



ACEA GROUP



CLIMATE-RELATED DISCLOSURE 2022



ACCORDING TO THE TCFD



RECOMMENDATIONS





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INTRODUCTION

Climate change has potential financial implications for companies in all sectors and presents **significant challenges and opportunities**. For example, the transition to a low-carbon economy has the potential to generate new investment and business opportunities – and therefore employment – while also boosting research and innovation (new related technologies). In addition, the risk-return profile of companies most exposed to climate-related risks and impacts could increase and be influenced also by international and national political-regulatory trends (e.g. “carbon pricing” or the push for growth in renewable energy production). To help steer the country system and to gain a competitive advantage, it becomes crucial for companies to consider the impact of climate change in their governance structures, strategies and risk management practices. In addition, it is important to **disclose relevant information** regarding climate impact and commitments undertaken in climate change mitigation and adaptation interventions. Analyses conducted by the main international reference bodies provide the probable scenarios that need to be addressed (climate, energy, etc.), while national and international agreements and policies define tools and guidelines that enable companies to develop a pathway for climate change mitigation and adaptation, including in the long term.

As a multi-utility, the Acea Group operates in sectors sensitive to climate change. It is the leading national operator, in terms of population served (around 9 million inhabitants), in the integrated water service; in electricity distribution it is the second largest national operator in terms of withdrawal points and the third in terms of volumes of electricity distributed; it is the seventh-ranking national operator in terms of volumes sold in the energy end market and is one of the main players in the Waste to Energy sector. In this context, therefore, Acea has been attentive to climate change for a long time and also expresses this commitment to its stakeholders, for example by having answered the CDP-Climate questionnaire for many years.

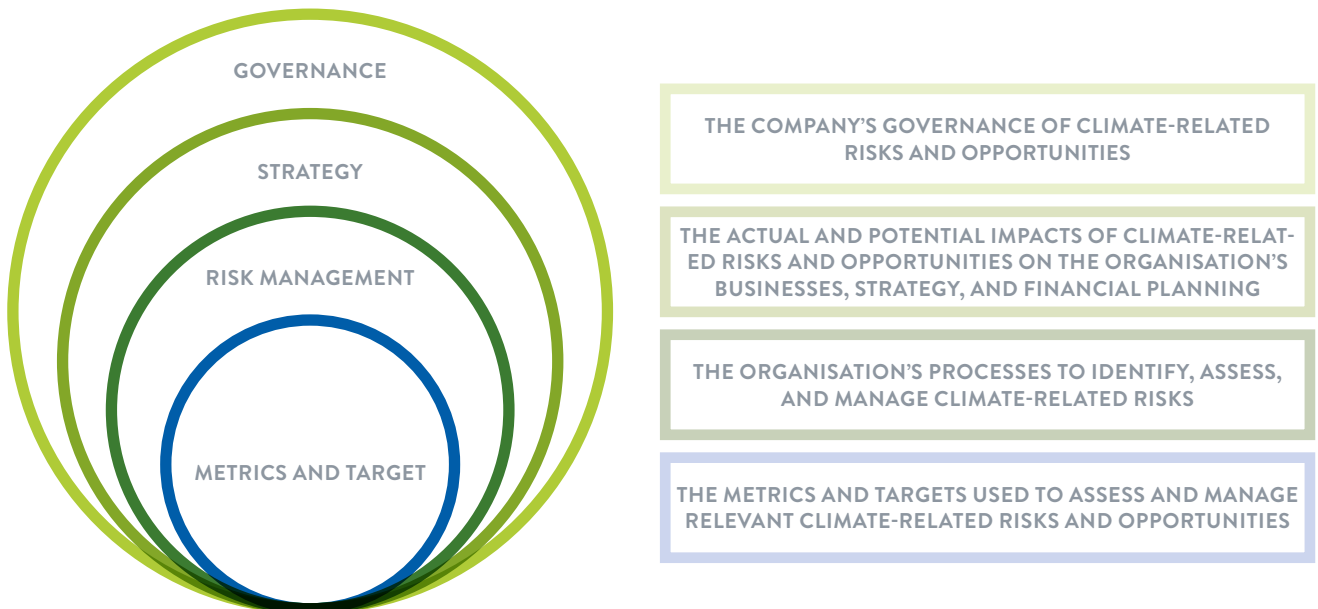
In 2022, the Group also decided to publish its first Climate-related Disclosure (on 2021 data) in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)¹, of which this document is an updated version with 2022 data.

It describes the organisation’s roles and responsibilities for managing climate change issues; the strategy; the identification, through scenario analysis, of the main risks and opportunities associated with climate change, including their economic and financial impacts and how to manage them; the Group’s emissions, the metrics adopted, and the targets identified in the medium- to long-term to manage climate-related risks and opportunities.

