-ENERGY

In addition to the activities already 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*). Adopting **circular economy logic**, once all possible material has been recovered, energy recovery generates energy and economic benefits and leads to a **notable volumetric reduction** — in 2022 the volume of waste leaving the waste system was 24% of the waste-to-energy volume — and the **biological stabilisation of waste**, minimising disposal in landfills.
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[176]. 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 15.1 MW_e for each of the other two lines, for a total power of approximately 44 MW_e;
- approximately 400,000 t/year of SRF, sludge and other waste at full treatment capacity.

In October 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 2022 **289,550 tonnes of waste** were processed by the waste-to-energy plants and approximately **251 GWh** of electricity was generated, a drop compared to 2021 production (-6%).

Table no. 54 – San Vittore del Lazio waste-to-energy plant: operating data (2020-2022)

	u. m.	2020	2021	2022
incinerated fuel	t	319,122	307,391	289,550
gross electricity produced	GWh	269.38	267.74	251.26
conversion efficiency (*)	kWh/kg SRF	0.84	0.87	0.87

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

The Terni plant is composed of **a waste-to-energy line** and has 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.

The waste-to-energy plant is **also equipped with photovoltaic systems**, the primary system on the pulper waste pre-treatment area and a secondary system on the adjacent building, which in 2022 generated approximately 454 MWh of electricity, with around 61% consumed on site and the remainder sold to the grid, in line with previous years.

176 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.

In 2022 **97,796 tonnes of pulper waste** were processed by the waste-to-energy plant and approximately **86 GWh** of electricity was generated, a slight decrease compared to 2021 figures.
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. 55 – Terni waste-to-energy plant: operating data (2020-2022)

	u. m.	2020	2021	2022
waste-to-energy paper mill pulper	t	90,215	99,730	97,796
gross energy produced	GWh	76.77	88.67	85.81
conversion efficiency (*)	kWh/kg pulper waste	0.85	0.89	0.88

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

In 2022, a waste **research facility** was opened within the Berg plant in San Vittore del Lazio to study the re-use of **fly and bottom ash**. For this project, Acea Ambiente and Berg received an EMAS award in the Best Circular Economy Initiative category[177].
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 the Company chapter.

INTEGRATED WASTE TREATMENT

Acea Ambiente manages major waste management facilities in the Umbria and Abruzzo regions. In particular, **in Orvieto**, in Umbria, it manages an important **systems hub for waste treatment, recovery and disposal**, 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 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. Management takes 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**.
There are **beehives** at the hub which are used to biomonitor the environment by sampling wax, honey and bee matrices and to plan public educational events aimed at local communities.

Total waste entering the plant in 2022 was **97,661 tonnes**, of which 71% (approximately 69,500 tonnes) was sent to landfill and almost all of the remainder was 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).
At the same site, there are **two energy production plants** powered respectively by the **biogas** produced by the anaerobic section of the treatment plant and by the biogas produced naturally by the landfill site. 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 **1.7 Mm³ of biogas** and **3.2 GWh of energy** were produced at the treatment plant **in 2022**;
- approximately **6.7 Mm³ of biogas** and **9.5 GWh of energy** were produced at the **landfill site**.

In total, approximately 12 GWh of electricity was fed into the grid (for more information see the Environmental Accounts).
The Orvieto hub is also equipped with a **photovoltaic plant** owed by Acea Produzione, which, in 2022, generated around 515 MWh, of which 99.8% was used for self-consumption on site.

The company **Deco** operates in Abruzzo, where it is responsible for managing its own plants[178] and plants owned by Acea Ambiente (such as the Grasciano hub[179]). In particular,

- a **landfill** for non-hazardous waste in **Casoni** (Chieti), divided into four sites with a total capacity of over 900,000 cubic metres, which is nearly full;
- 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 2022, Deco's waste processing plants produced **4,180,996 Nm³ of biogas and 2,656 MWh of electricity**.
Deco also operates a **Mechanical Biological Treatment (MBT)** plant for Municipal Solid Waste (MSW) in Casoni (Chieti). The facility, which recovers materials and SRF, processed **241,642 t of waste** in 2022 (see box).

177 *https://www.isprambiente.gov.it/it/attivita/certificazioni/files/emas/newsletter/2022/newsletter-emas-n3-2022.pdf*.

178 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, in the Province of Chieti, 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.

179 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).

DECO'S MBT PLANT

In view of the European regulations implemented in Italy by Legislative Decree 152/06, Deco has developed an innovative technology for the energy recovery of mixed municipal waste, with the consequent construction of a Mechanical Biological Treatment (MBT) plant, located in Casoni (Chieti), which has an authorised waste capacity of 270,000 t/year and is **one of the largest and most technologically advanced plants in Europe**.
The plant processing procedure includes a Reception and Primary Mechanical Treatment phase, a Biological Treatment phase and a Final Mechanical Treatment (refining) phase. Each phase takes place in separate rooms equipped with exhaust air and dust extraction and purification systems (biofilters, bag filters, etc.).
Thanks to the technology used, **less than 35% of the waste that enters the plant is sent to landfill**. Biostabilised waste is converted into **Solid Recovered Fuel (SRF)** and is used to power facilities such as waste-to-energy plants and cement plants.
In 2022, 241,642 t of municipal waste was processed, including **4,121 t recovered ferrous and non-ferrous metals and 96,093 t of SFR**. Around 58% of the SRF produced was used in cement plants outside Italy instead of conventional fossil fuels, while 42% was used in waste-to-energy plants in Italy to produce electricity.
The facility also has a photovoltaic system on the roof that produced 1,059 MWh in 2022, of which 943 (or 89%) was self-consumed on site by the MBT plant and the remainder was fed into the grid.

HIGH-QUALITY COMPOST PRODUCTION

Experimentation is currently underway with the University of Tuscia on high-quality compost produced by the Orvieto plant hub, totalling **approximately 3,412 tonnes in 2022**, for use as agricultural fertiliser, applying the direct product and sowing wheat crops on land at the plant itself (see the dedicated box).
As well as the site in Orvieto, Acea Ambiente has **two other composting plants** — one in **Aprilia** and one in **Monterotondo Marittimo** — while at the composting plant in Sabaudia waste delivery was suspended from 31 October 2019 to allow extraordinary maintenance works to be carried out[180].

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. In the first quarter of 2022, the compost bagging line entered into operation, with the aim of accessing additional markets for the soil improver and activating SRF production line using waste from the same plant. This new line enables waste to be delivered to the San Vittore del Lazio plant and contributes to an increasingly circular economy.
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 Segment* chapter and the *Environmental Accounts*.

THE USE OF COMPOST IN AGRICULTURE

At the Orvieto hub, a study is currently being conducted with the University of Tuscia to expand knowledge on the agricultural use of compost to explore responsible production and consumption practices. The land adjacent to the plant has been cultivated using compost produced at the plant and a study is being launched to analyse the toxicological and ethological effects of compost on the Folsomia candida springtail, a small invertebrate used as a bio-indicator.
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. In 2022, Acea Ambiente won one of the EMAS awards in the Best Circular Economy Initiative category for its project on how compost can be used as a fertiliser in a sustainable and circular agricultural system.

INTERMEDIATION AND TRANSPORT OF WASTE

In 2022, Aquaser**, which loads, transports, recovers and disposes of waste produced by treatment plants**, managed **400,000 tonnes of waste** (390,000 tonnes in 2021). With regard to **intermediation**, during the year Aquaser took charge of **approximately 166,000 tonnes of waste**, of which **137,000 tonnes of sludge** is attributable to the **Group's water companies**[181], and in particular approximately **80,500 tonnes to Acea Ato 2, Acquedotto del Fiora and Acea Ato 5**. The dried and dewatered sludge coming from the three Companies was sent to the following end destinations:

- 61% to material recovery operations (pretreatments aimed at agricultural use and composting);
- 13% to recovery of energy (waste-to-energy);
- 26% for disposal.

Also this year, due to regulatory constraints direct spreading was not used in agriculture.
Aquaser in particular **used its own means** to transport approximately **42,000 tonnes of non-hazardous waste**.

180 The liquid waste treatment facility at Sabaudia is currently inactive and studies, analyses and technical and economic assessments are currently underway to identify possible new industrial uses for the site.

181 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, Acquedotto del Fiora, Umbra Acque, Publiacqua, Acque and Acea Molise.

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. In 2022, approximately **25,400 tonnes of material** entered the plant and was processed for separation and recovery.
Meanwhile, almost **6,900 tonnes** of waste was processed by **Berg**, although, as detailed below, the company's main business area is the storage and treatment of hazardous and non-hazardous liquid waste (for more details, see the Environmental Accounts).

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 2022, due to the closure of the Pisa Nord and Pontedera sites, the amount of waste processed fell to around 50,000 tonnes of liquid waste, down 46% compared to 2021[182]. In addition, the Company provided brokerage services for approximately 37,000 tonnes of waste during the year (-31% compared to 2021).
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 **recovery of ammonium sulphate**, which can be used as an agricultural conditioner, of which **139,040 kg** were produced in 2022. The Company also provides services for 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, investing in research and development in the relevant sectors, in collaboration with recognised Research Bodies. For details of the type of incoming waste, the resources used, the waste produced and other specific information, see the **Environmental Accounts**.

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 2022 **approximately 93,700 tonnes of waste, both solid and liquid,** were processed and brokerage services were provided for a further 6,900 tonnes of waste.
The **Bio Ecologia**[183] plant in Chiusi handles the chemical/physical and biological treatment of **non-hazardous liquid waste**[184] **and treatment of sewage**. In 2022 approximately **98,000 tonnes of liquid waste** and approximately 82,000 m^3 of wastewater were processed.

WATER SEGMENT

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 companies data sheets and overseas activities*.

6% reduction in total lost water resources by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa compared to 2021

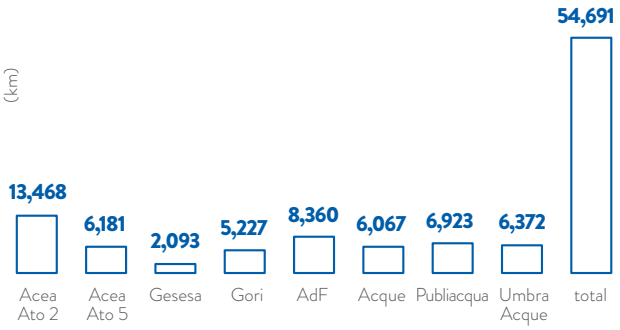
approximately **35,330 km of drinking-water network** managed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa

739,369 analytical tests on drinking water (Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa)

182 As well as the two platform closures, the platform at Poggibonnsi suspended its activities in June 2021 pending the re-issue of the standard operation permit.
183 (*) On 1 May 2021, Bio Ecologia Srl was merged by incorporation into Acea Ambiente.
184 The quantities of liquid waste authorised for treatment (excluding wastewater) have a maximum limit of 99,900 tonnes/year.

The Acea Group is a leader in Italy in terms of number of citizens served and one of the primary operators in the water sector. Activities regarding **water resource management** in all phases of the **integrated water service** are performed with the aim of preserving water and natural ecosystems from springs to surface bodies where water returns into the environment. Safeguarding of water resources is also expressed through **recovering leaks** (see the section *Attention to the use of water resources*), the **circular economy**, activities to combat **climate change**, **protection 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 end goal of reducing consumption.
The total pool of users served in Italy **by the Group**[185] is about 8.6 million residents, with **volumes of drinking water fed into the network** in 2022 equal to 1,285 million cubic metres. The distribution networks of the main Group Companies operating within the integrated water service stretches approximately 54,700 km (see Chart no. 53).

Chart no. 53 – The water distribution network of the main Group Companies in Italy (2022)



NOTE: the kilometres of network include the aqueducts.

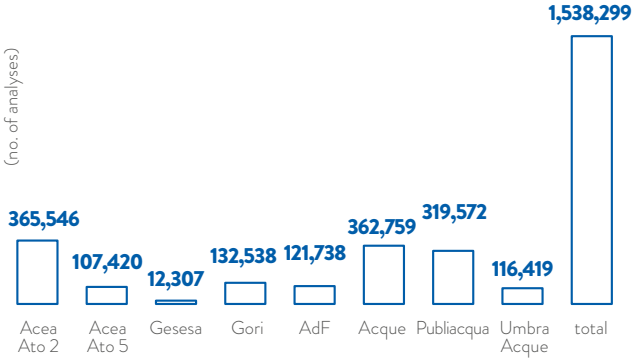
The **volume of drinking water drawn and fed into the grid by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa** in 2022 was approximately **1,010 million cubic metres**, with a total delivery[186] of 474 million cubic metres to more than **6.1 million citizens**. The specific data on the three Companies, are provided in the *Environmental Accounts*.
99.9% of the volumes drawn are fresh water, with the remainder, less than 1 million m^3 being seawater and drawn in Tuscany by AdF. The sources are located in areas at potential risk of water stress, as defined by the map of the Aqueduct Water Risk Atlas, drawn up by the World Resources Institute (WRI)[187] that illustrates the water availability of the different countries, taking into consideration risks caused by climate change, including extreme weather events such as drought and flooding.

The Companies within the Water Area in the water segment implement various initiatives to mitigate the impacts associated with these risks, including **Water Safety Plans** (see the section "Water Safety Plans - WSPs"), actions to **minimise leaks** on distribution networks and investments to secure water supplies.
In **OTA 2 - Lazio Centrale**, which includes Rome and 112 other municipalities[188], as at 31 December 2022 Acea Ato 2 managed the entire integrated water service[189] for 89[190] municipalities, thanks to the completion of the acquisition in 2022 of the management contracts for Agosta, Anguillara Sabazia, Anticoli Corrado, Campagnano di Roma, Civitella San Paolo, Marano Equo, Roviano, Sant'Angelo Romano and Trevi nel Lazio. The **volume of water drawn and issued from and to the network**, serving approximately 4 million citizens, was approximately **663 million cubic metres**[191].

WATER QUALITY

Water quality is monitored by all the companies in the operating segment (see Chart no. 54). The **analytical checks**, in addition to those performed by the Local Water Authorities, are performed on a scheduled, ongoing basis and regard drinking water issued to users, essential due to the **associated health effects**, and water returned to the environment following treatment, both of which are **crucial to the environmental quality of the region**. Compliance with drinking water analyses for all companies in the NFS reporting boundary is between 97% and 100%.

Chart no. 54 – Analytical checks on drinking water, total and by Company (2022)



In **Rome**, the qualitative characteristics of the water 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.

185 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.

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

187 For identification of areas under water stress, as indicated by the Standard GRI 303, the Aqueduct Water Risk Atlas was employed, available on the World Resource Institute website: *https://www.wri.org/aqueduct*.

188 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.

189 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.

190 In 17 other municipalities the integrated water service was managed partially.

191 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 2022 for the macro-indicator M1 pursuant to ARERA Resolution 917/2017/R/idr. See also the *Environmental Accounts*.

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, 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 the distribution network of the water system allows a high quality and safety level to be achieved.
Overall, in 2022, **365,546 analyses were conducted in the area managed by OTA 2,** for a total of 11,966 drinking-water samples. In addition to the analyses conducted to **check water quality**, performed by Acea Ato 2, with the support of Acea Elabori, analyses were performed by Acea Elabori for **study and research purposes** aimed at continuous improvement of monitoring of the drinking-water system.
Acea Elabori, **accredited pursuant to the ISO/IEC 17025 standard**, performs and certifies chemical and microbiological analyses in different substrates, including water (see Table no. 56 for the analyses performed on Rome drinking water). **AdF**, which outsources analyses to Publiacqua SpA, took 4,514 samples, 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, in March 2022, the Company **opened its own laboratory**.

Table no. 56 – Analyses in Rome (2020-2022) and main quality parameters of the drinking water distributed in Lazio, in Campania and in Tuscany (2022)

ANALYSES PERFORMED BY ACEA ELABORI ON DRINKING WATER – ROME HISTORICAL NETWORK (2020-2022)							
withdrawal area	no. withdrawal points	no. samples			no. analyses		
	2022	2020	2021	2022	2020	2021	2022
collection	46	227	344	307	13,579	15,267	15,180
water system and water feed pipes	15	135	104	116	4,950	3,997	4,736
tanks/water centres	18	85	198	135	3,048	7441	5,321
distribution networks	406	3,619	3,379	3,102	120,372	107,709	101,580
total	**485**	**4,066**	**4,025**	**3,660**	**141,949**	**134,414**	**126,817**

MAIN AVERAGE CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS OF THE DRINKING WATER DISTRIBUTED IN LAZIO, IN CAMPANIA AND IN TUSCANY (2022)							
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. 31/01
chlorides	mg/l Cl	10.3	6.4	47	16.0	25.0	<250
sulphates	mg/l SO_4	15.1	8.1	26	16.7	41.0	<250
calcium	mg/l Ca	85.3	80.8	115	exempt (*)	60.0	not applicable
magnesium	mg/l Mg	16.8	15.4	28	exempt (*)	10.5	not applicable
sodium	mg/l Na	9.6	4.5	32	15.7	15.0	<200
potassium	mg/l K	7.7	1.7	15	exempt (*)	2.3	not applicable
calculated fixed residue	mg/l	377.1	316.0	569	341.8	297.0	(**)
nitrates	mg/l NO_3	5.9	4.0	19	12.3	4.0	<50
fluorides	mg/l F	0.27	0.12	0.53	0.2	0.2	<1.50
bicarbonates	mg/l HCO_3	354.7	349.8	463	exempt (*)	233.0	not applicable

(*) In accordance with Legislative Decree no. 31/01 and in agreement with the health authority, Gesesa is exempted from supplying the parameter.
(**) maximum value recommended: 1,500 mg/l.

In 2022, **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. 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. The project has been submitted to the Municipality of Benevento, the implementing entity.
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**, Acea Ato 2 has implemented 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.)**

WATER SAFETY PLANS (WSPs)

Use of the Water Safety Plans (WSPs)[192] enables **prevention and reduction of the risks inherent in the drinking water service**, 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, and **risk mitigation actions**, **monitoring systems**, **operating procedures** under normal and emergency conditions, the **water quality control** plan, and the methods for **informing the public and the competent authorities** are defined.

Acea Ato 2 began implementation of the WSPs four years ago 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)[193]. The Company **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. Acea Ato 2 began implementing the WSPs for the water supply and distribution systems starting with the municipality of Guidonia Montecelio, with the documentation submitted to the Ministry in January 2022. In October 2022, the company also completed and submitted the WSPs for the municipalities of Albano Laziale, Manziana, and Marcellina and began preparing the Sanitation Safety Plan (SSP) for the Co.BIS treatment plant. Overall, implementation of the WSPs in Acea Ato 2 will involve 100% of the population served by aqueduct systems and from sources managed locally.

In 2022, **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. In particular, AdF developed the WSPs of the water systems supplied solely by the Fiora and Arbure springs, for a total of **39 WSZs** (Water Supply Zones), corresponding to a resident population of **28,197** inhabitants, or **12.3% of the total**. In 2022, AdF also **systematised the WSP implementation methodology** by creating a specific application with a **user interface** to enable easier consultation, developed with the open source software Grafana. Data were entered into the database and queries and functions were developed to enable the automatic calculation of the risks for each plant/network, for each hazard event and for each type of hazard in current and hypothetical scenarios, assessing, for example, the implementation of management measures on the key risks identified. With this system, it will be possible to archive all calculation data, 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 timeline.

Having successfully created, in the 2020-2021 two-year period, a cloud platform for sharing — including with the relevant authorities — data important to the process of implementing and approving WSPs, the description of aqueduct systems, requests to local health authorities to identify risk officers, control measures and the relative effectiveness, in 2022, **Gori** began to draft the operating instructions and procedures for managing documents and accessing the cloud, as well as the **risk management operating instructions manual**.

In 2022, **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. Finally, in 2022, **Acea Ato 5** chose the Agani Tufano spring as the site for the first WSP.

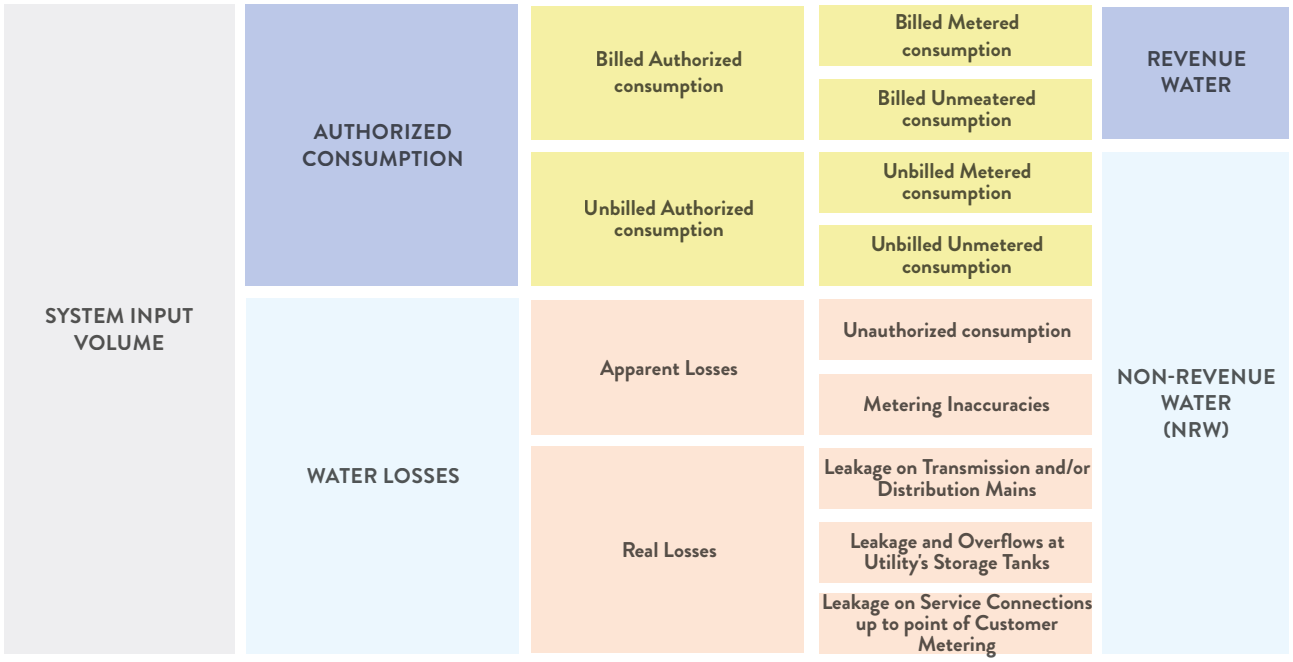
WATER LOSSES

Sustainable management of water also requires **minimising losses on distribution networks**, with all operational Group Companies in the water area involved. Each year, **intensive activity is carried out to identify leaks**, quantified as described in Chart no. 55, with the aim of recovering the greatest possible quantity of water. The process of **dividing the network into water districts** is used to optimise operating pressures, reducing losses, with activities focused 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.

192 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.

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

Chart no. 55 – Water loss accounting model



NOTE: the image refers to the model of the International Water Association.

Overall, **Acea Ato 2** has created **729 measurement districts** for over **13,460 km of** georeferenced **distribution 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 GIS systems. In addition, 2022 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 4.2% compared to 2021 (a reduction of about 17% compared to 2019[194]).

At **Acea Ato 2**, thanks to actions to improve service efficiency, overall losses fell to around 38.9%[195] in 2022 (39.9% in 2021) and total leaks across the Rome network also **fell to 27.8%** (28.6% in 2021). Data and reductions in losses for 2020-2021 are presented in the Environmental Accounts and for 2019 in the 2020-2024 Sustainability Plan in The Corporate Identity chapter.

In 2022, **Acea Ato 5** completed district planning for the networks of **nine new municipalities** and improved efficiency in previously established districts to balance network operation and optimise the distribution service. The Company has created **100 new districts** covering **856 km of network**. Active control of pressures has continued, with the installation of meters, reducers and flow-control valves at strategic points (**39 hydro valves** installed during the year), with the goal of improving management of flows into the zones managed and reducing differences between daytime and nighttime pressure levels. *Thanks to the measures implemented,* **leakage volumes** decreased from 77.1 million m^3 in 2021 to **70.7 million m^3 in 2022**, reducing the total amount of water entered into the system from 115.8 million m^3 to 109.8 million m^3, **an immediate savings of approximately 6 million m^3**. Losses fell in 2022 to 64.4% (66.5% in 2021), as shown in the Environmental Accounts.

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 2,500 km of the distribution network during the year. A further 430 km of network was monitored during the **district planning process**. Particular attention was paid to municipalities with higher water losses, such as Grosseto, where the action taken has enabled a reduction in the minimum night flow rate of about 60 l/s compared to 2021. The measures carried out led to **reductions in water losses** from 23.7 million m^3 in 2021 to **21.9 million m^3** in 2022, decreasing water losses to 37.2% in 2022 (39% in 2021). In 2022, AdF also defined a network monitoring project which involves updating the Waidy Management System with a threshold alarm system in over 600 districts.

During the year in question, **Gori** continued a structured course of action to optimise the water network in the municipalities of Nola, Angri, Nocera Inferiore, Castellammare di Stabia, Gragnano and Torre Annunziata. The actions taken were divided into distinct phases: integrative survey, district planning, modelling, and execution of pressure control and leak detection measures. The execution phase of the district planning works and the replacement of the most critical damaged pipelines was proposed to the Italian Ministry of Infrastructures and Sustainable Mobility in response to the call for "Expressions of Interest on the formulation of Project Proposals under

194 See also the 2020-2024 Group Sustainability Plan.

195 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.

Axis IV" (React - EU)[196]. In the other municipalities in the Water District Zone, Gori conducted conventional leak detection controls systematically (at Angri, Nola, Castellammare Di Stabia, Sarno, Nocera Inferiore, Sorrento and Torre del Greco) and in response to faults across the entire managed area, with such actions taken on 1,528 km of the water network in 2022. In addition, it installed 8 pressure regulation valves and carried out reclamation works on approximately 14 km of water network, distributed across almost all OTA 3 municipalities. The combined action of these strategies enabled a recovery of water resources estimated at approximately **274 l/s over the entire Water District Zone**. After the measures taken, total losses fell from 49.6% in 2021 to 47.1% in 2022.
At **Gesesa**, in 2022, a **Recovery Plan** was implemented for the water resources in the city of Benevento and other managed municipalities, which involves the replacement of damaged pipes, implementation of remote control technology, application of a system to reduce water leaks and reduction of operating pressures on the network. Losses for the year were 55.9% of total water fed into the aqueduct system (57.8% in 2021), **reducing lost volumes** from 11.2 million m^3 in 2021 to **10 million m^3 in 2022**. Actions will continue in 2023, involving all the Municipalities.
Overall, thanks to the actions taken by the company, **losses fell by 6%** in the year, from 465.7 mm^3 in 2021 to 436.7 mm^3. When compared to 2020 data (507.5 mm^3), this reduction was 14%.
See the *Environmental Accounts* for details on individual water balances.

SEWERAGE SERVICE AND TREATMENT SYSTEM

13,225 km of sewerage network and **489 treatment plants** managed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa, for **759 Mm^3** of water treated

approximately **160,293 t of sludge produced** by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa, of which **66% recovered** (in line with 2021)

Once it has been used for various civil purposes, water is **collected through the sewer system** and **sent to the wastewater treatment plants**. The treatment process enables the **removal of 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 **860 treatment plants** (of which **489** managed by Acea Ato 2, Acea Ato 5, AdF, Gori and Gesesa), the total volumes of water processed by the Group main companies[197] in 2022, were **940 Mm^3**, of which **759 Mm^3** by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa[198]. The total number of treatment plants has decreased, from 895 plants in 2019 to 860 in 2022, on the basis of the **project for centralisation of treatment of wastewater** in order to streamline the service, which involves the main Companies (see infobox for more details 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 57 and 58. The sewerage networks managed in 2022 total **22,004 km**, of which **13,225 km** relate to the five Companies listed.

Table no. 57 – Volumes of wastewater treated by Water Companies operating in Lazio, in Campania and in Tuscany (2020-2022) (Mm^3)

company	2020	2021	2022	destination
Acea Ato 2	596.9	601.5	589.5	99.7% returned to the environment (river/channel), sea (0.2%) and soil (0.1%).
Acea Ato 5	21.2	25.0	24.8	surface water body (river)
Gori	70.1	124.0	117.5	surface water body and sea (in sea, in 2022, 24%, equal to approximately 28 million cubic metres[199])
AdF	23.3	25.9	25.6	surface water body and sea (0.9% in sea)
Gesesa (*)	2.2	2.3	1.8	surface water body (river)

(*) Since 2020, Gesesa began installing flow meters at the entry to treatment plants. Estimated data.

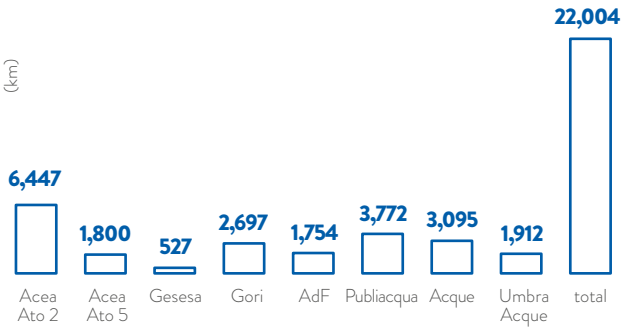
196 Gori was awarded a €50 million grant. The contracted works funded by the grant were delivered on 9 September 2022.

197 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.

198 Gesesa started installing the first flow meters on certain plants in 2020 and estimating the quantities of wastewater treated; this activity continued in 2022 as well.

199 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.

Chart no. 56 – Sewer networks of the main Group Companies in Italy (2022)



NOTE: The kilometres in the chart refer to georeferenced data.

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**. Only 0.2% of the water treated by Acea Ato 2, 0.9% of the water treated by AdF and 24% of the water treated by Gori is discharged into the sea, representing approximately 4% of total water treated[200]. The portion of water discharged into the sea travels through underwater pipes, following treatment at the coastal treatment plants of 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 discharge are presented in Table no. 59.

Table no. 58 – Percentage coverage of the sewer and purification services for total user accounts of the Water Companies in the NFS (2020-2022)

company	2020		2021		2022	
	sewer	purification	sewer	purification	sewer	purification
Acea Ato 2 (*)	91.7%	88.4%	91.5%	88.1%	91.6%	88.4%
Acea Ato 5	66.8%	57.3%	67.1%	57.7%	69.6%	60.7%
Gori	84.0%	70.4%	86.7%	76.1%	87.5%	77.6%
Gesesa	80.6%	33.9%	80.6%	34.8%	82.9%	34.6%
AdF	84.2%	73.6%	84.1%	74.8%	84.1%	76.3%

(*) The 2022 data include an estimated percentage of users in newly acquired municipalities not yet migrated to Acea Ato 2's commercial systems.

Table no. 59 – 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

NOTE: prior to discharge, wastewater is treated in the treatment plants managed by the Companies themselves.

The companies operating in the water sector are committed to increasing the capacity and efficiency of their treatment plants by upgrading certain facilities and decommissioning others (see the box on Works by Acea Ato 2).

CENTRALISATION OF ACEA ATO 2 TREATMENT PLANTS CONTINUES

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 geomorphological and urban-planning perspective.

In fact, with a high number of small and medium-sized treatment facilities and sewage systems managed (119 treatment plants with capacity below 10,000 P.E.), service coverage is guaranteed primarily by large and medium-large treatment plants (52 treatment plants with capacity above 10,000 P.E.). **In the last three years (2020-2022), 17 small and medium-capacity treatment facilities were decommissioned.**

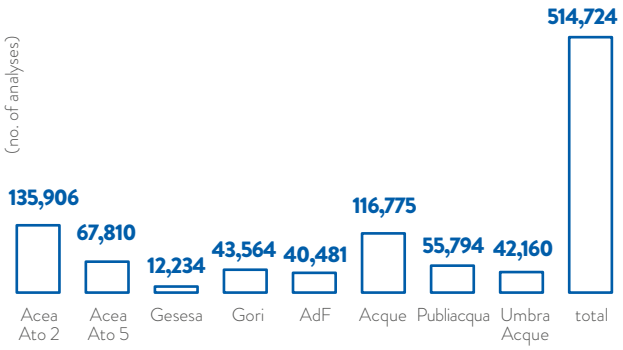
The reduced fragmentation in favour of medium-large plants, combined with integration of sewerage collector systems, has allowed **greater control of treatment efficacy** and optimisation of management and energy costs.

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 2022, the Centralisation Plan achieved its target of **decommissioning four other small treatment plants** (Carchitti in the municipality of Palestrina, Morosina in the municipality of Ciampino, Parco della Tiburtina in the municipality of Rome, and Santa Palomba in the municipality of Pomezia).

200 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.

The Company manages treatment processes in line with the provisions of the authorisations required for each plant and on the basis of the regulatory context in which they operate. The discharge limits are established for each plant, through an authorisation issued by the competent administrative body, which, on the basis of technical and environmental assessments during evaluation, 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: 2.8% for Acea Ato 2, approximately 0.8% for Acea Ato 5, 0% for Gori, 3.4% for AdF and 0.3% for Gesesa[201].

Chart no. 57 – Analytical checks on wastewater, total and by Company (2022)



The **135,906 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 treated** in 2022 **approximately 510 million of cubic metres of wastewater**, a figure that is slightly lower than the previous year (516 million cubic metres in 2021). Considering also the smaller treatment systems and the plants of the municipalities acquired in OTA 2 (a total of 164) a **total volume of 589 million cubic metres of wastewater treated** (602 Mm^3 in 2021).
Table no. 60 shows the figures of the most important parameters from the main treatment plants of Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa. Other indicators of the efficiency of purification are described in the section *Key environmental performance indicators – Water Segment* of the *Environmental Accounts*.

Table no. 60 – Output parameters of the main treatment plants managed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa (2022)

	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	7	8	9	8	≤ 25
COD	24	24	23	40	18	≤ 125
SST	8	5	19	12	2	≤ 35
nitrogen (ammoniacal, nitrate, nitrous)	6	7	8	19	6	-
phosphorous	2	1	1	3	1	-
	quantity output (t)					
COD	15,721	822	2,749	654	32	-
SST	4,713	211	2,227	205	8	-

The sludge produced during the treatment process is mostly *sent for* **recovery of material** (see *Intermediation and Transport of Waste* in the *Environment* section, and the chapter on Waste).
In 2022, actions continued to reduce the **quantity of sludge produced by treatment plants** managed by the Group Companies.
For more details on the activities carried out by individual companies to reduce sludge production and improve the efficiency of waste treatment processes, refer to the section on Management and Minimisation of Waste Produced in the chapter on Waste.
In 2022, **Acea Ato 2** obtained authorisation to **build two plants to upgrade the biogas produced by the anaerobic digestion processes** at the Roma Nord and Roma Est treatment centres for the **production of biomethane** (through a refining process) and its introduction into the gas network managed by Italgas Reti. The production of biomethane, which when at full capacity is estimated to reach a total of around 2.6 million Sm^3/year, will be incentivised from January 2024[202]. Finally, please note that both projects were included on the final list of projects eligible for funding under the National Recovery and Resilience Plan (NRRP)[203].

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

202 In November 2022, the GSE accepted the qualification requests submitted by the two plants for admission to the incentive issued under Article 6 of the Ministerial Decree of 2 March 2018: ten-year incentive relating to the production of advanced biomethane, so called as it is produced from an advanced raw material such as the sludge deriving from the treatment of urban waste water.

203 Investment "1.1 Action Line C of the NRRP", but with a payable amount of zero due to exhaustion of the relevant budget ceiling (MITE Decree of 21/12/2022).

THE USE OF MATERIALS, ENERGY AND WATER

energy efficiency (Areti, the Environment Segment and the Water Segment): approximately **8.4 GWh of savings per year**

and approximately **2,600 t** of **CO_2 emissions avoided**

around **350 GWh of electricity consumption** of the Group Companies **from renewable energy** with guarantee of origin, equal to approximately **110,250 t** of **CO_2 emissions avoided**

approximately **70,720 m^3** of water recovered in the Environment Area: **38%** of the total used in industrial processes by Environment companies

CONSUMPTION OF MATERIALS

The main materials used in production processes differ according to the business sector. For the **Companies in the Environment Segment**, the most important resources include **incoming waste for 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) for the production of electricity**. For the electricity distribution process, carried out by **Areti**, one important gas is sulphur hexafluoride SF_6, used **in medium and high-voltage plants** for its specific electrical and thermal insulation properties. For the **Companies in the water segment**, there is use of **chemical products** required for process management, such as reactants for drinking water processing, disinfection and treatment of wastewater. Finally, **Acea Energia** and 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. 61 and the *Environmental Accounts* for details of resources used by each area.

Table no. 61 – Type and consumption of materials by the main Group Companies (2020-2022)

materials	u.m.	2020	2021	2022
incoming waste for composting and landfill	t	221,950	249,867	246,846
pulper	t	90,215	99,730	97,796
SRF	t	319,122	307,391	289,550
methane	Sm^3 x 1,000	23,496	26,102	26,340
diesel fuel	l	587,028	646,730	883,290
SF_6	t	22.8	22.9	22.8
various chemicals of water companies	t	19,583	22,161	21,645
paper	t	352	341	320

NOTE: Data on incoming waste includes waste sent for anaerobic and aerobic treatment at the Orvieto landfill, waste entering the Deco landfill (2022 only), 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 2022, the renewable and biodegradable portions of pulper waste and SRF were respectively 41% and 47%. The SF_6 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

ENERGY CONSUMPTION

Total energy consumption amounts to approximately **12,990 TJ**, **with a very slight increase compared to 2021 (+4%)**. Net of energy sold, consumption stood at 9,892 TJ; the details are illustrated in Table no. 62.

The increases in production are attributable to several factors that occur during production, for example less rainfall resulted in the higher energy expenditure of the pumping systems used by the water companies and activities involving the use of vehicles returned to full capacity during the year after the slowdowns caused by the pandemic. The increased consumption of biogas relates to the entry of Deco into the reporting scope.

Electricity consumption of the main Companies, particularly connected to the distribution of drinking and non-drinking water, treatment, waste management plants and internal consumption at work sites, **originates from renewable sources with a Guarantee of Origin**, **for a total of approximately 350 GWh**, which, despite the decrease on the previous year[204], **was equal to 48% of specific consumption (731.4 GWh)** in 2022 (Table no. 62).