The 11 recommendations issued by the TCFD, which are divided into the four key thematic areas of Governance, Strategy, Risk Management, Metrics and Targets as mentioned above, provide guidance both for investors, who are increasingly interested to assess climate-related information, and for companies intent to share documents on climate-related risks and opportunities that are as clear and comparable as possible.

¹ Established in 2015 by the Financial Stability Board (FSB) at the request of the G20 Finance Ministers and Central Bank Governors, the Task Force took charge of developing a set of recommendations for reporting on climate change-related risks to assess their impact on the financial system. For further details, please visit the website of the Task Force on Climate-Related Financial Disclosures: Task Force on Climate-Related Financial Disclosures | TCFD) (fsb-tcfd.org). The following are key reference publications: *Recommendations of the Task Force on Climate-related Financial Disclosures* (2017), *The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities* (2017), *Guidance on Scenario Analysis for Non-Financial Companies* (2020), *Guidance on Risk Management Integration and Disclosure* (2020), *Annex: Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures* (2021), *Guidance on Metrics, Targets, and Transition Plans* (2021).

Figure No. 1 – The 4 key thematic areas for climate-related financial disclosures



Source: Recommendations of the Task Force on Climate-related Financial Disclosures (2017).

The process for the progressive implementation of the TCFD recommendations, which Acea intends to pursue, strengthen and enhance, implies the following:

- increasing awareness and understanding of climate-related risks and opportunities within the company, through better risk management and strategic planning that takes into account the implications of climate change;
- the consolidation of investor and lender confidence, thanks also to improved disclosure of data and information on the company's management of various climate-related matters.

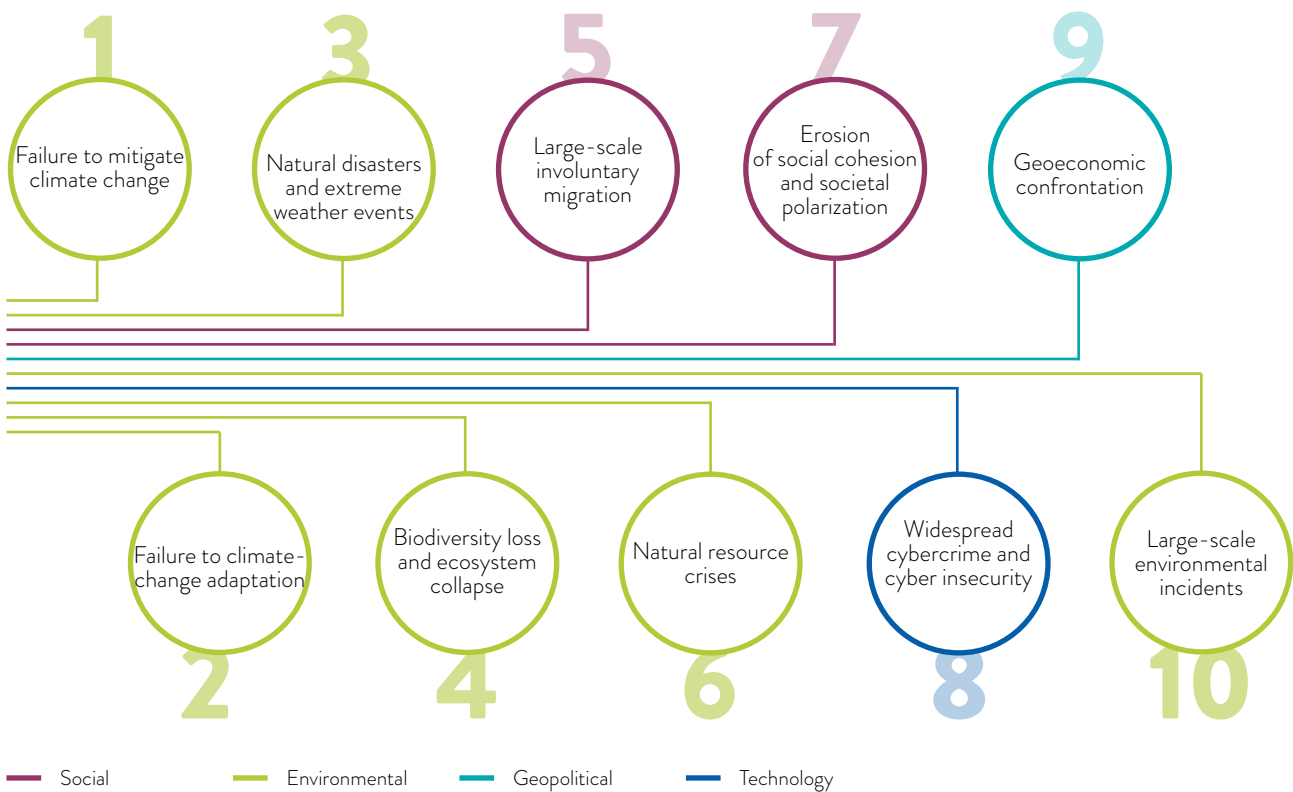
The implementation of the TCFD recommendations allows Acea to improve its resilience in the face of climate change impacts and to position itself even more solidly in terms of corporate sustainability.