Table no. 62 – Energy consumption by source (2020-2022) (*)

energy per source	2020	2021	2022
		TJ (GWh)	
SRF and pulper waste (waste-to-energy) – non-renewable share	2,849.4 (791.5)	2,770.1 (769.5)	3,090.0 (858.3)
biogas (100% renewable – waste management and water segment)	420.8 (116.9)	424.1 (117.8)	453.2 (125.9)
photovoltaic	1.8 (0.5)	1.0 (0.3)	6.3 (1.7)
GO electricity	1,516.6 (421.3)	1,498.5 (416.3)	1,260.0 (350.0)
total fuel and electricity consumption from renewable sources	**4,788.6 (1,330.2)**	**4,693.8 (1,303.8)**	**4,809.5 (1,336.0)**
SRF and pulper waste (waste-to-energy) – non-renewable share	3,859.1 (1,072.0)	3,659.0 (1,016.4)	3,800.4 (1,055.7)
methane (for electricity generation, district heating, processes, water area dryers and heating for offices)	1,238.6 (344.1)	1,331.6 (369.9)	1,281.5 (356.0)
diesel (for electricity generation, other uses, composting plants and road haulage)	175.3 (48.7)	176.0 (48.9)	183.9 (51.1)
LPG (heating, road haulage and processing)	1.2 (0.3)	2.1 (0.6)	2.2 (0.6)
petrol (road haulage)	7.1 (2.0)	18.0 (5.0)	28.4 (7.9)
LSC oil for process (disposal of Acque Industriali wastewater)	2.0 (0.6)	1.3 (0.4)	0.0 (0.0)
electrical energy losses on the distribution networks and transport	1,076.8 (299.1)	1,112.0 (308.9)	1,161.1 (322.5)
own use of electricity for the implementation of distribution and transmission activities	128.9 (35.8)	110.5 (30.7)	104.2 (28.9)
consumption for public lighting	241.1 (67.0)	242.4 (67.3)	242.7 (67.4)
non-GO electricity for internal use (water systems, environmental processes, laboratories and offices)	1,154.6 (320.7)	1,124.2 (312.3)	1,373.1 (381.4)
total fuel and electricity consumption from non-renewable sources	**7,884.7 (2,190.2)**	**7,777.0 (2,160.3)**	**8,177.5 (2,271.5)**
total fuel and electricity consumption	**12,673.3 (3,520.4)**	**12,470.8 (3,464.1)**	**12,987.0 (3,607.5)**
total energy sold	**3,429.2 (925.5)**	**3,749.4 (1,041.5)**	**3,095.5 (859.8)**
energy consumed	**9,244.2 (2,567.8)**	**8,721.3 (2,422.6)**	**9,891.5 (2,747.7)**

(*) Figures for the 2020-2021 two-year period have been adjusted for 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).

Table no. 63 shows the **energy intensity indices**. The public lighting indicators remain generally stable, while indicators regarding the water service reflect the low rainfall during the year which led to increased consumption for water collection/pumping and a lower quantity of water treated.

204 Rising electricity prices in 2022 also led to a sharp increase in the cost of renewable electricity certificates, which are no longer affordable for some Group companies.

Table no. 63 – Energy intensity indices (2020-2022)

Energy consumption intensity index	u.m.	2020	2021	2022
electricity consumed for public lighting per lamp	TJ/lamp	0.00106	0.00106	0.00105
total electricity consumed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa/ water issued into aqueduct systems	TJ/Mm^3	2.437	2.471	2.567
electrical energy consumed by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa for sewer service and treatment/water treated	TJ/Mm^3	1.264	1.263	1.286

ENERGY CONSUMPTION ALONG THE SUPPLY CHAIN

Acea works to increase awareness and monitor its supply chain in relation to energy issues. Since 2015, it has monitored **energy consumption**, requesting a representative panel of the suppliers to fill out a specific questionnaire. In December 2022 the questionnaire was sent to 100 suppliers, the principal parties in terms of value of orders for the year. Thanks to the results from 47 of those contacted (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 342,372 GJ[205]. The questionnaire has included a specific section on water consumption (see the section *Attention to water consumption*, further on in the document).

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 2022, the cogeneration plants managed by Ecogena received a total of 9,335 **EECs** under the Ministerial Decree of 5 September 2011, of which **355 were in 2022**. Furthermore, the energy efficiency initiatives implemented by the Acea Group, reported by Ecogena and validated by the GSE, received a total of **19,014 EECs**, of which **6,769 were received in 2022**.
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 2022 the Company cancelled 58,895 EECs, of which 9,948 were related to the 2021 quota and the remaining 48,947 to the 2019 quota.

ENERGY EFFICIENCY ACTIONS

In 2022, Acea implemented **measures to improve energy efficiency**, aimed particularly at **companies operating in the industrial water and environmental sectors, and the company Areti**.
Considering the **photovoltaic systems** at the plants of Acea Ato 2, AdF, Deco, Orvieto and Terni, total energy consumption (on-site self-consumption) was approximately **2,600 MWh**, with a consequent **830 tonnes of CO_2 emissions avoided**. In the **water** sector, the Company implemented the following **energy efficiency measures** in 2022.
Acea Ato 2 achieved **a total saving of 7.6 TJ** (2.1 GWh). The most significant efficiency gains, amounting to **6.5 TJ** (1.8 GWh), concerned several water centres, while for the water treatment sector, specific optimisation work was carried out at two treatment plants, with an efficiency gain of **approximately 0.8 TJ** (0.23 GWh).
Additionally, further savings related to reduced water losses. For **Acea Ato 5** increases in efficiency, corresponding to **2.9 TJ** (0.8 GWh), are attributable to replacing the pumps used for withdrawal at springs and well fields, installing inverters, and revamping a treatment plant.
Gori implemented actions to increase efficiency for a savings of **30.4 TJ** (8.5 GWh), primarily through the use of more efficient water sources, new water plant management structures, the use of higher-efficiency electric pumps, and measures to improve the efficiency of treatment plants. **AdF** increased efficiency for a savings of **4.7 TJ** (1.3 GWh) through the replacement of older pumps on the aqueduct network, district planning, management of pressure levels and leak detection. **Gesesa** has achieved a savings by improving the efficiency of **0.9 TJ** (0.3 GWh) resulting from actions to manage pressure in the context of the current district planning process. Overall, the above actions have enabled the **Water segment to avoid** approximately **1,700 t of CO_2**.
In the **Environment sector**, actions to improve energy efficiency in 2022 included the works at the **San Vittore del Lazio** plant to optimise combustion on Line 1, which led to annual efficiency gains of approximately **3.1 TJ** (869 MWh of electricity) and **28.5 TJ** (715 kSm^3 of natural gas). At the **Aprilia** composting site, efficiency gains were **3.8 TJ** (1.0 GWh of electricity) and **5.3 TJ** (208 kNm^3 of biogas) thanks to the optimisation of the anaerobic digester and the improved efficiency of managing plant downtime, which improved biogas productivity. At the **Monterotondo Marittimo** site, the replacement of halogen lights with LED bulbs and other process improvements provided efficiency gains of **0.9 TJ** (254 MWh). Other minor works included plant optimisation measures with the installation of inverters at a Berg plant (18 MWh/year) and the replacement of conventional lights with LED bulbs at Demap (for 3 MWh/year). In total, CO_2 avoided at sites in the Environment sector, including two waste-to-energy plants, amounted to approximately **2,406 t.**
In the Networks segment, the company **Areti** continued in 2022 with works to increase efficiency on the electricity distribution network managed, including:

- the replacement of **173 MV/LV transformers** with **super-low loss** equivalents, which allowed a reduction in electricity consumption of 276 MWh;
- other **actions on the HV/MV/LV distribution network** aimed at optimising the structure of the MV network and upgrading of HV and LV lines, currently estimated at a total of 744 MWh saved (including use of transformers).

Table no. 64 shows the types of actions and relative energy savings for Areti, for the last three years. In **2022**, the total **energy saving** was **2.7 TJ** (0.7 GWh) and approximately 230 tonnes of **CO_2 emissions were avoided**[206].

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

206 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.

Table no. 64 – Energy efficiency in Areti (2020-2022)

Energy savings achieved (GJ)

Action	2020	2021	2022
reduction in losses from the network	6,372	4057 (*)	2,678 (**)
of which reduction in losses through the purchase of new transformers	*1,141*	*1,397*	*992 (**)*

(*) consolidated figure.
(**) estimated figure.

Consumption for public lighting in 2022 was **242 TJ** (67 GWh), in line with 2021 consumption. The ratio of LED lamps to total lamps was **92%**.
In 2022, the company's operating personnel used a total of **87 electric vehicles** (25 via car sharing, and 62 vehicles individually assigned to operating personnel on a 24/7 basis).
According to monitoring by Areti, total journeys amounted to approximately 260,000 km, consumption was around 42 MWh and a net saving of approximately **26,200 kg of CO_2** was achieved thanks to the avoidance of diesel-powered vehicles.

ATTENTION TO THE USE OF WATER RESOURCES

Water resources are used in industrial processes, such as the generation of electricity and thermal energy and composting processes, as well as clean sewage 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 approximately **2.4 million m^3** in 2022, **an increase of 9%**. Specifically, in 2022 certain companies in the water sector developed initiatives to reuse treated water. For example, at the treatment plans currently managed by **Gori**, **treated wastewater was re-used**. The wastewater used for this purpose, defined as "technical wastewater", is distributed within plants through specific pipes and used for various purposes, including 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. These sites are equipped with specific flow gauges, and water audits are conducted to assess water withdrawals and consumption from treatment processes and identify strategies to increase savings and reuse possibilities.
After having completed the **industrial water network** (non-drinking water) of the **Roma Sud, Roma Nord, CoBIS and Ostia treatment plants** in 2020-2021, **Acea Ato 2** is planning similar actions at the Roma Est and Parco Leonardo (Fiumicino) treatment plants, increasing the amount of water intended for reuse according to a circular economy model. In 2022, the company recovered approximately **1.8 million m^3** of process water, representing around **49% of total water used**. At **Acea Ato 5**, around **535,000 m^3** of treated water was used at the treatment plants for service activities related to their operation.
The **Companies in the Environment sector** limit the use of drinking water, **mainly using water from wells**. In addition, at the **plants of San Vittore del Lazio, Orvieto, 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. For industrial uses[207], such as vehicle washing, rainwater that has already been treated in the storage tanks through sedimentation and de-oiling is also reused. 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. 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. Finally, the **Orvieto plant hub** collects rainwater from the roofs of certain buildings and transfers it to underground storage tanks serving the fire-fighting reserve. Thanks to the various solutions described, **the volume of water recovered from the Environment Area** was approximately **70,720 m^3** in 2022.

Water withdrawals of the main Group companies associated with industrial processes and civil use are illustrated in Table no. 65. While withdrawals were **generally stable** during the year, the illustrated actions have led to a **significant increase in the amount of re-used water during the three-year period**[208].
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 provisions that will be adopted with national regulations, facilitates a significant reuse of treated water in coming years.

207 In 2022, the existing plant underwent a major energy efficiency upgrade, which caused a period of plant downtime, with a resulting temporary reduction in water production from the reverse osmosis plant.

208 The increase is partly due to improved measurement processes.

Table no. 65 – Water withdrawal and recovery (2020-2022)

	2020	2021	2022
		(Mm³)	
Withdrawals (*)			
industrial processes (district heating, thermoelectric generation, Ambiente plants, Water companies) (**)	**0.344**	**0.232**	**0.342**
of which aqueduct	*0.237*	*0.125*	*0.199*
of which well	*0.104*	*0.104*	*0.120*
of which river water (***)	*0.003*	*0.003*	*0.023*
water consumption for civil use (****)	**2.601**	**2.517**	**2.508**
total water withdrawals (*****)	**2.945**	**2.749**	**2.850**
Recovery			
water recovered and used in industrial processes	**0.115**	**2.222**	**2.393**

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 2020-2021 two year period have been adjusted following consolidation.
(**) Water withdrawn for industrial use was partly used in processes totalling 0.193 Mm³ in 2020, 0.090 Mm³ in 2021 and 0.179 Mm³ in 2022; the discharge of water withdrawn for industrial use over the three-year period was 0.043 Mm³ in 2020, 0.027 Mm³ in 2021 and 0.001 Mm³ in 2022.
(***) 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 10% in 2020, 8% in 2021 and 12% in 2022. The increase in 2022 is partly attributable to the inclusion of Deco in the reporting scope.

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 Logistics function, has sent a panel of suppliers (on an experimental basis) a request for environmental data including information on water intake, divided by process and civil uses. **47 suppliers** out of 100 suppliers invited to replied to the section on water resources, corresponding 31% of the total expenditure of the Acea Group for procurements of goods, services and labour. Water intake for the above suppliers in 2022 equalled approximately 19,600 m³, divided into approximately 7,750 m³ for industrial uses and 11,850 m³ for civil uses. 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 intake occur within **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**, before being discharged into public sewerage. Water used in the waste-to-energy process at the **San Vittore del Lazio** plant, instead, is collected and stored in special underground tanks and disposed of as waste, as it may contain components 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 head of the treatment plant and sent to the locations described in the section *Sewerage service and treatment system*, in the chapter *Water segment*. All civil water intake from the aqueduct ends up directly in the sewer network.

EMISSIONS

-13% emissions on electricity sales (market based) thanks to the increase in GO electricity sold (+15%)

intensity index of Scope 2 emissions deriving from losses on the electricity distribution grid/GWh was stable at **0.01 t/MWh**

continuous analysis of waste-to-energy emissions:

values of pollutants significantly lower than legal limits

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 standards. Acea Ambiente also applies the UNI EN ISO 50001 management system, while the waste-to-energy plants, the Orvieto plant and the Deco sites are also registered under the European EMAS III scheme, extended until 2024[209].

The most relevant **macro-pollutants**, which are attributable to the Acea Ambiente and Acea Produzione plants, are monitored through Continuous Emission Monitoring Systems (CEMs). In 2022, macro-pollutants were recorded at very low values and are decreasing compared to previous years (see Table no. 66).

Table no. 66 – Total atmospheric emissions of pollutants from the main Group plants (2020-2022)

emissions	2020	2021	2022
		(t)	
CO	8.34	7.68	5.95
NO_x	190.67	198.11	191.30
SO_x	0.90	1.60	1.51
particles (particulate matter)	0.60	0.74	0.36

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

Specifically, monitoring of the **waste-to-energy plants** is carried out by means of fixed and mobile stations that **sample and analyse the fumes coming out of the chimneys**, **measuring concentrations** for numerous parameters that are periodically checked by internal personnel and certified by qualified external laboratories. Again in 2022, the **values of the main pollutants** were also **significantly below the legal limits** (see Table no. 67).

At the **San Vittore del Lazio** plant, the monitoring campaigns carried out for PM10, PM2.5[210], 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, a monitoring campaign was conducted in December 2022 to survey the presence of hydrogen sulphide, volatile organic compounds, nitrogen oxide, methane odours, and other components.

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

210 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. 67 – Concentrations of atmospheric emissions generated by waste-to-energy plants (2020-2022)

		San Vittore del Lazio plant (*)				Terni plant (*)			
pollutant	**u. m.**	**scope of reference (**)**	**2020**	**2021**	**2022**	**scope of reference (**)**	**2020**	**2021**	**2022**
HCl	mg/Nm³	8	0.145	0.064	0.139	8	3.807	3.701	3.919
NO_x	mg/Nm³	70	29.925	29.488	29.560	180	125.989	120.644	122.070
SO_2	mg/Nm³	40	0.086	0.310	0.310	25	0.969	0.928	0.563
HF	mg/Nm³	1	0.020	0.016	0.020	1	0.00	1.040	0.854
CO	mg/Nm³	40	0.604	1.083	0.910	25	1.057	0.049	0.093
total particles (particulate)	mg/Nm³	3	0.010	0.049	0.040	25	0.763	0.760	0.468
PAH (polycyclic aromatic hydrocarbons)	mg/Nm³	0.01	0.00007	0.000007	0.00001	0.01	0.00000	0.00002	0.000005
dioxins and furans (PCDD +PCDF)	ng/Nm³	0.1	0.0094	0.0023	0.0032	0.1	0.0000	0.0000	0.0000
heavy metals (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)	mg/Nm³	0.5	0.0246	0.0315	0.0372	0.3	0.03	0.04	0.03
Hg	mg/Nm³	0.05	0.0013	0.0022	0.0020	0.05	0.0004	0.0018	0.0008

(*) 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[211] 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

Acea quantifies its CO_2 emissions by **monitoring and evaluating the carbon footprint of the individual macro production processes** according to the guidelines of the GHG protocol[212] which requires reporting in the categories of **direct** (**Scope 1**) and **indirect** (**Scope 2** and **Scope 3**).

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[213] effect, the Terni waste-to-energy plant is no longer included in the scope of application of the ETS Directive.
The allowances assigned under the NAP (National Allocation Plan) are lower every year and in any case small, compared to the actual emissions recorded. Data for the three-year period 2020-2022 is presented Table no. 68.

Table no. 68 – CO_2 emission allowances as per the National Allocation Plan (NAP) and actual emissions by plant (2020-2022)

	2020		2021		2022	
plant	(t)					
	assigned by NAP	**actual**	**assigned by NAP**	**actual**	**assigned by NAP**	**actual**
Tor di Valle (*) (**)	3,782	44,227	3,564	51,839	3,472	54,386 (***)
Montemartini	0	1,546	0	1,712	0	2,338

(*) As with previous years, in 2022 the applicable legislative framework allowed the Tor di Valle plant to benefit from free of charge emission allowances (3,472 t) as it serves a district-heating network.
(**) The 2021 figures for actual emissions have been updated with the certified figures.
(***) Estimated emissions, pending certification by the responsible body.

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

212 See www.ghgprotocol.org for more information.

213 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 (SF_6) 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 the waste-to-energy plants in 2022 **increased slightly compared to 2021** (see Table no. 69). This was mainly due to **less biodegradable waste** entering and processed for waste-to-energy at the Terni plant (renewable energy fell from 43.4% to around 41%).
The increase in CO_2 emissions from Acea Produzione's thermoelectric power stations is attributable to a higher production of thermoelectric energy and consequent increase in fuel use, while the higher emissions related to the integrated water service processes are mainly due to occasional work by Acea Ato 2 at a specific water centre.

Scope 2 greenhouse gas emissions from electricity consumption in 2022 were in line with 2021 (+1%). Efficiency gains in the water sector, for example, offset the increased consumption caused by the use of pumps as a result of low rainfall. For more details see the paragraph on Energy Saving. Emissions from electricity grid losses increased (by about 4%) due to the increase in electricity demand on the distribution grid (+2%).

Scope 3 emissions include those deriving from the gas and electricity sales, electricity consumption by suppliers of purchased goods, services and works, business travel and, from 2022, main subsidiaries[214] (scope 3 category "investments") (see Table no. 69).
Emissions from business travel rose in 2022 due to the end of restrictions caused by the pandemic and the resumption of **normal business travel.**
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 regards energy (primarily consumption of fuels, electricity and vehicle fuels) and data for refrigerant gases used at supplier premises, 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 offered exclusively 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. For more details, see the section on Customer Care in the Customers chapter. **Green energy sold** by Acea Energia to free market customers in 2022 totalled 2,536 GWh (2,196 GWh in 2021), corresponding to 42% of total energy sold to free market customers (see also the *Environmental Accounts*). The **sale of electricity with GO certification** has therefore led to a saving of approximately 799,000 t of CO_2 **in the Scope 3 category.** For gas sales in 2022, offsetting measures are expected to cover approximately **54 MSm³** (estimated figure; 3.3 MSm^3 in 2021 according to the updated figure), corresponding to approximately **107,000 t of CO_2.**

INTENSITY INDICES FOR GREENHOUSE GAS EMISSIONS

Scope 2 carbon dioxide emissions, deriving from **leaks on electricity distribution networks**, **relative to total electricity distributed**, is one of the intensity indices for greenhouse gas emissions monitored. The index is **in line with 2021, rising from 0.0099 t/MWh** (updated figure after consolidation) to 0.0101[215]. However, performance of the **Scope 1 emissions index on energy produced**[216] fell. The indicator stands at 462.1 g/kWh (413.8 g/kWh considering also the photovoltaic production of the subsidiary not consolidated on a line-by-line basis), with an increase due mainly to the reduction in electricity production from hydroelectric (-23% compared to 2021 production) and waste-to-energy (-5%) sources. Finally, the **emissions intensity index linked to value added improved**, decreasing by 4% compared to 2021. Total Scope 1 plus Scope 2 emissions remained almost stable (+0.8%), while value added increased by 5% (see Table no. 69).

Table no. 69 – Environmental indicators: CO_2 emissions, intensity indices for greenhouse gas emissions (2020-2022)

CO_2 EMISSIONS				
SCOPE 1 EMISSIONS				
FROM ENERGY PRODUCTION PLANTS				
	u. m.	**2020**	**2021**	**2022**
CO_2 emissions from Acea Produzione thermoelectric power stations (*)	t	45,773	53,551	56,724
CO_2 emissions from the Ecogena plants	t	9,607	7,829	5,191
CO_2 emissions from Acea Ambiente waste-to-energy plants (*)	t	341,763	325,684	327,426

214 Acque, Publiacqua and Umbra Acque.

215 The figure is estimated.

216 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.

FROM WASTE MANAGEMENT, ENERGY DISTRIBUTION, HEATING PLANTS AND VEHICLE FLEET				
CO_2 emissions from waste-management plants (**)	t	1,582	1,895	2,028
CO_2 emissions from water-plant processes of the IWS (***)	t	6,979	7,486	8,309
CO_2 emissions from heating (***)	t	872	881	755
CO_2 emissions from vehicle fleet	t	9,705	10,533	11,065
CO_2 emissions from Areti and Acea Produzione plants (from SF_6) (****)	t	8,695	7,045	4,959
CO_2 emissions from refrigerants (HCFCs) (*****)	t	1	0	2
TOTAL SCOPE 1 EMISSIONS	**t**	**424,977**	**414,904**	**416,458**
***SCOPE 2* EMISSIONS**				
location-based Scope 2 emissions (market based) (******)	t	**384,323 (284,433)**	**357,669 (271,973)**	**362,211 (299,385)**
of which CO_2 emissions from network leaks	t	*100,489*	*97,301*	*101,596*
***SCOPE 3* EMISSIONS** (*******)				
CO_2 emissions deriving from the purchase of goods/services and works (********)	t	11,642	31,701	26,674
CO_2 emissions from business travel	t	46	38	143
CO_2 emissions from volumes of gas sold	t	276,284	346,567	337,895
CO_2 emissions from the sale of electricity, location based (market based)	t	2,200,491 (2,382,384)	2,447,005 (2,555,276)	2,323,676 (2,210,141)
CO_2 emissions from Investee operating companies ("investments")	t	39,793	38,224	38,927

INTENSITY INDICES FOR GREENHOUSE-GAS EMISSIONS				
intensity indices of the GHG emissions	**u. m.**	**2020**	**2021**	**2022**
CO_2 emissions (Scope 1 + Scope 2)/Acea Group added value (*********)	(t/k€)	568.3	504.3	483.6
Scope 1 CO_2 emissions/gross production (**********)	(g/kWh)	428.7	381.1	462.1
Scope 2 CO_2 emissions deriving from losses on the electrical energy distribution network/issued MWh	(t/MWh)	0.0104	0.0099	0.0101

(*) The 2021 figures for the Tor di Valle and Terni plants have been adjusted after the ETS certification, while the 2022 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. The increase in 2022 was mainly due to occasional works by Acea Ato 2 at a water centre in Albano Laziale.
(****) These are the tonnes of equivalent CO_2 corresponding to the emissions of insulating SF_6 present in Areti's HV equipment (1 t of SF_6 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 2021 and 2022 (0.336 for 2020), 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 2020, 2021 and 2022, respectively: 0.466 t/MWhe, 0.459 and 0.457 (Source: AIB document "European Residual Mixes 2021"). Emissions due to technical network losses in 2021 were calculated on the basis of the corresponding adjusted figure in 2022.
(*******) 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 2022 figure is broken down as follows: 21,871 tonnes of CO_2 for suppliers of services and works and 4,803 tonnes of CO_2 for suppliers of goods.
(*********) Data for the 2020-2021 two-year period have been recalculated, excluding from the numerator the emissions of the investee companies Acque, Publiacqua and Umbra Acque. From 2022, these are reported as Scope 3 emissions under the Investments category.
(**********) *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 413.8 g/kWh. In any case, the indicator rose in 2022 mainly due to the increased CO_2 emissions from waste-to-energy processes (due to plant downtime), while energy production fell.
NOTE Emission factors for *Scope 1* emissions are taken from the standard parameters – ISPRA data 2021, DEFRA 2022 and GHG Protocol-5th Assessment Report-AR5.

WASTE

47% of waste recovered on the total waste produced **(177,983/376,578 t)**

83% ash recovered against total produced in waste-to-energy plants **(52,782/ 63,645 t)**

66% of sludge recovered against total sludge produced by Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa **(106,087/160,293 t)**

With regard to the **waste produced**, each company has defined 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. 70 – Total waste produced (2020-2022)

waste produced	2020	2021	2022
		t	
total waste	**306,060**	**353,137**	**376,578**
hazardous	*70,669*	*73,139*	*72,588*
non-hazardous	*235,391*	*279,997*	*303,989*
detail by type of processing			
entirely recovered waste (*) (**)	**111,534**	**157,771**	**177,983**
entirely disposed of waste (***)	**194,526**	**189,854**	**198,594**
incineration (with energy recovery)	*3,769*	*2,962*	*5,580*
incineration	*16,948*	*5,242*	*5,486*
landfill and other disposal operations	*173,815*	*181,650*	*187,528*

(*) Waste sent for recovery in 2022 was divided as follows: 139,654 t for preparation for reuse, 33,809 t for recycling 4,520 t for other recovery operations.
(**) In 2022, hazardous waste sent for recovery amounted to 54,656 t; non-hazardous waste amounted to 123,328 t.
(***) In 2022, no hazardous waste was sent to waste-to-energy plants or incineration. Non-hazardous waste sent to waste-to-energy plants was 5,580 t, while 5,486 t was sent for incineration. 17,933 t of hazardous waste and approximately 169,596 t of non-hazardous waste was sent to landfill and other disposal operations.

WASTE FROM THE INTEGRATED WATER SYSTEM

In the Water Segment, production of waste largely corresponds with the production of **sludge from the treatment process**, with a minimal portion from **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. Sand and screens derive from 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. The Companies are all committed to recovering sludge, with 66% of all sludge produced recovered. For example, in 2022 AdF recovered 99%, Acea Ato 2 recovered 80%, Gori recovered 60% and Acea Ato 5 recovered 23%.

Chart no. 58 – Waste streams for the Water Segment Companies

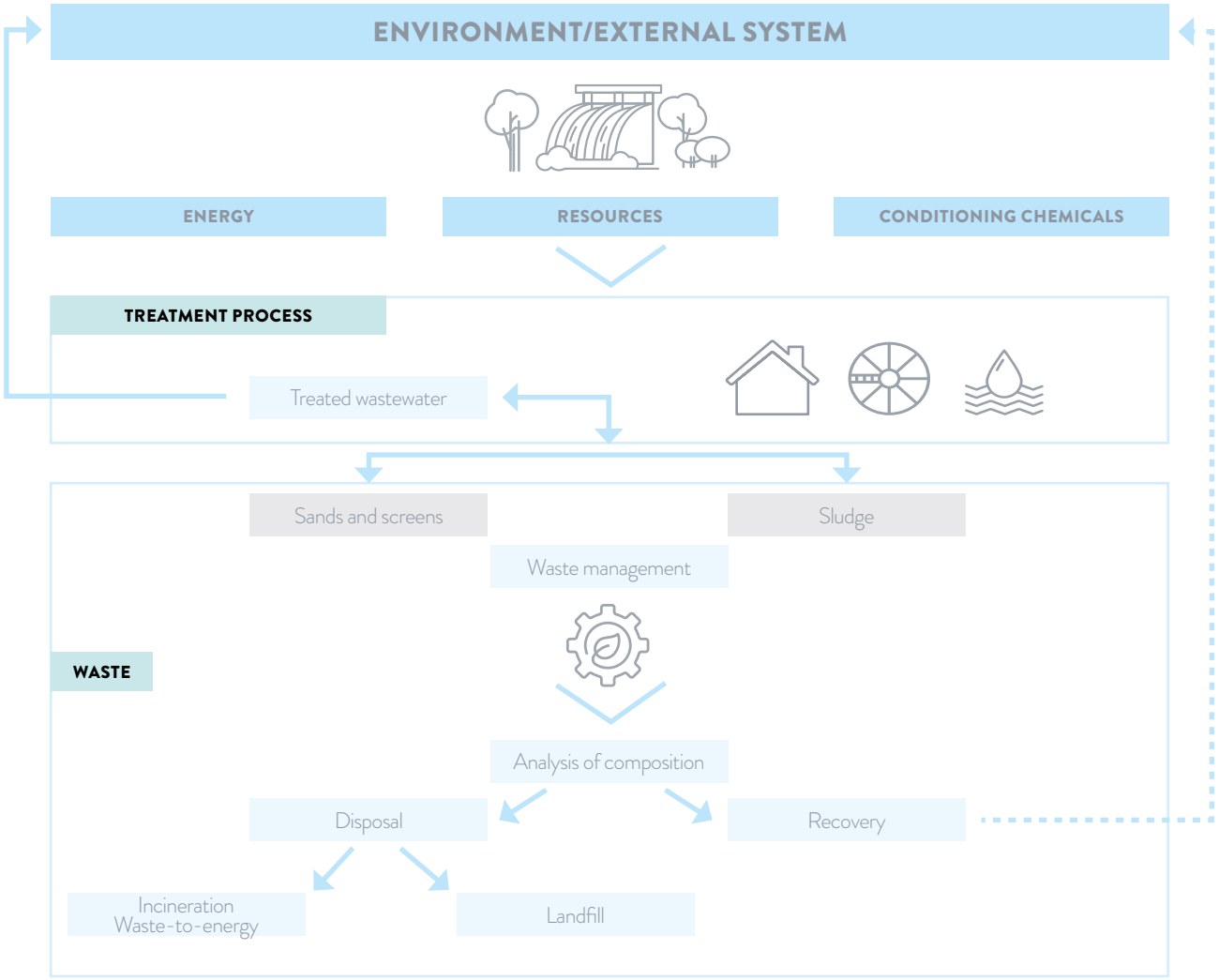


Table no. 71 – Waste produced by Companies in the Water Segment (2020-2022)

Water Segment waste	2020	2021	2022
	t		
total waste	**152,285**	**176,438**	**183,637**
hazardous	*239*	*379*	*449*
non-hazardous	*152,046*	*176,059*	*183,189*
of which sludge, sand and screens	*138,756*	*166,969*	175,570
detail by type of processing			
entirely recovered waste	**63,570**	**110,019**	**115,167**
of which sludge, sand and screens for recovery (*)	*59,884*	*108,620*	113,561
entirely disposed of waste (*)	**88,715**	**66,419**	**68,470**
of which sludge, sand and screens for disposal (**)	*78,872*	*58,349*	62,209
incineration (with energy recovery)	*2,759*	2,962	1,304
incineration	*16,660*	*5,242*	*5,486*
landfill and other disposal operations	*69,296*	*58,215*	*61,680*

(*) In 2022, 106,087 t of sludge and 7,474 t of sand and screens were sent for recovery.
(**) In 2022, the following was sent for disposal: 54,206 t of sludge and 8,004 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

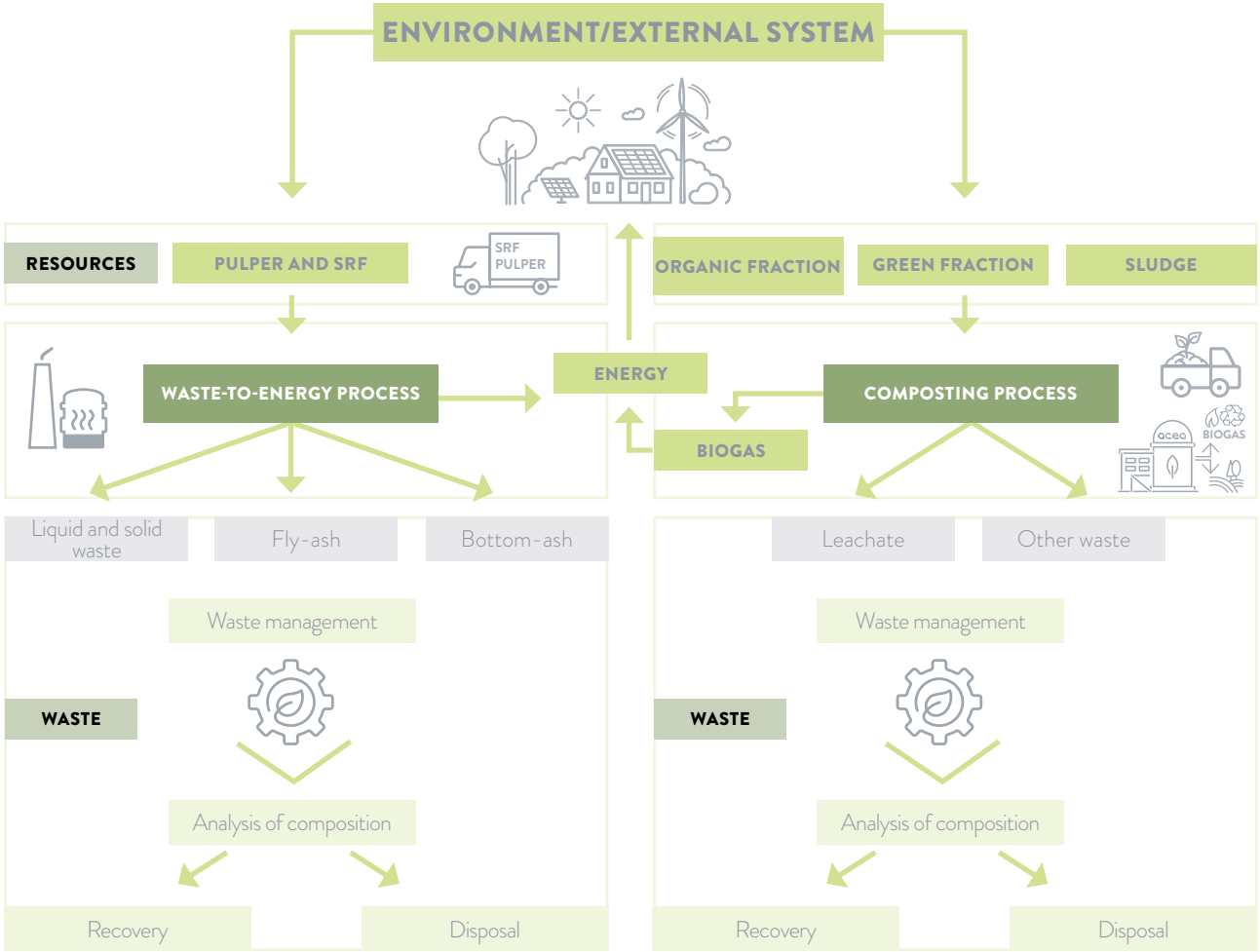
and recovery/disposal of waste (solid and liquid), with identification of final-destination sites for special waste with regard to solid materials, and providing logistical services (pick-up, transport and discharge) for liquid waste that is handed over to authorised plants.

WASTE FROM THE ENVIRONMENT SEGMENT

Waste streams in the Environment sector 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 of liquid and solid waste and brokerage/transport. Below are details for the first three, while transport and brokerage are handled under *Waste-to-energy, composting, disposal of solid and liquid waste and related services* in the *Environment Segment* section.

Waste-to-energy activity, with the plants of San Vittore del Lazio and Terni, produces the greatest quantity of waste, totalling 93,821 t in 2022. The majority of waste produced by these plants is fly-ash, bottom-ash and water from the buffer tank[217]. In 2022, **52,782 tonnes of ash were recovered** (approximately 83% of the total). The Orvieto hub, the Deco sites and the 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 (93%). 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 plant of Bio Ecologia[218], which primarily produce sludge.

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



217 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.

218 The waste from the Bio Ecologia plant derive both from treatment of liquid waste and treatment of wastewater.

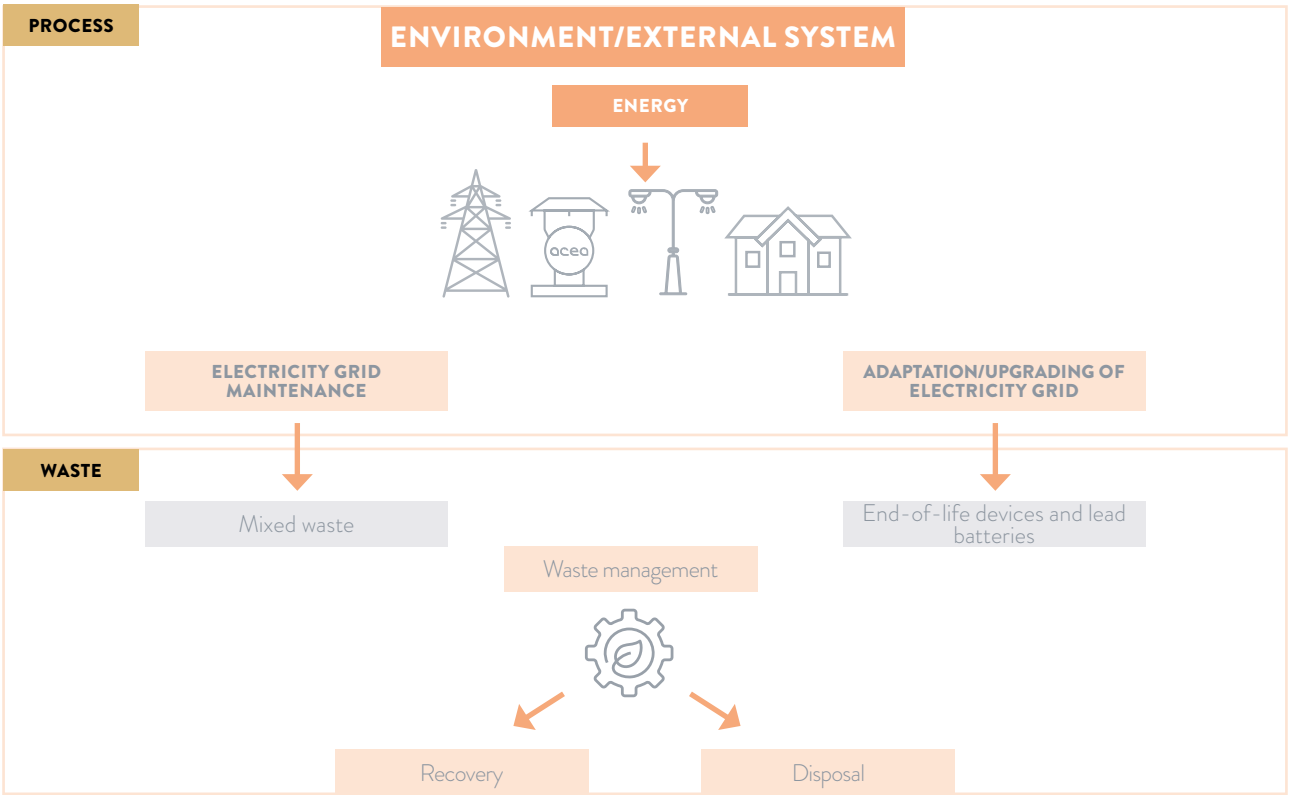
Table no. 72 – Waste produced by companies in the Environment Segment (2020-2022)

Environment Segment waste	2020	2021	2022
		t	
total waste	**151,966**	**173,674**	**190,038**
hazardous	69,560	71,038	70,098
of which ash	*59,435*	*59,142*	*63,645*
non-hazardous	82,407	102,636	119,940
of which liquid waste (leachate and buffer water)	*51,426*	*57,669*	*61,702*
detail by type of processing			
entirely recovered waste	**46,570**	**46,033**	**60,414**
of which ash	*42,584*	*43,425*	*52,782*
entirely disposed of waste (*)	**105,396**	**122,129**	**129,624**
of which ash	*16,852*	*15,717*	*10,863*
of which sent to landfill and subject to other disposal operations	*104,098*	*122,129*	*125,348*

WASTE FROM DISTRIBUTION OF ELECTRICITY

Areti manages the distribution of electricity and primarily produces waste derived from 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[219]. The waste flow generated by Areti's business are illustrated in Chart no. 60.