CONTEXT

The *Sharm el-Sheikh Implementation Plan*, approved at the 27th Conference of the Parties (COP27)², held in November 2022, confirms the agreements ratified in the *Glasgow Climate Pact* (COP26): the signatory countries’ commitment to keeping global temperatures below a 1.5°C increase compared to pre-industrial levels. According to the *Intergovernmental Panel on Climate Change* (IPCC)³, such efforts require far-reaching transitions in energy, land, urban, infrastructure and industrial systems. Reducing global greenhouse gas emissions and accelerating the transition to a low-carbon economy could lead to significant changes in several economic sectors and geographic areas in the short term. Pursuant to the Paris Agreement and the UN Sustainable Development Goals, the European guidelines aim to rapidly achieve climate neutrality by 2050.

In this context, we note the results of the World Economic Forum’s Risk Perception Survey 2022-2023, which lists the global threats⁴ perceived to be the most serious for the next 10 years. The top three places are taken by environmental risks, as in the previous edition of the survey. Specifically, in the 2022-2023 survey, the top three risks are related to climate change⁵.

Figure No. 2 – WEF, Global Risk Perception Survey 2022-2023: Top 10



Source: World Economic Forum *Global Risks Perception Survey 2022-2023*

2 For further details, please refer to the website of the 27th Conference of the Parties (<https://cop27.org/#/>).

3 For further information, please visit the website of the Intergovernmental Panel on Climate Change (www.ipcc.ch/).

4 “Geoeconomic confrontation”, ranking ninth in the top 10 perceived risks, means: “Deployment of economic levers by global or regional powers to decouple economic interactions between nations, restricting goods, knowledge, services or technology with the intent of gaining geopolitical advantage and consolidate spheres of influence. Includes, but is not limited to: currency measures, investment controls, sanctions, state aid and subsidies, and trade controls on energy, minerals and technology”. See *Appendix A, Global Risks Report 2023* from the World Economic Forum.

5 In the *Global Risks Report 2023* by the World Economic Forum, in addition to environmental, geopolitical, societal, and technological risks, economic risks were also considered, although they do not fall within the top 10.

Extreme geophysical phenomena are clearly increasing in intensity. According to the Copernicus European Earth Observation Programme, July and August 2022 saw not only the most severe drought in Europe in 500 years⁶, but also particularly intense rainfall, such as the deadly floods in Pakistan at the end of August 2022 or those in Italy's Marche region in September 2022. Sea levels, meanwhile, continued to rise.

In general, environmental risks, if not properly addressed, could generate biodiversity loss, critical damage to the agricultural system, financial crises, damage to health and loss of human lives.

On a global level, the effects of climate change are advancing rapidly and, as the World Meteorological Organisation points out, these effects are more pronounced in certain parts of the planet such as Europe⁷.

Despite efforts to cap world average temperatures, the most recent data published in the IPCC Report⁸ indicates that the temperature increase since 1850 has been around 1°C, and that the energy sector contributes over 30% of global greenhouse gas emissions. The United Nations Environmental Programme (UNEP) has pointed out that the emission reduction commitments made by governments are not yet fit for purpose and it will be essential to intensify efforts to keep the global temperature increase within 1.5°C⁹.

The *Sharm el-Sheikh Implementation Plan* emphasised the need to reduce the use of fossil fuels and to make a rapid transition to a system based on renewable sources. For the first time ever, it advocated the elimination of fossil fuel subsidies.

The global geopolitical situation has landed several, mostly European, countries with an energy crisis, which has significantly increased raw material prices and accelerated the search for alternative energy sources. An analysis by the International Energy Agency (IEA)¹⁰ showed that 2% of all people employed worldwide work in the energy sector, with over 50% of them working in clean energy. According to the *World Energy Outlook 2022*¹¹, investment in clean energy will reach over USD 2 trillion by 2030 – an increase of over 50% from the current level. In this scenario, the share of fossil fuels in the global energy mix will drop from 80% to 60% by mid-century.