Chart no. 60 – Waste streams in Areti



219 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. 73 – Waste produced by the Areti Company (2020-2022)

Areti waste	2020	2021	2022
	t		
total waste	**1,106**	**2,153**	**2,454**
hazardous	841	1,645	1,996
non-hazardous	265	508	459
detail by type of processing			
entirely recovered waste	**747**	**902**	**1,992**
entirely disposed of waste	**359**	**1,251**	**463**

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**.
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.
At **AdF**, in 2022, a thermochemical hydrolysis system was used at the San Giovanni treatment plant in Grosseto, with the aim of treating the dewatered sludge produced in the other plants as well as the sludge produced at the plant itself, reducing the total amount of sludge produced; in 2022, the company achieved **a 21% reduction in the total volume of sludge produced compared to the previous year.**
For several years, **Acea Ato 2** has defined and implemented 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 as a material and for energy, through a range of different actions, rationalising the entire treatment segment and transforming large treatment plants into hubs for centralised sludge processing (a number of small treatment plants were decommissioned in the year as part of the centralisation measures). In 2022 Acea Ato 2 achieved a **5% reduction** in the volume of sludge produced. It is hoped that, by 2024, the largest plants (Roma Est, Roma Nord, Roma Sud, Ostia and Co.Bis) will be able to dry the sludge produced directly.

Waste from the majority of Group Companies is sent to external sites[220]. 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[221]. The reliability of brokers is guaranteed by the mandatory **authorisation required by the specific regulations** for performance of activities and by periodic checks on documentation.
The data and information on waste for the main Companies is managed with dedicated management software[222]. 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 Segment, 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. In addition, for these Companies and for Acea Produzione, which are equipped with plants mainly certified in accordance with standard UNI EN ISO 14001, systematic checks are carried out on legislative compliance of compliance in terms of environmental factors.
In 2022, there were no significant releases of pollutants into the environment, such as mineral oils, fuels or chemical products[223].

220 The Orvieto plants and the Deco sites, which are plant hubs with internal waste streams and destinations, are exceptions.

221 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.

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

223 In 2022, there were two minor leaks of mineral oil into the environment at a substation due to theft. No leaks of other pollutants such as fuels or chemicals were recorded.

WATER COMPANIES 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 Optimal Territorial Conference – Umbria 1 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 holds the **SOA certification** for the **OG6** (in class III)[224] and **OS22** (in class II)[225] categories and **qualification for design and construction** (up to the 8th 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 (2022)

size of drinking-water network - *data in GIS*	**6,372 km** (**1,388** km of supply network, **4,984** km of distribution)
type of work	
interventions due to network failure/leak detection	**18,343 interventions** (18,160 due to faults, 183 leak detection)
meter installations (new installation and replacement)	**36,514 interventions** (5,941 new installation, 30,573 replacements)
network extension	**18.2 km** of expanded network
network reclamation	**24 km** of reclaimed network
drinking water quality control	**6,514 samples** collected and **116,419 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2022)

size of sewerage network - *data in GIS*	**1,912** km
type of work	
interventions due to network failure	**1,073 interventions**
planned interventions	**55 interventions**
network extension	**9 km** of expanded network
network reclamation	**20 km** of network under video inspection with in-house equipment and personnel
quality control on wastewater for sewerage networks	**203 samples** collected and **5,502 tests** performed

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2021-2022)

	2021			2022		
(no.)	men	women	**total**	men	women	**total**
composition of the staff						
executives	5	0	**5**	5	0	**5**
managers	10	2	**12**	14	2	**16**
clerical workers	72	92	**164**	77	93	**170**
workers	209	0	**209**	212	1	**213**
total	**296**	**94**	**390**	**308**	**96**	**404**
contract type						
staff with permanent contract	280	89	**369**	288	92	**380**
of which part-time staff	*0*	*7*	***7***	*0*	*7*	***7***
permanent staff	12	4	**16**	19	4	**23**
staff under apprenticeship contracts	4	1	**5**	1	0	**1**
total	**296**	**94**	**390**	**308**	**96**	**404**
changes						
incoming staff	**9**	**3**	**12**	**20**	**6**	**26**
outgoing staff	**9**	**2**	**11**	**8**	**4**	**12**
turnover rate (%)	**6.1**	**5.3**	**5.9**	**9.1**	**10.4**	**9.4**
incoming rate (%)	3.0	3.2	**3.1**	6.5	6.3	**6.4**
outgoing rate (%)	3.0	2.1	**2.8**	2.6	4.2	**3.0**

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

225 Drinking water and water treatment plants.

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2021-2022)

	2021	2022
accidents (no.)	5	13
total days of absence	234	8,072
hours worked (*)	659,520	664,753
frequency index (FI) (number of accidents per 1,000,000/working hours) (*)	**7.58**	**19.56**
severity index (SI) (days of absence per 1,000/working hours) (*)	**0.35**	**12.14**

(*) The 2022 figure is estimated.

TRAINING 2021-2022

course type, hours provided and costs

	courses (no.)		training (hours)		costs (€)	
course type	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**
advanced training	1	1	6	42	310	0
technical-specialised	77	120	7,842	4,849	82,211	115,935
legal	2	8	8	65	538	2,495
managerial	10	9	149	71	2,689	3,125
safety	20	31	1,780	2,802	16,716	36,752
total	**110**	**169**	**9,785**	**7,829**	**102,464**	**158,307**

employees trained

	2021 (*)			2022		
(no.)	men	women	**total**	men	women	**total**
	303	96	**399**	308	96	**404**
breakdown of training hours by qualification						
executives	219	0	**219**	216	0	**216**
managers	359	61	**420**	313	74	**387**
clerical workers	2,396	3,309	**5,705**	1,468	2,029	**3,497**
workers	3,441	0	**3,441**	3,725	4	**3,729**

(*) The figures are higher than the number of employees as they include employees who provided services only for a few months of the year.

Training provided during the year covered a variety of topics, such as anti-corruption and privacy, and **safety** training continued in accordance with current regulations.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS	**u. m.**	**2020**	**2021**	**2022**	**Δ% 2022/2021**
WATER BALANCE					
drinking water from the environment	**Mm³**	**58.6**	**56.3**	**56.0**	**-0.5**
from the surface	*Mm³*	*0*	*0*	*0*	-
from wells	*Mm³*	*44.82*	*42.80*	*45.16*	*5.6*
from springs	*Mm³*	*10.61*	*10.20*	*8.14*	*-20.6*
of which water from other aqueduct systems	*Mm³*	*3.17*	*3.34*	*2.65*	*-18.2*
total drinking water leaving the aqueduct system (c) = (a+b)	**Mm³**	**31.3**	**31.0**	**31.7**	**2.3**
total drinking water dispensed and billed in the network (a)	**Mm³**	**28.7**	**28.6**	**28.7**	**0.3**
measured volume of water delivered to users	*Mm³*	*28.7*	*28.6*	*28.6*	*0.3*
volume consumed by users and not measured	*Mm³*	*0*	*0*	*0*	-
total drinking water authorised and not billed in the network (b)	**Mm³**	**2.6**	**2.4**	**3.0**	**25.0**
measured unbilled authorised consumption	*Mm`*	*1.2*	*0.7*	*0.5*	*-28.6*
unmeasured unbilled authorised consumption	*Mm³*	*1.4*	*1.7*	*2.5*	*47.1*
LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks	Mm³	27.3	25.3	24.3	**-4.0**
water loss percentages	%	46.6	44.9	43.3	**-3.6**
TREATED WASTE WATER					
water treated in the main treatment plants (*)	**Mm³**	**56.8**	**59.3**	**45.5**	**-23.3**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water	**no.**	**107,257**	**116,891**	**116,419**	**-0.4**
of which no. analytical tests on surface water	*no.*	*7,209*	*7,350*	*6,822*	*-7.2*
no. analytical tests on wastewater (**)	**no.**	**35,610**	**42,404**	**42,160**	**-0.6**

(*) two-year data for 2020-2021 are estimated; 2022 data are partially measured (for treatment plants above 10,000 PE). The sharp decline 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.	2020	2021	2022	Δ% 2022/2021
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER					
materials					
sodium hypochlorite	t	92	93	87	-6.5
sodium chloride	t	214	222	217	-2.3
hydrochloric acid	t	207	210	214	1.9
aluminium polychloride	t	12	11	9	-18.2
phosphoric acid (10%)	t	0	0	0	-
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	123	95	138	45.3
ferric chloride (40%)	t	62	114	201	76.3
mineral oil and fats	t	0	0	0	-
OTHER CONSUMPTION					
drinking water (*)	**m³**	**20,222**	**53,178**	***32,438***	**-45.2**
drinking water consumed for non-industrial water uses (offices, outside showers, etc.)	*m³*	*1,597*	*10,416*	*6,270*	-39.8
drinking water consumed for process water uses (washing machinery and bays, etc.)	*m³*	*18,625*	*42,762*	*26,168*	-38.8

(*) The figures for 2020 and 2021 are estimated considering the partial closure of offices and the different organisation of work following the health emergency.

There are no active internal water reuse processes, but the Company has supplied 273,940 m³ of non-potable water for industrial use to two local businesses.

ENERGY CONSUMPTION	u. m.	2020	2021	2022	Δ% 2022/2021
FUELS					
vehicle fuels					
diesel	l	410,000	456,600	444,900	-2.6
petrol	l	7,000	5,800	4,900	-15.5
ELECTRICITY					
total electricity for drinking water	**GWh**	**69.2**	**69.4**	**74.9**	**7.9**
electricity for water pumping stations	*GWh*	*68.8*	*69.1*	*74.5*	*7.8*
electricity for offices	*GWh*	*0.4*	*0.3*	*0.4*	*33.3*
total electricity for waste water	**GWh**	**22.7**	**23.1**	**22.5**	**-2.6**
electricity for treatment	*GWh*	*17.9*	*17.9*	*17.8*	*-0.6*
electricity for pumping stations	*GWh*	*4.8*	*5.2*	*4.7*	*-9.6*
electricity for offices	*GWh*	*0.1*	*0.1*	*0.1*	-

ENERGY EFFICIENCY (2020-2022)

action	energy savings achieved (kWh)		
	2020	2021	2022
extraordinary maintenance on plants	75,000	150,000	415,000

The completion of extraordinary maintenance on the Raggio water plant in the municipality of Gubbio (one of the primary water lifts) and extraordinary maintenance on the oxidative systems of five treatment plants in 2022 resulted in an estimated energy savings of 415,000 kWh.

WASTE	u. m.	2020	2021	2022	Δ% 2022/2021
SPECIFIC WASTE FROM TREATMENT OF WASTE WATER					
treatment sludge (*)	t	14,941	13,868	17,356	25.2
sand and sediment from treatment	t	1,057	1,353	1,548	14.4
WASTE EXCLUDING SLUDGE AND SAND					
hazardous waste (**)	t	20.2	8.0	16.2	102.5
non-hazardous waste	t	4,940	3,767	3,255	-13.6

(*) The item includes liquid sludge transported to other plants for the dewatering process, for a value of 4,940 t in 2020, 2,525 t in 2021 and 5,253 t in 2022.
(**) The increase in 2020 and 2022 is due to the exceptional disposal of vehicles and company cars.

TOTAL COD IN INPUT AND OUTPUT (2020-2022)

(t/year)	2020	2021	2022
COD_{in}	17,135	13,401	11,086
COD_{out}	2,288	1,556	960

OUTPUT PARAMETERS FOR THE MAIN TREATMENT PLANTS (2020-2022)

parameter	average values (mg/l) 2020	average values (mg/l) 2021	average values (mg/l) 2022
BOD_5 (*)	18.6	12.3	12.9
COD	40.3	21.0	21.0
SST	30.8	12.0	13.7
NH_4^+	5.0	2.0	2.0
phosphorous	2.0	2.0	1.9

(*) 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 (2020-2022)

parameter	average values (%) 2020	average values (%) 2021	average values (%) 2022
$100x(COD_{in} - COD_{out})/COD_{in}$	87.0	88.4	91.3
100x(SSTin - SSTout)/SSTin	89.4	95.7	93.4
$100x(NH_4^+in - NH_4^+out)/NH_4^+in$ (*)	86.4	93.8	93.1
$100x(P_{in} - P_{out})/ P_{in}$ (*)	33.0	35.0	27.8

(*) 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 no. 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 (2022)

size of drinking-water network - *data in GIS*	**6,923 km** (**1,397** km of supply network, **5,526** km of distribution)
TYPE OF WORK	
interventions due to network failure/leak detection	**5,252 interventions** (3,886 due to fault reporting, 1,366 due to leak detection activities)
meter installations (new installation and replacement)	**6,237 interventions** (2,913 new installations and 3,324 replacements due to breakdowns/breakage) and **28,641** mass replacements under contract
network extension	**7.6 km** of expanded network
network reclamation	**35.1 km** of reclaimed network
drinking water quality control	**10,477 samples** collected and **319,572 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2022)

size of sewerage network - *data in GIS*	**3,772** km
TYPE OF WORK	
interventions due to network failure	**3,908 interventions**
planned interventions	**1,442 interventions**
network extension	**10.1 km** of expanded network
network reclamation	**8.9 km** of reclaimed network
quality control on wastewater for sewerage networks	**3,343 samples** collected and **55,794 tests** performed

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2021-2022)

	2021			2022		
(no.)	men	women	**total**	men	women	**total**
composition of the staff						
executives	3	1	**4**	3	1	**4**
managers	15	7	**22**	14	8	**22**
clerical workers	187	142	**329**	184	156	**340**
workers	259	5	**264**	269	3	**272**
total	**464**	**155**	**619**	**470**	**168**	**638**
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	**29**	**7**	**36**	**44**	**25**	**69**
outgoing staff	**22**	**10**	**32**	**39**	**11**	**50**
turnover rate (%)	**10.99**	**10.97**	**10.99**	**17.66**	**21.43**	**18.65**
incoming rate (%)	6.3	4.5	5.8	9.4	14.9	10.8
outgoing rate (%)	4.7	6.5	5.2	8.3	6.5	7.8

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2021-2022) (*)

	2021	2022
accidents (no.) (**)	9	10
total days of absence (***)	323	267
hours worked (****)	1,034,611	1,073,177
frequency index (FI) (number of accidents per 1,000,000/working hours)	**8.70**	**9.32**
severity index (SI) (days of absence per 1,000/working hours)	**0.31**	**0.25**

(*) Some figures for 2021 have been updated following consolidation.
(**) 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. As a result of consolidation, the figure for 2021 was amended, requiring a recalculation of the severity and frequency indices as well.

TRAINING (2021-2022) (*)

course type, hours provided and costs

	courses (no.)		training (hours)		costs (€)	
course type	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**
advanced training (**)	2	0	182	0	2,641	0
IT	3	2	398	24	3,962	2,100
technical-specialised	44	112	4,298	5,593	58,104	61,250
legal	5	4	809	490	6,603	27,290
managerial	54	30	2,249	1,924	71,309	95,300
safety	46	40	4,102	2,725	60,745	50,823
total	**154**	**188**	**12,038**	**10,756**	**203,364**	**236,763**

employees trained

	2021			2022 (***)		
(no.)	men	women	**total**	men	women	**total**
	464	154	**618**	485	172	**657**
breakdown of training hours by qualification						
executives	68	10	**78**	104	21	**125**
managers	309	71	**380**	217	191	**408**
clerical workers	2,333	1,583	**3,916**	1,635	1,325	**2,960**
workers	7,612	52	**7,664**	7,220	43	**7,263**

(*) Some figures for 2021 have been updated following consolidation.
(**) 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.

Throughout the year, numerous courses on **safety, regulations under Legislative Decree no. 231/2001, preventing corruption**, and **specific technical and operational training** were offered.
The first course on **diversity and inclusion** was provided to the entire HR structure, along with an experiential pilot *team-building day*.
The entire corporate population was trained on *cybersecurity* and *data protection*, and specialized training on regulatory updates was provided for various organisational structures.
In addition, the *Reconnect People* course for managers was introduced, emphasizing managerial management, organisational conflict, and internal and external communication.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS (*)	u. m.	2020	2021	2022	Δ% 2022/2021
WATER BALANCE					
drinking water from the environment	**Mm³**	**148.7**	**147.0**	**144.0**	**-2.0**
from the surface	*Mm³*	*95.4*	*93.5*	*92.1*	*-1.5*
from wells	*Mm³*	*41.9*	*43.5*	*42.8*	*-1.6*
from springs	*Mm³*	*10.7*	*9.3*	*9.1*	*-2.2*
of which water from other aqueduct systems	*Mm³*	*0.7*	*0.66*	*0.74*	*12.1*
total drinking water leaving the aqueduct system (e) = (a+b+c+d)	**Mm³**	**84.5**	**87.9**	**87.4**	**-0.6**
total drinking water dispensed and billed in the network (a)	**Mm³**	**76.6**	**78.8**	**80.7**	**2.4**
measured volume of water delivered to users	*Mm³*	*76.6*	*78.1*	*80.0*	*2.4*
volume consumed by users and not measured	*Mm³*	*0*	*0.66*	*0.74*	*12.1*
total drinking water authorised and not billed in the network (b)	**Mm³**	**0.4**	**0.4**	**0.4**	**-**
measured unbilled authorised consumption	*Mm³*	*0*	*0*	*0*	-
unmeasured unbilled authorised consumption	*Mm³*	*0.4*	*0.4*	*0.4*	-
drinking water exported (sub-distributors) (c)	**Mm³**	**0.7**	**0.9**	**0.005**	**-99.4**
measured process losses (d)	**Mm³**	**6.8**	**7.8**	**6.3**	**-19.2**
LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks (**)	Mm³	64.2	59.1	57.3	-3.0
water loss percentages	%	43.2	40.2	39.6	-1.5
TREATED WASTE WATER					
water treated in the main treatment plants	**Mm³**	**97.4**	**98.3**	**93.4**	**-5.0**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water	**no.**	**288,298**	**296,620**	**319,572**	**7.7**
of which no. analytical tests on surface water (***)	*no.*	*26,665*	*24,949*	*29,435*	*18.0*
no. analytical tests on waste water	**no.**	**38,293**	**38,676**	**55,794**	**44.2**

(*) Some figures for the 2020-2021 two year period have been updated following consolidation. The 2022 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.	2020	2021	2022	Δ% 2022/2021
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER					
materials					
sodium hypochlorite	t	1,117	1,097	1,102	0.5
sodium chloride	t	347	349	376	7.7
hydrochloric acid	t	403	402	392	-2.5
flocculant	t	5,055	5,015	3,883	-22.6
purate	t	349	414	344	-16.9
sulphuric acid	t	523	608	515	-15.3
oxygen	t	90	76	19	-75.0
acetic acid	t	113	112	63	-43.8
carbon dioxide (excluding drinking fountains)	t	634	648	838	29.3
ferrous chloride	t	45	37	22	-40.5
phosphoric acid	t	13	18	15	-16.7
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	158	307	275	-10.4
sodium hypochlorite	t	61	64	45	-29.7
peracetic acid, caustic soda, polyamine/anti-foaming agent	t	13	12	12	-
polyaluminium chloride (PAC)	t	4,382	4,122	3,903	-5.3
lime	t	527	693	523	-24.5
acetic acid 80%	t	712	684	743	8.6
OTHER CONSUMPTION					
drinking water	**m³**	**182,775**	**275,109**	**191,432**	**-30.4**

(*) Some figures for 2021 have been updated following consolidation.

ENERGY CONSUMPTION	u. m.	2020	2021	2022	Δ% 2022/2021
FUELS (*)					
process fuels - wastewater					
methane	Sm^3	84,214	90,195	93,889	4.1
biogas produced	m^3	609,120	593,478	562,421	-5.2
heating fuels					
methane	Sm^3	60,429	60,641	63,125	4.1
diesel fuel	l	4,500	5,000	4,125	-17.5
lpg	l	0	1,750	2,170	24.0
vehicle fuels					
diesel	l	349,724	360,131	363,564	1.0
petrol	l	26,913	26,172	28,515	9.0
ELECTRICITY (*)					
total electricity for drinking water	**GWh**	**72.6**	**71.2**	**73.5**	**3.2**
electricity for water pumping stations	*GWh*	*71.1*	*69.6*	*71.1*	*2.2*
electricity for offices	*GWh*	*1.5*	*1.6*	*2.4*	*50.0*
total electricity for waste water	**GWh**	***34.6***	***35.0***	***34.9***	**-0.3**
electricity for treatment	*GWh*	*30.5*	*30.5*	*30.4*	*-0.3*
electricity for pumping stations	*GWh*	*4.0*	*4.4*	*4.4*	-
electricity for offices	*GWh*	*0.1*	*0.1*	*0.1*	-

(*) Some figures for the 2020-2021 two year period have been updated following consolidation.

ENERGY EFFICIENCY (2020-2022)

	energy savings achieved (kWh)		
action	**2020**	**2021**	**2022**
network efficiency improvement	4,110,000	3,195,000	1,500,000
Soa Coverciano – *Power quality* management	-	-	3,990
Anconella - New pump impellers #3 and #6	-	-	250,000
offices *relamping*	-	6,700	-

Approximately 1.5 GWh of energy reductions are attributed to **optimisation actions in the water distribution network**. New impellers that permit reduced dissipative adjustments at low flow rates have also helped to improve the efficiency of the final thrust section of the Anconella potable water treatment facility. The electronic device test to optimise the Coverciano power plant's input power management (SOA) was also successful, albeit with modest absolute values for the installation situation, but with a 7.5% reduction in consumption.

WASTE	u.m.	2020	2021	2022	Δ% 2022/2021
SPECIFIC WASTE FROM TREATMENT OF WASTEWATER (*)					
treatment sludge	t	28,760	30,873	29,978	-2.9
sand and sediment from treatment	t	1,328	1,296	1,199	-7.5
WASTE PURSUANT TO ITALIAN LEGISLATIVE DECREE NO. 152/06 EXCLUDING SLUDGE AND SAND (*)					
hazardous waste	t	32.6	83.6	26.8	-67.9
non-hazardous waste	t	12,054	8,009	7,726	-3.5

(*) Some figures for the 2020-2021 two year period have been updated following consolidation.

TOTAL COD IN INPUT AND OUTPUT - SAN COLOMBANO TREATMENT PLANT (2020-2022)

(t/year)	2020	2021	2022
COD_{in}	14,536	14,851	13,084
COD_{out}	1,321	1,691	1,415

OUTPUT PARAMETERS – SAN COLOMBANO TREATMENT PLANT (2020-2022) (*)

parameter	average values (mg/l) 2020	average values (mg/l) 2021	average values (mg/l) 2022
BOD_5	2.2	2.1	2.3
COD	13.8	15.6	15.8
SST	4.8	4.9	4.9
NH_4^+	0.5	1.0	0.8
phosphorous	0.8	0.7	0.8

(*) 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 (2020-2022) (*)

parameter	average values (mg/l) 2020	average values (mg/l) 2021	average values (mg/l) 2022
BOD_5	2.2	2.1	2.3
COD	14.3	17.1	16.0
SST	4.9	4.7	4.7
NH_4^+	0.7	1.1	1.0
phosphorous	0.9	0.8	0.9

(*) 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.

PURIFICATION EFFICIENCY SAN COLOMBANO TREATMENT PLANT (2020-2022)

parameter	average values (%) 2020	average values (%) 2021	average values (%) 2022
$100x(COD_{in} - COD_{out})/COD_{in}$	89.4	93.2	87.4
$100x(SST_{in}-SST_{out})/SST_{in}$	95.1	92.3	91.2
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	97.9	95.8	97.3
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	74.0	72.7	73.7

PURIFICATION EFFICIENCY OF THE MAIN TREATMENT PLANTS (2020-2022) (*)

parameter	average values (%) 2020	average values (%) 2021	average values (%) 2022
$100x(COD_{in} - COD_{out})/COD_{in}$	90.9	88.4	89.2
$100x(SST_{in}-SST_{out})/SST_{in}$	96.1	93.9	92.6
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	97.4	95.8	96.9
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	73.3	73.0	73.4

(*) 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.

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 approximately 735,000 user accounts served.

MANAGEMENT SYSTEMS

Acque has implemented and certified an **Integrated Management System based on 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 (2022)

size of drinking-water network (*) - *data in GIS*	**6,067 km**
TYPE OF WORK	
interventions due to network failure/leak detection	**25,915 interventions** (25,278 due to faults, 637 leak detection)
meter installations (new installation and replacement)	**15,640 interventions** (6,620 new installation, 9,020 replacements)
network extension	**12.4 km** of expanded network
network reclamation	**51.8 km** of reclaimed network
drinking water quality control	**11,356 samples** collected and **326,759 tests** performed

SIZE OF NETWORK, WORKS AND CHECKS ON SEWERAGE WATER AND NETWORKS (2022)

size of sewerage network(*) - *data in GIS*	**3,095** km
TYPE OF WORK	
interventions due to network failure	**4,802 interventions**
planned interventions	**2,223 interventions**
network extension	**5.3 km** of expanded network
network reclamation	**7.4 km of** reclaimed network
quality control on wastewater for sewerage networks	**7,924 samples** collected and **116,775 tests** performed

(*) Estimated figure equal to the final figure for 2021.

HUMAN RESOURCES IN FIGURES

GENERAL DATA ON PERSONNEL (2021-2022)

	2021			2022		
(no.)	men	women	**total**	men	women	**total**
composition of the staff						
executives	2	2	**4**	2	2	**4**
managers	7	4	**11**	8	4	**12**
clerical workers	95	159	**254**	103	167	**270**
workers	150	0	**150**	157	1	**158**
total	**254**	**165**	**419**	**270**	**174**	**444**
contract type						
staff with permanent contract	249	163	**412**	259	173	**432**
of which part-time staff	*1*	*30*	***31***	*2*	*34*	***36***
permanent staff	0	2	**2**	1	1	**2**
staff under apprenticeship contracts	5	0	**5**	10	0	**10**
total	**254**	**165**	**419**	**270**	**174**	**444**
changes						
incoming staff	**11**	**2**	**13**	**30**	**15**	**45**
outgoing staff	**10**	**1**	**11**	**14**	**6**	**20**
turnover rate (%)	8.3	1.8	**5.8**	16.3	12.1	**14.6**
incoming rate (%)	4.3	1.2	**3.1**	11.1	8.6	**10.1**
outgoing rate (%)	3.9	0.6	**2.6**	5.2	3.5	**4.5**

The company's workforce increased significantly from 419 in 2021 to 444 in 2022 as a consequence of the internalization of some areas formerly managed by the associated company Ingegnerie Toscane and the incorporation of new facilities formerly managed by other companies.

INDUSTRIAL ACCIDENTS AND FREQUENCY AND SEVERITY INDICES (2021-2022)

	2021	2022
accidents (no.)	7	7
total days of absence (*)	359	317
hours worked	654,851	667,351
frequency index (FI) (number of accidents per 1,000,000/working hours)	**10.69**	**10.49**
severity index (SI) (days of absence per 1,000/working hours)	**0.55**	**0.48**

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

TRAINING 2021-2022

course type, hours provided and costs (*)

	courses (no.)		training (hours)		costs (€)	
course type	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**
IT	2	4	403	1,000	0	1,320
new hires	1	1	1,001	2,162	0	0
technical-specialised	33	35	1,766	1,857	12,488	29,600
managerial	3	4	97	311	270	2,800
safety	36	27	4,105	3,325	9,891	21,208
environment	1	3	8	50	0	2,701
cross-cutting	4	9	148	311	0	6,386
training pursuant to Legislative Decree no. 231/01	1	1	250	41	0	0
e-learning training	7	11	386	77	0	0
total	**88**	**95**	**8,164**	**9,134**	**22,649**	**64,015**

employees trained

	2021 (**)			2022		
(no.)	men	women	**total**	men	women	**total**
	286	174	**460**	274	161	**435**
breakdown of training hours by qualification						
executives	116	32	**148**	99.5	70.5	**170**
managers	161	43	**204**	229.5	112.5	**342**
clerical workers	1,933	3,314	**5,247**	3,251	3,610	**6,861**
workers	2,565	0	**2,565**	1,740	21	**1,761**

(*) Emergency tests are excluded; by new hires, we mean the coaching of new staff by more experienced workers. E-learning training is training on the usable integrated management system through SAP Success Factor.
(**) The figures are higher than the number of employees, as they include employees of other companies, posted workers and workers who provided services only for a few months of the year.

ENVIRONMENTAL ACCOUNTS

PRODUCTS AND ANALYTICAL TESTS	u. m.	2020	2021	2022	Δ% 2022/2021
WATER BALANCE (*)					
drinking water from the environment	**Mm³**	**74.8**	**74.4**	**74.4**	**-**
from the surface	*Mm³*	*3.3*	*3.1*	*3.1*	-
from wells	*Mm³*	*57.3*	*57.5*	*57.5*	-
from springs	*Mm³*	*6.3*	*6.3*	*6.3*	-
of which water from other aqueduct systems	*Mm³*	*7.9*	*7.5*	*7.5*	-
total drinking water leaving the aqueduct system (e) = (a+b+c+d)	**Mm³**	**46.3**	**47.3**	**47.3**	**-**
total drinking water dispensed and billed in the network (a)	**Mm³**	**43.9**	**44.2**	**44.2**	**-**
measured volume of water delivered to users	*Mm³*	*43.7*	*43.9*	*43.9*	-
volume consumed by users and not measured	*Mm³*	*0.2*	*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*	*0.1*	*0.1*	-
unmeasured unbilled authorised consumption	*Mm³*	*0.2*	*0.2*	*0.2*	-
drinking water exported to other systems (c)	**Mm³**	**1.0**	**1.2**	**1.2**	**-**
measured process losses (d)	**Mm³**	**1.1**	**1.6**	**1.6**	**-**
LOSS ASSESSMENT ACCORDING TO ARERA RESOLUTION 917/17 R/IDR					
water leaks	Mm³	28.5	27.1	27.1	-
water loss percentages	%	38.1	36.4	36.4	-
TREATED WASTE WATER					
water treated in the main treatment plants	**Mm³**	**46.4**	**44.6**	**41.9**	**-6.0**
ANALYTICAL TESTS ON DRINKING WATER AND WASTE WATER					
no. analytical tests on drinking water (including analytical tests on surface water)	**no.**	**357,585**	**297,342**	**362,759**	**22.0**
no. analytical tests on waste water	**no.**	**122,766**	**122,803**	**116,775**	**-4.9**

(*) The 2021 figures have been restated following consolidation and differ from those previously published. The 2022 figures are estimated to be equal to those for 2021.

RESOURCES USED	u. m.	2020	2021	2022	Δ% 2022/2021
COLLECTION, SUPPLY AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER (*)					
materials					
laboratory reagents (chemical section and microbiological section)	t	2	2	2	0.0
sodium hypochlorite	t	180	231	240	3.9
hydrochloric acid	t	478	339	343	1.2
potassium permanganate	t	4	4	5	25.0
aluminium polychloride	t	209	194	210	8.2
DREFLO 908 PG powder	t	0	0	1	-
salt in bags	t	1	1	0	-100
sodium chloride	t	367	362	341	-5.8
caustic soda	t	2	1	2	100
citric acid	t	3	1	0	-100
alifons L	t	0.13	0	0.05	-
oxalic acid	t	0	0	0.025	-
sodium hydroxide sol. 30%	t	0	0	0.25	-
DRYFLOC™ Polyelectrolyte EM494SFC	t	0	0	0.10	-
WASTE WATER TREATMENT					
materials					
polyelectrolyte emulsion	t	234	194	194	-
aluminium polychloride	t	20	8	6	-25.0
ferric chloride for sludge dehydration	t	528	546	570	4.4
sodium hypochlorite for final disinfection	t	29	11	42	281.8
acetic acid	t	0	0.05	0	-100.0
sulphuric acid	t	1	0	0	-
caustic soda (sodium hydroxide) - Solvay	t	2	1	0	-100.0
citric acid removed	t	0	0.05	0.15	200.0
biotek base L - biological reactivator	t	0.04	0	0	-
biotek clar – biological reactivator	t	0.3	0.3	0	-100.0
desmell Bio L – odorogenic emissions treatment	t	0	0.1	0.1	-
nutrients	t	1,136	1,320	867	-34.3
hydrochloric acid 9%	t	0	0	0.5	-

OTHER CONSUMPTION					
drinking water (*)	**m³**	**284,305**	**295,508**	**295,508**	**-**
drinking water consumed for non-industrial water uses (offices, outside showers, etc.)	*m³*	*215,604*	*225,835*	*225,835*	-
drinking water consumed for process water uses (washing machinery and bays, etc.)	*m³*	*68,701*	*69,673*	*69,673*	-

(*) Due to consolidation, figures for 2021 have been revised. It is estimated that figures for 2022 will be identical to those for 2021.

In 2022, Acque **reused** approximately **201,501 m³ of recovered water** for washing the sheets of sludge dehydration equipment (belt presses).

ENERGY CONSUMPTION	**u. m.**	**2020**	**2021**	**2022**	**Δ% 2022/2021**
FUELS					
process fuels - drinking water/non-drinking water					
diesel fuel	l	1,500	2,050	1,100	-46.3
process fuels - wastewater					
diesel fuel	l	0	500	550	10.0
heating fuels					
methane	Sm^3	50,743	55,583	49,576	-10.8
lpg	l	15,419	17,847	11,130	-37.6
vehicle fuels					
diesel	l	228,802	240,882	247,012	2.5
petrol	l	15,373	26,950	44,215	64.1
methane	kg	23,884	15,308	9,589	-37.4
ELECTRICITY					
total electricity for drinking water	**GWh**	**51.1**	**51.0**	**53.3**	**4.5**
electricity for water pumping stations	*GWh*	*50.7*	*50.3*	*52.6*	*4.6*
electricity for offices	*GWh*	*0.4*	*0.7*	*0.7*	-
total electricity for waste water	**GWh**	**32.3**	**31.9**	**30.3**	**-5.0**
electricity for treatment	*GWh*	*24.7*	*24.5*	*23.9*	*-2.4*
electricity for pumping stations	*GWh*	*7.4*	*7.0*	*6.0*	*-14.3*
electricity for offices	*GWh*	*0.2*	*0.4*	*0.4*	*2.4*

ENERGY EFFICIENCY (2020-2022)

	energy savings achieved (kWh)		
action	**2020**	**2021**	**2022**
Pieve a Nievole (PT) inter-municipal treatment plant: implementation of microbubbles oxidative section Line 2	-	303,095	324,517
treatment plant via Hangar Pontedera (PI): implementation of microbubbles oxidative section	252,650	208,020	198,328
La Fontina (PI) treatment plant: replacement of air distribution plates lines 1 and 2	577,230	472,605	589,760

Acque has implemented energy efficiency improvements, such as the replacement of the oxygenation system on the Pieve a Nievole and Pontedera (PI) treatment plants, which led to the 2022 energy savings indicated in the table.

WASTE	**u. m.**	**2020**	**2021**	**2022**	**Δ% 2022/2021**
SPECIFIC WASTE FROM TREATMENT OF WASTE WATER					
treatment sludge	t	19,880	20,247	18,660	-7.8
sand and sediment from treatment	t	1,982	1,413	1,359	-3.8
WASTE EXCLUDING SLUDGE AND SAND					
hazardous waste	t	25.0	16.8	20.2	20.2
non-hazardous waste (*)	t	72,920	63,778	59,025	-7.5

TOTAL COD IN INPUT AND OUTPUT (2020-2022) (*)

(t/year)	2020	2021	2022
COD_{in}	22,808	22,021	16,860
COD_{out}	1,268	1,212	988

(*) 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 (2020-2022) (*)

parameter	average values (mg/l) 2020	average values (mg/l) 2021	average values (mg/l) 2022
BOD_5	5.5	4.7	7.2
COD	25.5	24.3	32.0
SST	5.0	5.9	8.3
NH_4^+	3.0	3.3	3.9
phosphorous	2.0	2.2	2.6

(*) 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 (2020-2022) (*)

parameter	average values (%) 2020	average values (%) 2021	average values (%) 2022
$100x(COD_{in} - COD_{out})/COD_{in}$	95.0	95.4	94.1
$100x(SST_{in}-SST_{out})/SST_{in}$	97.8	98.2	97.3
$100x(NH_4^+{}_{in} - NH_4^+{}_{out})/ NH_4^+{}_{in}$	92.7	92.7	91.9
$100x(PO_4^{-3}{}_{in} -PO_4^{-3}{}_{out})/ PO_4^{-3}{}_{in}$	73.0	68.3	71.3

(*) 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[226], 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 2022, 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 are 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	123,433
inhabitants served	801,000 (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 de Sula
shareholders	Acea SpA 60.65%, Ireti SpA 39.35%
no. of employees	410
turnover (in € thousand)	43,332

226 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.

The company has provided **65 training seminars** in a variety of areas, such as Quality Management Systems, gender equality, anti-bribery management, environmental sustainability, and climate change, with the goal of enhancing and developing people's skills. In addition, **occupational health and safety** training continued, with 70 courses on timely medical care, mental health, and occupational health. All employees were vaccinated and updated on **Biosafety and Personnel Protection Measures and Biosafety Protocols** as part of a **vaccination programme** that included specific **training** on **COVID-19 risks**.

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 initiated in 2006 to restore degraded areas of the reserve, with the aim of planting 1 million fruit and timber trees on 876 hectares by 2022. In addition, **fire prevention and suppression** activities continued. Due to the watch towers constructed over the past few years, a dedicated team is able to intercept and extinguish numerous fires before they spread (3 cases in 2022). Finally, **guidance was provided on the 6 Sectoral Committees for Water Management**, including support in preparing reports and plans to preserve supply micro-basins.

With a focus on the **rural communities of Merendón**, Aguas de San Pedro organised **24 workshops** dedicated to **health and environmental protection** and, in particular, hygiene in the communities of the Rio Manchaguala, Rio Frio and El Palmar micro-basins, with sessions dedicated to children belonging to the Children's Health 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	194,378
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
purpose of the project	commercial management of the water service
shareholders	Acea SpA 100%
no. of employees	148
turnover (in € thousand)	5,512

Through the implementation of an educational campaign, Acea Dominicana is **educating** elementary school students in the municipality of Boca Chica about the importance of **water conservation**. The Company conducts **reforestation** activities to **restore and protect forest ecosystems**, which resulted in the planting of 1,050 native and endemic trees in 2022. Taking into account the reforestation activities conducted in previous years, the Company has planted a total of 6,350 trees.
Skill development for employees continued during the year, with courses on customer service, risk assessment, occupational safety, stress management, and on social aspects such as raising awareness about violence against women, for a total of 1,864 hours of training.