In the European landscape, the current geopolitical and energy market situation is pushing Europe towards increased energy independence. In response to the difficulties and disruptions in the energy market, the European Commission, in May 2022, presented the REPowerEU plan¹² aimed at saving energy, producing clean energy and diversifying energy supply. The REPowerEU plan sets out measures to reduce dependence on fossil fuels and accelerate the green transition, while also increasing the resilience of the EU energy system. The key points are: diversify, save, and accelerate the spread of clean energy. In September 2022, the European Parliament also approved a revision of the Renewable Energy Directive to increase the renewable energy share to 45% (from the 32% planned share) in final energy consumption by 2030, as well as a revision of the Energy Efficiency Directive to increase the energy savings target to 40% for final energy consumption and 42.5% for primary energy consumption¹³.

In Italy, the *Long-Term Strategy on the Reduction of Greenhouse Gas Emissions*¹⁴ was published in 2021, which envisages achieving carbon neutrality by 2050 by reducing energy consumption by 40% compared to current levels, promoting the use of renewables. According to the report on the *National Energy Situation in 2022*, published in 2023 by the Ministry of the Environment and Energy Security (MASE), 86.4% of Italy's electricity needs were met by national production. The largest contribution to production was still from non-renewable thermoelectric power (around 64.8% of total energy produced), while in renewable sources there was a significant drop in production from hydroelectric power (down 37.8% from 2021) and, at the same time, a significant increase in production from photovoltaics (11.9%

6 For further information, please refer to the website of the Copernicus European Earth Observation Program, managed by the European Commission and the European Space Agency (ESA): Copernicus: Summer 2022 Europe's hottest on record | Copernicus.

7 For further details, please visit the website of the World Meteorological Organization (<https://public.wmo.int/en>).

8 For further details, please refer to the website of the Intergovernmental Panel on Climate Change Report: *AR6 Synthesis Report 2023, referencing the Climate Change 2022: Impacts, Adaptation and Vulnerability and Climate Change 2022: Mitigation*.

9 United Nations Environment Programme, *Emissions Gap Report: The Closing Window – Climate crisis calls for rapid transformation of societies* (2022).

10 International Energy Agency, *World energy employment* (2022).

11 International Energy Agency, *World Energy Outlook* (2022).

12 For further information, please consult the dedicated webpage of the European Commission: REPowerEU (europa.eu).

13 For further details, please visit the dedicated webpage of the European Parliament (www.europarl.europa.eu/doceo/document/TA-9-2022-09-14_EN.html).

14 For further details, please refer to the dedicated webpage of the Ministry of the Environment and Energy Security (*Microsoft Word - LTS_Gennaio 2021 (mase.gov.it)*).

up from 2021). The MASE report highlights how the climate scenario impacts production trends in renewable sources; in fact, just as the drop in hydroelectric energy production was influenced by the lack of snow and reduced rainfall, the increase in solar photovoltaic production (thanks to increased installed capacity), benefited from the widespread “clear sky” conditions and a 5.4% increase in average global radiation compared to 2021¹⁵.

Finally, in December 2022, the MASE submitted the new *National Climate Change Adaptation Plan* (PNACC)¹⁶ for public consultation. An update of the *National Integrated Energy and Climate Plan 2030* (PNIEC) is also expected with new goals and scenarios reflecting European regulatory developments.

GOVERNANCE - ROLES AND RESPONSIBILITIES OF THE ORGANISATION FOR HANDLING ASPECTS PERTAINING TO CLIMATE CHANGE

Acea’s governance system also includes the **monitoring of ESG** (Environmental, Social & Governance) **issues**, including aspects related to climate change.

In 2022, the Board of Directors (BoD) adopted the **updated edition of the Code of Ethics**¹⁷ of the Acea Group. The document sets out the general ethical principles and rules of conduct that guide the company’s activities. The corporate bodies, management, employees, external collaborators and all those who cooperate with the Acea Group are required to observe these principles and rules, each within the scope of its functions, competences and responsibilities. The updating of the *Code of Ethics* was also intended to give further prominence to some issues related to sustainability, as a guiding principle of business conduct, with explicit reference also to the commitment to **define a climate change mitigation and adaptation strategy**¹⁸.

The activities of the Board of Directors aided by the Board Committees, certain areas of responsibility of the Chairperson and the Chief Executive Officer, the specific tasks of Top Management Staff Functions and the operations of management all contribute – within their respective roles and responsibilities – to ensuring the monitoring and proper management of these issues in the conduct of business (see also paragraph *Commitment and integration of sustainability and climate change aspects in the strategy*).

¹⁵ Ministry of the Environment and Energy Security, *Relazione annuale sulla Situazione energetica nazionale* (2023).

¹⁶ For further details, please refer to the dedicated webpage of the Ministry of the Environment and Energy Security (*Piano Nazionale di Adattamento ai Cambiamenti Climatici* | Ministero dell’Ambiente e della Sicurezza Energetica (mase.gov.it)).

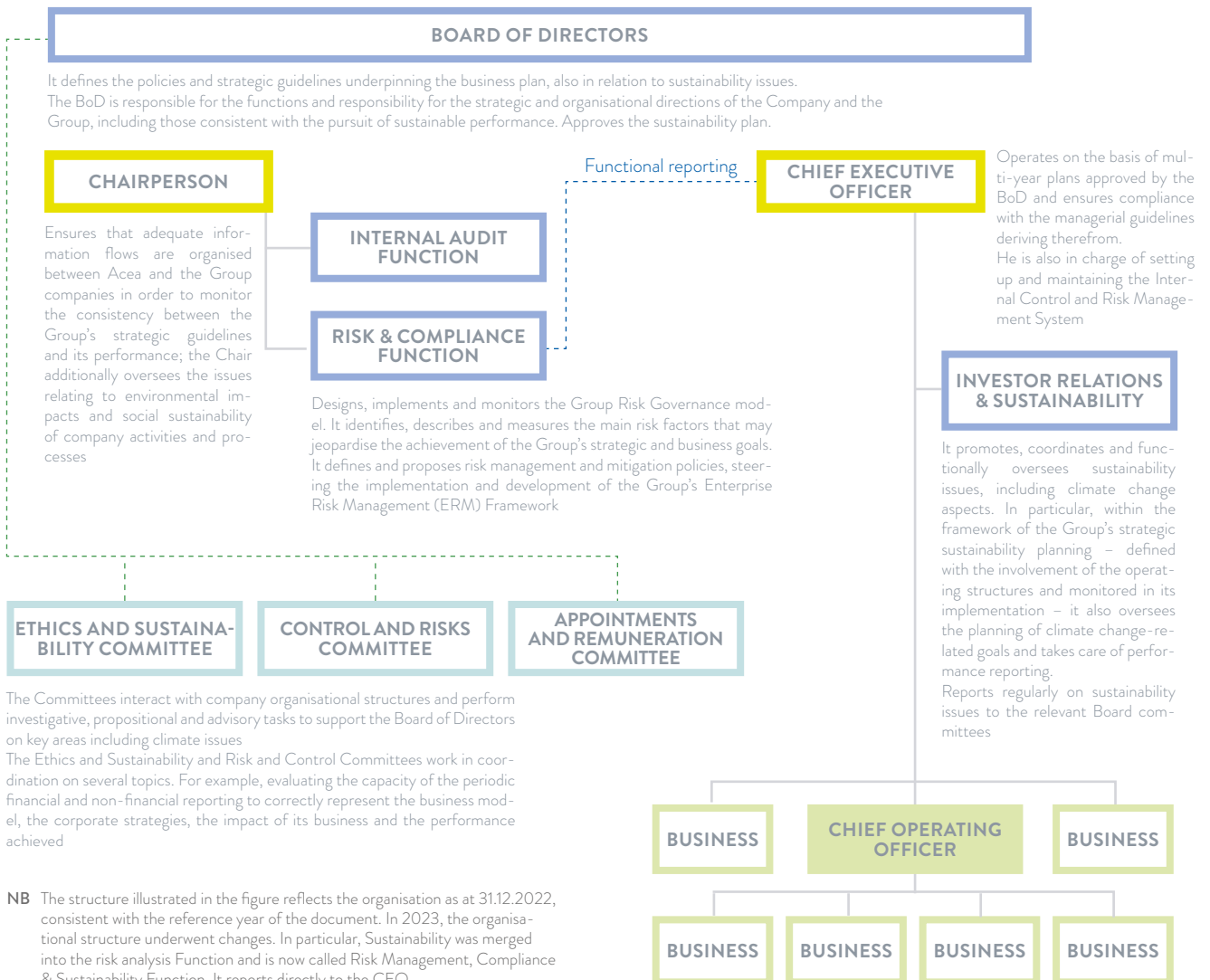
¹⁷ *Code of Ethics – Sustainability, Stakeholder Responsibility, and Environmental Protection* (2022).

¹⁸ *Code of Ethics – Sustainability, Stakeholder Responsibility, and Environmental Protection* (2022), page 22.