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. These are **Consorcio Agua Azul**, **Consorcio Acea**, **Consorcio Acea Lima Norte**, and **Consorcio Acea Lima Sur**, while **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 **Consorcio ACEA Lima Norte:** 7.01.2021 – 7.01.2024 **Consorcio Acea Lima Sur:** 18.12.2021 – 18.12.2024
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%)
no. of employees	**Consorcio Agua Azul:** 31 **Consorcio Acea:** 987 **Consorcio ACEA Lima Norte:** 645 **Consorcio Acea Lima Sur:** 241
turnover (in € thousand)	**Consorcio Agua Azul:** 15,309 **Consorcio Acea**: 8,323 **Consorcio ACEA Lima Norte:** 13,342 **Consorcio Acea Lima Sur:** 7,868

Specifically:

- **Consorcio Agua Azul**, a subsidiary of **Acea SpA**, 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 253 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 maintenance activities on the drinking water and sewerage systems for the **Surquillo area in the southern area 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 2022. In addition, specialised staff training continued, including support for the **undergraduate and graduate education** of two employees.

Because of the improvement in the pandemic situation, Consorcio Agua Azul has been allowed to restart operations aimed at strengthening ties with the community, such as finishing the installation of **new toilette facilities** in the area's seven schools. In the same institutions, 2,182 **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.

Consorcio Acea, **Consorcio Acea Lima Norte** and **Consorcio Acea Lima Sur** follow the standards of the Certified Management Systems obtained from 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 a **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 2022, the three Consortia began **employee training initiatives on inclusion and organisational wellness**, covering subjects such as gender equality and healthy nutrition, as well as **occupational health and safety**.

To protect the land, the three consortia have taken measures to lower **environmental impact** by disposing of 100% of electromechanical, uniform, and PPE waste appropriately.

GRI CONTENT INDEX: REPORTING PRINCIPLES, UNIVERSAL STANDARDS, SPECIFIC STANDARDS AND MATERIAL TOPICS

The Sustainability Report has been prepared **in accordance with the GRI Standards**. The Index incorporates the news of the 2021 edition of the **Universal Standards** and contains:

- the "Statement of use";
- reference to the **GRI 1: Foundation 2021, i.e. to the reporting principles**;
- definition of the **30 general disclosures (GRI 2: General Disclosures 2021)**, the **3 disclosures on material topics (GRI 3: Material Topics 2021)** and the **71 specific disclosures of the GRI** (also including the GRI 306-3 of GRI 306: Effluents and waste 2016, as required by the framework, which therefore appears twice in the index), selected, as part of the respective Specific Standards, for their **correlation with Acea's material topics**, with evidence of the sections and pages of the document, where it is possible to consult the requested contents or the feedback directly reported in the index.

The GRI content index, in accordance with the specific Standards, contains the list of related material topics of the Acea Group; for details on the compliance of Acea's material topics of high relevance and the GRI specific disclosures, please refer to Table no. 1 (see *Disclosing sustainability: methodological note*).

GRI CONTENT INDEX

Statement of use	Acea has reported in accordance with the GRI Standards for the period from 1 January 2022 to 31 December 2022.	
GRI standard	**definition of GRI standards notes (replies or reporting of omissions) sections and reference pages**	**Alignment with Legislative Decree no. 254/2016**
UNIVERSAL STANDARDS		
GRI 1: FOUNDATION 2021		
GRI 2: GENERAL DISCLOSURES 2021		
	THE ORGANIZATION AND ITS REPORTING PRACTICES	
	2-1 Organizational details. Acea SpA Piazzale Ostiense 2, 00154 Rome *Disclosing sustainability: methodological note*, pages 15-17 and Tables nos. 2 and 3; *Corporate identity* pages 20-21 and Chart no. 2, 30.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
	2-2 Entities included in the organization's sustainability reporting (specify the differences between the list of entities included in its financial reporting and the list included in its sustainability reporting). In addition to the data requested, highlighted in the *Methodological note*, sometimes the scope varies by default. This change, again reported in the text, is primarily correlated to the different business sectors (and companies that belong to them) reported, or, in residual cases, the centralised management of certain data, which, on the basis of the activities managed under service, does not cover the entire scope of reporting. *Disclosing sustainability: methodological note*, pages 15-17 and Tables nos. 2 and 3 and note 23; *Relations with stakeholders* pages 96, 149; *Relations with the environment* pages 206, 210, 214; *Environmental Accounts* pages 268, 272, 275.	**Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries
	2-3 Reporting period, frequency and contact point. *Disclosing sustainability: methodological note* pages 10-11, 17; *GRI Content index* page 250. Questions and information can be requested at the email address RSI@aceaspa.it	**Art. 2 paragraph 1**: public interest bodies prepare a disclosure for each financial year **Art. 3 paragraph 3**: the information (...) is provided with a comparison with the information provided in previous years
	2-4 Restatements of information. Any recalculation or groupings that require changes to the data published in 2021 are appropriately flagged and justified in the report. *Disclosing sustainability: methodological note* page 11; *Relations with stakeholders* page 142; *Relations with the environment* pages 229-230 Table no. 69.	**Art. 3 paragraph 3**: the information (...) is provided with a comparison with the information provided in previous years

2-5 External assurance (current policy and practice for seeking external assurance, etc.). *Disclosing sustainability: methodological note* pages 10-11; *Opinion Letter* pages 303-305.	**Art. 3 paragraph 10**: (...) verification of the non-financial statement
ACTIVITIES AND WORKERS	
2-6 Activities, value chain and other business relationships (activities, products, services, markets served, supply chain, etc.). *Corporate identity* pages 20-21 and Chart no. 2, 22-25, 30 and Table no. 5; *Relations with stakeholders* pages 96-99 and Table no. 18, 114, 129, 149-150, 179.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-7 Employees (no. of employees for employment contract – permanent, temporary, full-time, part-time – broken down by gender and by region). Over 99% (6,713 employees out of 6,763) of the Company population has Italian citizenship; the rest is equally distributed between other citizenships of EU countries (24) and non-EU countries (26). *Corporate identity* pages 20, Table no. 4, 46-47; *Relations with stakeholders* pages 139, 157-161 and Tables nos. 41-42.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
2-8 Workers who are not employees (n. of workers who are not employees and whose work is controlled by the organization, describying the most common types of contractual relationship with the organization and the type of work they perform). In 2022, 191 non-employees (130 men and 61 women) worked for Acea with a temporary contract activated through specialized agencies (temporary). *Relations with stakeholders* pages 139, 157 and Table no. 41.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **paragraph 2, letter d)**: aspects relating to staff management
GOVERNANCE	
2-9 Governance structure and composition (including committees of the highest governance body, executive and non-executive members, etc.). *Corporate identity* pages 70 and Chart no. 13, 71 and Table no. 10, 72.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-10 Nomination and selection of the highest governance body (describing the criteria used, independence and competencies, etc.). In the composition of corporate bodies, Acea ensures balanced representation of genders, as set out in Law, and guarantees the presence of Independent Directors, governed by the By-laws and current regulations. Gender diversity of the Governance Body and the Committees is an important element, in tempering "single-mindedness" as well as for the different ways in which men and women exercise their leadership. Selection processes involve shareholders who, in accordance with the recommendations of the *Corporate Governance Code*, are guided in the choice of candidates to propose in the lists by the guidelines provided by the Board of Directors of Acea, having received the opinion of the Appointments Committee and taking into account the results of self-assessment, on the size and composition of the administrative body. *Corporate identity* page 71.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-11 Chair of the highest governance body (report whether the chair of the highest governance body is also a senior executive, if the chair is also a senior executive, explain their function with the organization's management, the reasons for this arrangement, and how conflicts of interest are prevented and mitigated). *Corporate identity* page 71 and Table no. 10.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-12 Role of the highest governance body in overseeing the management of impacts (including the role of the highest governance body and of senior executives in developing, approving, and updating the organization's strategies, policies, and goals related to sustainable development, etc.). *Disclosing sustainability: methodological note* pages 11-17; *Corporate identity* pages 46-49 and Chart no. 12, 50, 70 and Chart no. 13, 71-74, 78-85; *Relations with stakeholders* page 179.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **lettera c)**: l'impatto, ove possibile sulla base di ipotesi o scenari realistici anche a medio termine, sull'ambiente nonché sulla salute e la sicurezza
2-13 Delegation of responsibility for managing impacts (process for delegating responsibility for managing the organization's impacts on the economy, the environment and people, etc.). The Board of Directors confers management powers to the Chief Executive Officer, who, in the context of the corporate macrostructure established by the same Board, confers powers and proxies to management, in accordance with the missions and responsibilities of the different structures. The standard practice for any type of assignment of powers, and therefore for economic, environmental and social areas, is based on analysis of the requirement/need for such assignment.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **lettera c)**: l'impatto, ove possibile sulla base di ipotesi o scenari realistici anche a medio termine, sull'ambiente nonché sulla salute e la sicurezza
2-14 Role of the highest governance body in sustainability reporting. *Disclosing sustainability: methodological note* page 11; *Corporate identity* page 72.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **paragraph 7**: the responsibility to ensure that the report is drawn up and published in accordance with the provisions of this legislative decree lies with the directors of the public interest body

2-15 Conflicts of interest (describe the processes for the highest governance body to ensure that conflicts of interest are prevented and mitigate, etc.). The risk of conflicts of interest in Acea is monitored employing corporate governance systems and procedures (Management, Organisation and Control Model, Code of Ethics, and Independent Directors). These tools act in different contexts where conflicts of interest could arise: in relations between controlling shareholders and minority shareholders, between Acea and Related Parties, and between Acea and the Public Administration. *Corporate identity* pages 70-71.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-16 Communication of critical concerns (whether and how critical concerns are communicated to the highestgovernance body, etc.). The Board of Directors (BoD) receives constant information on potentially critical situations, primarily through the work performed by the Control and Risks Committee, to which the Internal Audit Function manager periodically reports, which interacts with BoD. The activities performed and results of activity of the Supervisory Body (pursuant to Italian Legislative Decree no. 231/01), which may identify the risk of liability for the Company, are subject to information flows to the BoD. The Chief Executive Officer, also in his role as Director in Charge of the Internal Control and Risk Management System, provides constant updates to the Board on developments in management and the existence of any potentially critical situations. *Corporate identity* pages 72-73, 77-84 and Table no. 12, 86.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **paragraph 2, letter e)**: regarding human rights, the measures adopted to prevent breaches thereof and measures to avoid conduct and actions that are in any case discriminatory
2-17 Collective knowledge of the highest governance body (measures taken to advance the collective knowledge, skills, and experience on sustainable development). *Disclosing sustainability: methodological* note page 11; *Corporate identity* pages 46, 70 and Chart no. 13, 71-72.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-18 Evaluation of the performance of the highest governance body (overseeing the management of the organization's impacts on the economy, environment, and people). Non-executive Directors receive a fixed fee, set by the Shareholders' Meeting on the basis of the commitment requested of them. *Corporate identity* pages 71-72, 86; *Relations with stakeholders* pages 175.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-19 Remuneration policies (of the highest governance body and senior executives). For Top Management, Executives Holding Key Positions and other executives with roles of particular impact on the Acea Group's business, the clawback clause applies: i.e. the right to request the return of variable components of remuneration, short and medium-long term linked to performance and results, if these do not prove to be effective or are the result of intentional and/or gross negligence. There are no agreements that provide for fixed indemnities or clauses aimed at safeguarding Group Managers in the event of termination of the employment relationship, referring, on this subject, to the institutions provided for by the CCNL for Executives of Public Utility Service Companies and the "Executive Exodus Management". This "Executive Exodus Management" policy refers to the collective agreement and takes into account the monthly payments in terms of fixed and variable short and long term. The long-term incentive system (LTIP) and the short-term annual incentive system (MBO) are linked, in addition to economic and financial objectives, also to environmental objectives and with an impact on sustainability, including a composite sustainability indicator. For details, please refer to the Report on the remuneration policy and remuneration paid. *Corporate identity* pages 70 and Chart no. 13, 71, 73; *Relations with stakeholders* page 175.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-20 Process to determine remuneration. In 2022, no external consulting companies were involved in processes for the determination of remuneration. *Corporate identity* pages 70 and Chart no. 13, 71, 73; *Relations with stakeholders* pages 162-163, 174-175.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-21 Annual total compensation ratio (ratio of the annual total compensation for the highest-paid individual to the average annual total compensation for all employees - excluding the highest-paid individual; ratio of the percentage increase in annual total compensation for the highest-paid individual to the average percentage increase in annual total compensation for all employees). The ratio between the total annual salary of the person who received, in 2022, the maximum salary and the average salary of employees is equal to 12.26. There was no increase in the remuneration of the highest paid person between 2021 and 2022, a circumstance partly attributable to the departure of the previous CEO in September 2022. *Corporate identity* page 73.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
STRATEGY, POLICIES AND PRACTICES	
2-22 Statement on sustainable development strategy (statement from the highest governance body or most senior executive about the relevance of sustainable development to the organization and its strategy for contributing to this). *Letter to the stakeholders* page 4; *Corporate identity* pages 22-25, 44-49; *Relations with stakeholders* pages 139-140, 143-144, 186-187, 189.	**Art. 3 paragraph 7**: the responsibility to guarantee that the report is (...) compliant rests with the directors

2-23 Policy commitments. *Corporate identity* pages 44, 46-49, 50-69, 70, 74, 77, 80-81 Table no. 12, 85, 86 Table no. 14; *Relations with stakeholders* page 147, 167, 169, 175-176, 188; *Relations with the environment* pages 211, 227.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company
2-24 Embedding policy commitments. *Corporate identity* pages 46, 70 Chart no. 13, 80-81 Table no. 12; *Relations with stakeholders* pages 147-149, 174 Table no. 47, 175-176; *Relations with the environment* pages 211, 227.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company
2-25 Processes to remediate negative impacts. *Corporate identity* pages 78, 80-81 Table no. 12; *Relations with stakeholders* page 128.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company; **letter c)**: the impact, where possible on the basis of realistic assumptions or scenarios also in the medium term, on the environment as well as on health and safety
2-26 Mechanisms for seeking advice and raising concerns (describe the mechanisms for individuals to seek advice on implementing the policies and practices for responsible business conduct; raise concerns about the business conduct). *Corporate identity* pages 70 Chart no. 13, 77-78.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **paragraph 2, letter e)**: regarding human rights, the measures adopted to prevent breaches thereof and measures to avoid conduct and actions that are in any case discriminatory
2-27 Compliance with laws and regulations (including the total number of significant instances of non-compliance with laws and regulations; the total number and the monetary value of fines for instances of non-compliance). *Corporate identity* pages 46-49, 77-78, 84; *Relations with stakeholders* pages 111-114, 121, 128-129, 134, 143, 148, 165, 182; *Relations with the environment* page 198; *Environmental accounts* page 290.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them
2-28 Membership associations (industry, category and other associations in which it participates in a significant role). *Relations with stakeholders* pages 186-193; *Relations with the environment* page 196.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
STAKEHOLDER ENGAGEMENT	
2-29 Approach to stakeholder engagement (including a description of the categories of stakeholders engaged and how they are identified; the purpose of the engagement and how the organization seeks to ensure their meaningful engagement). *Disclosing sustainability: methodological note* pages 12-17 and Table no. 1; *Corporate identity* pages 22-29, 44, 73, 76-77, 87-90; *Relations with stakeholders* pages 100-106 and Tables nos. 19-20, 109, 111, 115, 118-121, 128-134, 138-146, 148, 152-156, 164-167, 169-171, 174, 175-178, 180-181, 184-193; *Relations with the environment* pages 196, 198.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model
2-30 Collective bargaining agreements (report the percentage of total employees covered by collective bargaining agreements; indicate how working conditions are determined for workers not covered by collective bargaining agreements). *Relations with stakeholders* page 164.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
GRI 3: MATERIAL TOPICS 2021	
3-1 Process to determine material topics. *Disclosing sustainability: methodological note* pages 12-17; *Corporate identity* pages 22-25, 34-39; *Indice dei contenuti GRI* pages 250-263.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **lettera c)**: **the impact, where possible on the basis of realistic assumptions or scenarios also in the medium term, on the environment as well as on health and safety**; **Art. 4 paragraph 1**: to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
3-2 List of material topics. *Disclosing sustainability: methodological note* pages 13-14, Table no. 1, 90-93 and Table no.15. *Environmental accounts* pages 250-263.	**Art. 4 paragraph 1**: to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

SPECIFIC STANDARDS AND MATERIAL TOPICS		
TOPIC	**ECONOMIC PERFORMANCE** **(related material topics: 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 30, 44-49, 50, 75, 77-84 and Table no. 12, 90-93 and Table no. 15.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 201: Economic Performance 2016	**201-1 Direct economic value generated and distributed (including revenues, operating costs, employee wages and benefits, payments to providers of capital, payments to government and community investments).** *Corporate identity* pages 30 and Table no. 5, 87-90, 93; *Relations with stakeholders* pages 162-163, 179, 181.	**Art. 3 paragraph 1, letter d)**: social aspects and aspects relating to staff management
	201-2 Financial implications and other risks and opportunities due to climate change. *Corporate identity* pages 22-25, 82; *Relations with the environment* pages 198, 223-225.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	201-3 Defined benefit plan obligations and other retirement plans. *Relations with stakeholders* pages 163-164 and Table no. 45.	**Art. 3 paragraph 1, letter d)**: social aspects and aspects relating to staff management
	201-4 Financial assistance received from government. *Corporate identity* pages 75 note 20.	-
TOPIC	**INDIRECT ECONOMIC IMPACTS** **(related material topics: 3, 4, 5, 8, 10, 11, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 24-26, 45-49, 50, 78-84 and Table no. 12, 87-90, 90-93 and Table no. 15; *Relations with stakeholders* pages 106-127, 144-146, 148-149.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 203: Indirect Economic Impacts 2016	**203-1 Infrastructure investments and services supported (the organization shall report: the extent of development of significant infrastructure investments; current or expected impacts on communities, including positive and negative impacts where relevant; whether these investments and services are commercial, in-kind, or pro bono engagements, etc.).** *Corporate identity* pages 87-90; *Relations with stakeholders* pages 106-127 and Tables nos. 21 and 28, 144-146, 187-188 and Chart no. 47; *Relations with the environment* page 204.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment as well as on health and safety
	203-2 Significant indirect economic impacts (examples of significant identified indirect economic impacts of the organization, including positive and negative impacts, etc.). *Corporate identity* pages 87-90; *Relations with stakeholders* pages 97-98, 106-127 and Table no. 21, 141-142, 144-146, 147-151 and Tables nos. 39-40; *Relations with the environment* page 207.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment as well as on health and safety
TOPIC	**PROCUREMENT PRACTICES** **(related material topics: 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 147-149.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