“Acea pursues sustainable performance through consistent organisational, procedural and cultural tools. The company has established an internal Ethics and Sustainability Committee (...). There are procedures for monitoring sustainability targets and classifying operational activities according to the eco-compatibility criteria set forth in the European taxonomy. There are also procedures for dialogue with investors and relevant stakeholders (...), and integrating sustainability into the corporate ecosystem is continually promoted, for example, through initiatives aimed at Acea personnel, including members of corporate bodies, such as training and management culture programmes and strategic analysis, or through the continuous updating of corporate policies and procedures according to the sensitivity of the subjects dealt with for corporate sustainability (e.g., in 2022, the new Code of Ethics, Diversity & Inclusion Policy and procedures on materiality analysis, sustainable finance, assessment of suppliers) (...). With regard to the risk factors that may impact the generation of long-term value, the Company is set towards an increased understanding of the relationship between ERM approaches and methods and the most relevant sustainability topics.”¹⁹

Report on corporate governance and ownership structure, financial year 2022.

Figure No. 3 – Climate issues: governance, responsibilities and information flows (as at 31.12.2022)



19 Report on corporate governance and shareholdings, financial year 2022, approved by the BoD on 2 March 2023, pages 7-8.

ROLES AND RESPONSIBILITIES OF THE BOARD OF DIRECTORS, THE CHAIRPERSON AND THE CEO

In the guidelines that have led to the definition of the current Board of Directors²⁰, Acea recognises that the Board of Directors should collectively possess **competencies** in sustainability and corporate social responsibility. These guidelines also indicate specific experience in strategy and ESG²¹ as a desirable element to further enrich the skills mix of directors' profiles. Within the Board of Directors, as of the end of financial year 2022, the Chairperson of the Ethics and Sustainability Committee has proven competencies on ESG issues²².

The **Board of Directors** defines the policies and strategic guidelines that underpin the Industrial Plan, including those related to sustainability issues.

The **BoD presides over climate issues in strategic planning and therefore in financial planning**. In particular, as an integral part of certain lines of development of the managed businesses (resilience of infrastructure including water and energy distribution, development of energy production from renewable sources, water resource protection, efficiency improvements, etc.), climate-related issues are highlighted by the Board of Directors through the preparation of strategic planning guidelines and policies.

The **Chairperson of the Board of Directors** ensures that adequate information flows exist between Acea and the Group companies in order to guarantee the monitoring of consistency between strategic guidelines (see the dedicated paragraph *Commitment and integration of sustainability and climate change aspects in the strategy*) and the Group's performance (see the dedicated chapter *Performance actions and goals*). It also oversees the issues of environmental impacts and social sustainability (corporate social responsibility) of corporate activities and processes²³ (see also Figure No. 3 - *Climate issues: governance, responsibilities and information flows*).

In particular, the BoD "*holds a central role in the sphere of the Company's governance, and all the departments and the managers of the Company and of the Group with strategic and organisational responsibilities report to the Board of Directors, in line with the pursuit of sustainable performance*"²⁴.

The BoD is informed, through meetings with the Audit and Risk Committee, about the main risks and opportunities for the Group, including those related to climate change.

The **Chief Executive Officer** works on the basis of the multi-year plans approved by the Board of Directors, guaranteeing and verifying compliance with the resulting management guidelines; they are also in charge of setting up and maintaining the Internal Control and Risk Management System (see the dedicated paragraph *The risk identification, assessment and management process*).

20 The Board of Directors, in its meeting of 26 September 2022, appointed Acea's new CEO, granting him the powers necessary for the ordinary management of the Company, in accordance with the previous structure. For more details, see: Report on corporate governance and shareholdings, financial year 2022, approved by the BoD on 2 March 2023, page 34. Subsequently, following the natural expiry of the term of office on 18 April 2023, the Shareholders' Meeting renewed the Board of Directors, which on 3 May 2023 confirmed the office of the Chief Executive Officer appointed in September 2022.

21 *Views of the Board of Directors of Acea to the Shareholders on the dimensions and composition of the New Board of Directors*, 8 March 2023, pages 3-4.

22 *Report on corporate governance and shareholdings*, financial year 2022, pages 23-24 and 51. It should also be borne in mind that specific ESG competences are now relevant to several profiles of the members of the current Board of Directors appointed in April 2023 upon the natural expiry of the term of office of the previous Board of Directors.

23 *Report on corporate governance and shareholdings*, financial year 2022, pages 31-35.

24 *Report on corporate governance and shareholdings*, financial year 2022, page 13.

ROLES AND RESPONSIBILITIES OF BOARD COMMITTEES: ETHICS AND SUSTAINABILITY, CONTROL AND RISK, APPOINTMENTS AND REMUNERATION

The Board Committees, composed of Directors, interact with the company's organisational structures and perform investigative, propositional and consultative tasks to support the BoD on key areas that also include climate issues; this applies, in particular, to the Ethics and Sustainability, Control and Risk, and Appointments and Remuneration Committees²⁵ (see also Figure No. 3 - Climate issues: governance, responsibilities and information flows).