GRI 204: Procurement Practices 2016	**204-1 Proportion of spending on local suppliers (in relation to the significant locations of operation).** There is no specific preferential strategy for local suppliers, although, particularly for sourcing of works, the prevalence of local suppliers arises naturally. *Relations with stakeholders* pages 150-151 and Table no. 40.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them
TOPIC	**ANTI-CORRUPTION** **(related material topics: 2, 9, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 75, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* page 172.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through the **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 205: Anti-corruption 2016	**205-1 Operations assessed for risks related to corruption (report the total number and percentage of operations assessed for risks related to corruption).** *Corporate identity* pages 77-78.	**Art. 3 paragraph 1, letter c)**: the main risks generated or suffered; **paragraph 2, letter f)**: anti-corruption and bribery measures
	205-2 Communication and training about anti-corruption policies and procedures (report the total number and percentage of employees that the organization's anti-corruption policies and procedures have been communicated to). *Corporate identity* page 25; *Relations with stakeholders* pages 172, 173 Table no. 47.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **paragraph 2, letter f)**: anti-corruption and bribery measures
	205-3 Confirmed incidents of corruption and actions taken (total number and nature of confirmed incidents of corruption, etc.). No instances of corruption were recorded.	**Art. 3 paragraph 2, letter f)**: anti-corruption and bribery measures
TOPIC	**ANTI-COMPETITIVE BEHAVIOR** **(related material topics: 2, 11)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 50, 74-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 172, 182.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 206: Anti-competitive Behavior 2016	**206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices (number of legal actions pending or completed during the reporting period regarding anti-competitive behavior and violations of anti-trust and monopoly legislation).** *Relations with stakeholders* page 182.	**Art. 3 paragraph 1, letter b)**: fundamental indicators of non-financial performance
TOPIC	**MATERIALS** **(related material topics: 1, 5, 6, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with the environment* pages 196, 198, 222; *Environmental accounts*page 268.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

GRI 301: Materials 2016	**301-1 Materials used by weight or volume (materials that are used to produce and package the organization's primary products and services, by non-renewable and renewable materials used).** *Relations with the environment* pages 222 and Table no. 61, 226 and Table no. 65; *Environmental accounts* pages 279-281.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	301-2 Recycled input materials used. *Relations with the environment* page 222 and Table no. 61.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
TOPIC	**ENERGY** **(related material topics: 1, 3, 4, 5, 10, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 45-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 172, 154, 175-176; *Relations with the environment* pages 196-198, 206-211-213, 221-224.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 302: Energy 2016	**302-1 Energy consumption within the organization.** *Relations with the environment* pages 211-212, 222-224 and Table no. 62.	**Art. 3 paragraph 2, letter a)**: use of energy resources
	302-2 Energy consumption outside of the organization. *Relations with the environment* page 224.	**Art. 3 paragraph 2, letter a)**: use of energy resources
	302-3 Energy intensity. *Relations with the environment* pages 223 and Table no. 63, 224-225.	**Art. 3 paragraph 2, letter a)**: use of energy resources
	302-4 Reduction of energy consumption. *Relations with the environment* pages 210-212, 224-225 and Table no. 64.	**Art. 3 paragraph 2, letter a)**: use of energy resources
	302-5 Reductions in energy requirements of products and services. *Relations with the environment* pages 224-225.	**Art. 3 paragraph 2, letter a)**: use of energy resources
TOPIC	**WATER AND EFFLUENTS** **(related material topics: 1, 3, 5, 8, 10, 11, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 24-26, 45-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 115, 118-119, 121, 175-176; *Relations with the environment* pages 196-198, 203-206, 214, 217-221, 225-226.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 303: Water and effluents 2018	**303-1 Interactions with water as a shared resource.** *Relations with stakeholders* pages 115, 118-119, 121, 140; *Relations with the environment* pages 196, 203-206 and Table no. 50, 214, 217-220 and Table no. 59, 225-226 and Table no. 65; *Environmental accounts* pages 274-276.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company **Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	303-2 Management of water discharge-related impacts. *Relations with stakeholders* pages 119, 121; *Relations with the environment* pages 215-217, 219-221, 225-226; *Environmental accounts* pages 274-276.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	303-3 Water withdrawal. *Relations with the environment* pages 203-206 and Table no. 50, 214, 225-226 and Table no. 65; *Environmental accounts* page 279.	**Art. 3 paragraph 2, letter a)**: use of water resources
	303-4 Water discharge. *Relations with stakeholders* pages 121; *Relations with the environment* pages 215, 219-221 and Tables nos. 57 and 59, 225-226; *Environmental accounts* pages 277-278.	**Art. 3 paragraph 2, letter a)**: use of water resources; **letter c)**: the impact (...) on the environment
	303-5 Water consumption. *Relations with the environment* pages 217-219, 225-226; *Environmental accounts* pages 274-276.	**Art. 3 paragraph 2, letter a)**: use of water resources

TOPIC	**BIODIVERSITY** **(related material topics: 1, 3, 8, 10)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-17; *Corporate identity* pages 24-26, 33, 46-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 121, 175-176; *Relations with the environment* pages 198, 199-206, 219-221.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 304: Biodiversity 2016	**304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.** *Relations with the environment* pages 199-206 and Chart no. 48.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	304-2 Significant impacts of activities, products, and services on biodiversity. *Relations with stakeholders* page 119; *Relations with the environment* pages 199-206, 210.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	304-3 Habitats protected or restored. *Relations with the environment* pages 202-206.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk. *Relations with the environment* pages 199-206 and Chart no. 49.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
TOPIC	**EMISSIONS** **(related material topics: 3, 4, 11, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 24-26, 45-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders pages* 129-130, 142, 172, 175-176; *Relations with the environment* pages 196-198, 211-213, 222-224, 227-230.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 305: Emissions 2016	**305-1 Direct (Scope 1) GHG emissions.** Biogenic CO_2 was calculated for Environment Operations and Water Operations and in 2022 equalled 322,970 t. *Relations with the environment* pages 228-230 and Table no. 69; *Environmental accounts* pages 282-283, 286.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-2 Energy indirect (Scope 2) GHG emissions. *Relations with the environment* pages 229-230 and Table no. 69; *Environmental accounts* pages 282-283.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-3 Other indirect (Scope 3) GHG emissions. *Relations with the environment* pages 229-230 and Table no. 69.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-4 GHG emissions intensity. *Relations with the environment* pages 229-230 and Table no. 69.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-5 Reduction of GHG emissions as a direct result of reduction initiatives. *Relations with the environment* pages 210, 224-225 and Table no. 64, 229-230 and Table no. 69.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-6 Emissions of ozone-depleting substances (ODS). *Relations with the environment* page 228; *Environmental accounts* pages 257, 279, 281.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions
	305-7 Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions. *Relations with the environment* page 227 Table no. 66; *Environmental accounts* pages 282-283.	**Art. 3 paragraph 2, letter b)**: Greenhouse-gas emissions

TOPIC	**WASTE** **(related material topics: 3, 6, 10, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity pages* 22-25, 45-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15, 175-176; *Relations with the environment* pages 196-198, 210-214, 221, 231-235; *Environmental accounts* page 268.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 306: Effluents and waste 2016	**306-3 Significant spills.** During the reporting period, there were no cases of significant spills.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
GRI 306: Waste 2020	**306-1 Waste generation and significant waste-related impacts.** *Relations with the environment* pages 231-235.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	306-2 Management of significant waste-related impacts. *Relations with the environment* pages 231-235; *Environmental accounts* pages 282-285.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	306-3 Waste generated. *Relations with the environment* pages 231-235 and Tables nos. 70-73.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	306-4 Waste diverted from disposal. *Relations with the environment* pages 214, 231-235 and Tables nos. 70-73.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
	306-5 Waste directed to disposal. *Relations with the environment* page 231-235 and Tables nos. 70-73.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment
TOPIC	**SUPPLIER ENVIRONMENTAL ASSESSMENT** **(related material topics: 8, 10, 12)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 147, 149, 152-156; *Relations with the environment* pages 224, 229.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 308: Supplier Environmental Assessment 2016	**308-1 New suppliers that were screened using environmental criteria (indicate the percentage).** *Relations with stakeholders* pages 149, 152-156; *Relations with the environment* page 224.	**Art. 3 paragraph 1, letter c)**: the main risks generated or suffered (...) deriving from the business, its products, services or commercial relations, including, where relevant, supply and subcontracting chains
	308-2 Actual and potential negative environmental impacts in the supply chain and actions taken. *Relations with stakeholders* pages 152-156; *Relations with the environment* pages 224, 229.	**Art. 3 paragraph 1, letter c)**: the main risks generated or suffered (...) deriving from the business, its products, services or commercial relations, including, where relevant, supply and subcontracting chains; **paragraph 2, letter c)**: the impact (...) on the environment
TOPIC	**EMPLOYMENT** **(related material topics: 8, 9, 13)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 147, 152-156, 157, 162-163, 169-176, 178.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

GRI 401: Employment 2016	**401-1 New employee hires and employee turnover (report the total number and rate of new employee hires and employee turnover, broken down by age group, gender and region).** *Relations with stakeholders* pages 157-161 and Table no. 43.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees. *Relations with stakeholders* page 175.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
	401-3 Parental leave (including return-to-work rate and retention rates of employees that took parental leave, by gender). Acea operates in accordance with the Consolidated Law on supporting maternity and paternity (Italian Legislative Decree 151/2001 as amended), which governs leave, rest days, days off for specific reasons and economic support for female and male workers connected with maternity, paternity of children, adopted children and fostered children. The law prohibits any discrimination for reasons related to gender, with particular reference to any less favourable treatment on the basis of being pregnant, maternity and paternity. It establishes mandatory maternity leave for a period of five months and guarantees the work post during this period, imposing a prohibition on dismissal. It also establishes the reintegration of the employee into the activities performed prior to the leave period or equivalent activities, with fines applicable for employers contravening these rules. Therefore, 100% of employees making use of this type of leave maintain their post and return to work. The employees who took leave for parenthood in 2022 numbered 388, of which 164 were men and 224 women. All of these, after the leave period, returned to work and are still employed.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management; **lettera e)**: actions taken to prevent attitudes and conduct that are in any case discriminatory
TOPIC	**LABOR/MANAGEMENT RELATIONS** **(related material topics: 9)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 164-165, 152.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 402: Labor/Management Relations 2016	**402-1 Minimum notice periods regarding operational changes (report whether the notice period and provisions for consultation and negotiation are specified in collective agreements).** *Relations with stakeholders* page 165.	**Art. 3 paragraph 2, letter d)**: methods of dialogue with trade unions
TOPIC	**OCCUPATIONAL HEALTH AND SAFETY** **(related material topics: 2, 7, 8, 12, 13)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders pages* 147-148, 152-156, 166-169, 172.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 403: Occupational Health and Safety 2018	**403-1 Occupational health and safety management system.** *Corporate identity* page 85; *Relations with stakeholders* pages 154-156, 165-169.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company

GRI 403: Occupational Health and Safety 2018	**403-2 Hazard identification, risk assessment, and incident investigation.** *Relations with stakeholders* pages 155, 166-169 and Table no. 46.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company; **letter c)**: the main risks generated or suffered (...) deriving from the business, its products, services or commercial relations, including, where relevant, supply and subcontracting chains **Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-3 Occupational health services. *Relations with stakeholders* pages 166-169.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company **Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-4 Worker participation, consultation, and communication on occupational health and safety. Acea observes the indications of Italian Legislative Decree no. 81/2008 on health and safety in the workplace. 100% of workers are represented in formal health and safety commissions (composed of representatives from management and workers), through appointed figures. *Relations with stakeholders* pages 148, 155, 164-166.	**Art. 3 paragraph 1, letter a)**: the corporate management and organisation model; **letter b)**: the policies implemented by the company **Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management (...) methods of dialogue with trade unions
	403-5 Worker training on occupational health and safety. *Relations with stakeholders* pages 154-156, 167.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-6 Promotion of worker health. *Relations with stakeholders* pages 164-165, 177-178.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-8 Workers covered by an occupational health and safety management system. *Relations with stakeholders* pages 166-169.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-9 Work-related injuries. *Relations with stakeholders* pages 156, 166-167 and Chart no. 45.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
	403-10 Work-related ill health. *Relations with stakeholders* pages 156, 169.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety; **letter d)**: aspects relating to staff management
TOPIC	**TRAINING AND EDUCATION** **(related material topics: 9)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 169-176.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 404: Training and Education 2016	**404-1 Average hours of training per year per employee (by gender and employee category).** *Relations with stakeholders* page 173 and Table no. 47.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management

GRI 404: Training and Education 2016	**404-2 Programs for upgrading employee skills and transition assistance programs.** *Relations with stakeholders* pages 153, 154, 156, 157, 159.	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
	404-3 Percentage of employees receiving regular performance and career development reviews. In 2022, in the context of the Human Resources Management System in force, all personnel of Group Companies within the scope of reporting (100%) were subject to evaluation. *Relations with stakeholders* page 175	**Art. 3 paragraph 2, letter d)**: aspects relating to staff management
TOPIC	**DIVERSITY AND EQUAL OPPORTUNITY** **(related material topics: 13, 14)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity pages* 22-25; 46-49, 50, 78-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 147, 162-163, 175-176, 178.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 405: Diversity and Equal Opportunity 2016	**405-1 Diversity of governance bodies and employees (reporting the percentage of individuals of governance bodies and employees by gender, age group and other diversity indicators if relevant).** Regarding representation of the different age brackets for members of the governance bodies, considering these to include the BoD and the Board of Statutory Auditors, it is noted that 27% of members are in the 30-50 years bracket, and the remaining 73% are in the over-50 bracket. *Corporate identity* page 71; *Relations with stakeholders* pages 161 Tables nos. 42 and 44, 176-178.	**Art. 3 paragraph 2, letter d)**: social and staff management aspects
	405-2 Ratio of basic salary and remuneration of women to men (for each employee category, by significant locations of operation). The overall incidence of women's pay on men in 2022 is 98%. The data broken down by category are shown in the chapter *Staff*. *Relations with stakeholders* pages 162-163.	**Art. 3 paragraph 2, letter d)**: social and staff management aspects
TOPIC	**NON DISCRIMINATION** **(related material topics: 2, 8, 13)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 33, 46-49, 50, 75, 77-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 172, 175-176.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 406: Non discrimination 2016	**406-1 Incidents of discrimination and corrective actions taken.** *Corporate identity* pages 78, 87-90; *Relations with stakeholders* page 178.	**Art. 3 paragraph 2, letter d)**: social and staff management aspects; **letter e)**: actions taken to prevent attitudes and conduct that are in any case discriminatory
TOPIC	**LOCAL COMMUNITIES** **(related material topics: 2, 8, 10)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 50, 78-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 100-127, 138-146, 181, 184-185.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

GRI 413: Local Communities 2016	**413-1 Operations with local community engagement, impact assessments, and development programs (indicate the percentage).** 100% of the main Group Companies have initiatives in place for stakeholder engagement. *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 85-87 and Table no. 14, 87-90; *Relations with stakeholders* pages 100-106, 109, 115, 118, 121, 132, 138-146, 147-149, 152-156, 187; *Relations with the environment* page 196.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment as well as on health and safety
	413-2 Operations with significant actual and potential negative impacts on local communities. *Corporate identity* pages 87-90; *Relations with stakeholders* pages 199-206.	**Art. 3 paragraph 2, letter c)**: the impact (...) on the environment as well as on health and safety
TOPIC **GRI 3: Material Topics 2021**	**SUPPLIER SOCIAL ASSESSMENT** **(related material topics: 7, 8, 10, 12)** **3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 22-25, 46-49, 50, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 147-149, 152-156.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 414: Supplier Social Assessment 2016	**414-1 New suppliers that were screened using social criteria (indicate the percentage).** *Relations with stakeholders* pages 149, 152-156.	**Art. 3 paragraph 1, letter c)**: the main risks generated or suffered (...) deriving from the business, its products, services or commercial relations, including, where relevant, supply and subcontracting chains; **paragraph 2, letter c)**: the impact (...) on health and safety
	414-2 Negative social impacts in the supply chain and actions taken. *Relations with stakeholders* pages 148, 152-156.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety
TOPIC **GRI 3: Material Topics 2021**	**CUSTOMER HEALTH AND SAFETY** **(related material topics: 2, 8, 10, 11)** **3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 50, 78-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 119, 121; *Relations with the environment* pages 215-217.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 416: Customer Health and Safety 2016	**416-1 Assessment of the health and safety impacts of product and service categories (report the percentage of significant product and service categories for which impacts are assessed).** *Corporate identity* pages 85-87 and Table no.14; *Relations with stakeholders* pages 116 Table no. 29, 119, 121, 141; *Relations with the environment* pages 215-217.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety
	416-2 Incidents of non-compliance concerning the health and safety impacts of products and services (specifying whether they have generated a fine, penalty or warning). *Relations with the environment* page 198.	**Art. 3 paragraph 2, letter c)**: the impact (...) on health and safety
TOPIC **GRI 3: Material Topics 2021**	**MARKETING AND LABELING** **(temi materiali corrlati: 2, 11)** **3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 78-84 and Table no. 12, 85-87 and Table no.14, 90-93 and Table no.15; *Relations with stakeholders* pages 100-127 and Tables nos. 25-27, 128-134, 156, 181-182.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated

GRI 417: Marketing and Labeling 2016	**417-1 Requirements for product and service information and labeling.** The GRI international indicator, on the basis of the reference to "services" in addition to products, is indicated, adapting it to the national situation and operations of a multiutility company, both in terms of the main parameters of quality of water distributed and in relation to performance of a commercial, contractual and technical nature for the services managed in the water and energy sector, which are subject to regulation by the national industry authority (ARERA). *Relations with stakeholders* pages 106-127 and Tables nos. 24-27 e 30-35, 128, 130-134, 142; *Relations with the environment* pages 215-217.	**Art. 3 paragraph 1, letter b)**: fundamental indicators of non-financial performance
	417-2 Incidents of non-compliance concerning product and service information and labeling (specifying whether they have generated a fine, penalty or warning). *Relations with stakeholders pages 106-128 and Tables nos. 24-27 and 30-35, 134, 182.*	**Art. 3 paragraph 1, letter b)**: fundamental indicators of non-financial performance
	41417-3 Incidents of non-compliance concerning marketing communications (specifying whether they resulting in a fine, penalty or in a warning). *Relations with stakeholders* pages 156, 182.	**Art. 3 paragraph 1, letter b)**: fundamental indicators of non-financial performance
TOPIC	**CUSTOMER PRIVACY** **(related material topics: 2, 11)**	
GRI 3: Material Topics 2021	**3-3 Management of material topics.** *Disclosing sustainability: methodological note* pages 12-13; *Corporate identity* pages 46-49, 50, 74, 76, 78-84 and Table no. 12, 90-93 and Table no.15; *Relations with stakeholders* pages 131, 172.	**Art. 3 paragraph 1, letter b)**: the policies implemented by the company (...) and the results achieved through them **Art. 4 paragraph 1**: the consolidated statements include the data of the parent company and its fully consolidated subsidiaries. (...) to the degree necessary to ensure the understanding of the group's business, its performance, results, and the impact it generated
GRI 418: Customer Privacy 2016	**418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data (received from outside parties and/or received from regulatory bodies).** During the year 2022, the office of the DPO received 189 new requests regarding utilisation of rights pursuant to Arts 15-22 of Regulation (EU) 679/2016 - GDPR (requests for updating, erasure, modification and refusal of consent etc.), for which a dedicated procedure has been launched. 4 instances have seen the involvement of the Antitrust Authority made known in the communications by the interested party and for none has received verification intervention. In the aftermath of an investigation dating back to 2021, for which there was an inspection activity directed by the Guarantor Authority during 2022, a Group company was subjected to technical adaptation measures of the application software dedicated to the management of arrears, with the burden of a significant economic sanction. The Group has not recorded any events involving the theft of information on customer data, nor has it received any news of violations of significant personal data.	**Art. 3 paragraph 1, letter b)**: fundamental indicators of non-financial performance

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