The **Ethics and Sustainability Committee**²⁶ has specific competencies in business ethics and environmental, social and governance (ESG) issues, which it promotes, supervises and monitors. It therefore receives regular updates on various sustainability-related initiatives and projects. The Committee reviews the guidelines of the Sustainability Plan, approved by the BoD, and monitors its implementation; it also carries out the necessary activities to support the BoD in examining and approving the Business Plan, also based on the analysis of issues relevant to the generation of long-term value.

The **Control and Risk Committee** issues opinions to the Board regarding the definition of the guidelines of the Internal Control and Risk Management System, with reference to "risks that may become relevant to medium-long term sustainability"²⁷, so that they are correctly identified and adequately measured, managed and monitored, and have regard to the determination of the degree of compatibility of the main risks with management consistent with the strategic objectives identified.

The Ethics and Sustainability and Risk and Control Committees work in coordination on several topics. For example, evaluating the capacity of the periodic financial and non-financial reporting to correctly represent the business model, the corporate strategies, the impact of its business and the performance achieved.

Lastly, the **Appointments and Remuneration Committee** "proposes to the Board of Directors the policy for the remuneration of directors and executives with strategic responsibilities, with a view to sustainability and the creation of value in the medium-long term"²⁸ and monitors its concrete implementation. Acea is attentive to the connection between variable remuneration mechanisms and the achievement of social and environmental, and economic results, confirming the path of greater integration of sustainability in business activities (see section on *Climate-related incentive systems*).

25 *Report on corporate governance and shareholdings*, financial year 2022, pages 45-48, pages 51 and following, pages 65 and following.

26 After the renewal of the Board of Directors in April 2023, the Ethics and Sustainability Committee was renamed the Ethics, Sustainability, and Inclusion Committee. It currently consists of five non-executive and independent administrators.

27 *Report on corporate governance and shareholdings*, financial year 2022, page 65.

28 *Report on corporate governance and shareholdings*, financial year 2022, page 46. For further details, please refer also to the *Report on the remuneration policy and the remuneration paid, 2023* (financial year 2022).

Figure No. 4 – The Board committees

COMMITTEE	COMPOSITION	TASKS
CONTROL AND RISKS	At least 3 Independent Directors or, alternatively, Non-Executive Directors with an independent majority, from whom the Chairman is chosen	Issues a prior opinion to the BoD regarding the definition of the Guidelines for the Internal Control and Risk Management System for the Group companies, including those relevant for medium/long-term sustainability , so that they are correctly identified, measured, managed and monitored. Supports the assessments and decisions of the Board of Directors on these issues. Assists the Board of Directors, together with the competent Function and having consulted with the independent auditor and Board of Statutory Auditors, in assessing the correct use of accounting standards adopted in order to draw up the consolidated non-financial statement as per Legislative Decree 254/2016. For the matters within its remit, monitors the adequacy and effective implementation of the Code of Ethics .
APPOINTMENTS AND REMUNERATION	At least 3 Non-Executive Directors with an independent majority, from whom the Chairman is chosen	Provides opinions to the Board of Directors regarding its composition: size, adequacy of skills, compatibility of positions . Proposes the remuneration policy for Directors and Executives to the Board of Directors, promoting medium-long term sustainability .
ETHICS AND SUSTAINABILITY	At least 3 Non-Executive Directors with an independent majority, from whom the Chairman is chosen	In a proactive and advisory manner, supports the Board of Directors in the context of corporate ethics and environmental, social and governance topics . Promotes the integration of sustainability into the corporate strategy and culture . Supervises the main sustainability issues related to business activities and interactions with stakeholders. Examines the guidelines of the Sustainability Plan and, once approved by the Board of Directors, supervises its monitoring. Checks the adequacy and implementation of the Code of Ethics . Promotes a culture of diversity and fighting discrimination in the company.

THE MANAGEMENT ROLE IN ASSESSING AND HANDLING CLIMATE-RELATED RISKS AND OPPORTUNITIES

The role of **management** is crucial for the concrete implementation of sustainability issues, which also include the various aspects of climate change, in business processes. As regards the risk management aspects, including environmental and climate change-related risks, Acea has implemented a well-structured Internal Control and Risk Management System, which has a transversal influence on business management and involves corporate governance bodies and specific functions²⁹, such as Risk & Compliance and Internal Audit, responsible for implementing the Enterprise Risk Management and control activities. It also involves the operating structures, i.e. Management, which is responsible for risks and their day-to-day handling (see also *The risk identification, assessment and management process*).

The **Risk & Compliance Function** designs, implements and monitors the Group Risk Governance model. Its duties involve identifying, describing and measuring the main risk factors – including climate-related risks – that could compromise the achievement of the Group's strategic and business objectives, defining and proposing risk management and mitigation policies, and guiding the implementation and evolution of the Group's Enterprise Risk Management (ERM) framework. The Function reports regularly on sustainability issues to the relevant Board committees. It is also involved in the activities of preparing feedback to the Carbon Disclosure Project (CDP)³⁰ questionnaire and in internal working groups on climate scenario analysis.

²⁹ This document refers to the organisational structure of the Group as of December 31, 2022.

³⁰ For further details, please visit the dedicated website of the Carbon Disclosure Project (www.cdp.net/en).

The **Investor Relations & Sustainability Function** promotes, coordinates and oversees relevant sustainability issues at Group level, including climate change aspects. In particular, within the framework of the strategic sustainability planning – defined with the involvement of the operating structures and monitored in its implementation – the function oversees the planning of climate change-related goals and takes care of performance reporting, including the coordination of activities relevant to the CDP Questionnaire. The department reports regularly on sustainability issues to the relevant Board committees.

All **management** engaged in operational processes assesses and manages sustainability impacts relevant to the business, including climate change impacts, consistent with the Group’s industrial and sustainability guidelines (see the following paragraph *Commitment and integration of sustainability and climate change aspects in the strategy*).

SUSTAINABILITY STRATEGY RELATED TO CLIMATE CHANGE

COMMITMENT AND INTEGRATION OF SUSTAINABILITY AND CLIMATE CHANGE ASPECTS IN THE STRATEGY

“Acea intends to conduct its business while respecting the principles of **sustainable development** and contributing to the pursuit of the UN Sustainable Development Goals (2030 Agenda) and as they are implemented at European (Green Deal) and national level.” This is stated in the **new Code of Ethics** of the Acea Group, reflecting its **core values and principles** that guide the Group’s management and strategic choices. Moreover, “(...) Acea involves stakeholders in processes of dialogue and consultation, taking into account their legitimate demands, in an ideal of **cooperation** for mutual benefit and with respect for roles. It contributes to the enhancement of the community, including through the support of cultural initiatives, social utility, or that favour the well-being of the community and the protection of the natural environment.

Acea works to **integrate** care for the social and environmental aspects of its business with corporate growth strategies, communicating the reference values that should guide behaviour, policies implemented, and results achieved **transparently**.

The environment is the natural context within which Acea’s business activities find their origin, purpose, and limitations, and therefore Acea plans its activities by seeking a balance between economic initiatives and unavoidable environmental needs, committing itself to the protection of ecosystems, the preservation of biodiversity, the sustainable management of water resources, and all other natural resources, including the involvement of stakeholders.

Acea is committed to adopting strategies aimed at **continually improving** its performance in the field of environmental protection and care, focusing its efforts on **preventing pollution** and **minimising environmental risks and impacts**³¹.

By the very nature of the activities managed by Acea Group, the BoD and Committees consider climate issues when reviewing and guiding strategy, major action plans, risk management policies, annual budgets and business plans, as well as setting the organisation’s performance targets and monitoring implementation and performance.

31 Code of Ethics – Sustainability, Stakeholder Responsibility, and Environmental Protection (2022), page 8.

Taking into account the opportunities offered by the evolving context and the new economic, social and environmental challenges, the **2020-2024 Industrial Plan**³² presented to the market in October 2020³³ was defined considering five mega trends that characterise the Utilities sector: sustainability and circular economy, customer-centricity, energy transition, innovation and digitalisation, and increased market competitiveness. The plan identified sustainability as one of its strategic pillars. For the four-year period 2020-2024, the envisaged Business Plan investments for sustainability goals total € 2.1 billion. During 2022, monitoring was carried out to assess progress towards targets and the level of investment committed during the year, which amounted to approximately € 437 million as at 31 December 2022. The total investment in sustainability targets, achieved over the 2020-2022 three-year period, was approximately € 1.2 billion³⁴.

In December 2020, the Board of Directors also approved the **2020-2024 Sustainability Plan**³⁵, developed in line with the industrial development guidelines, taking into account the most relevant issues (so-called “material issues”) identified through stakeholder engagement³⁶, and consistent with the European Green Deal goals and the Agenda 2030 Sustainable Development Goals, relevant to the business activities managed. It consists of a governance section, aimed at integrating sustainability into overall company management, and five operational macro-goals, which translate into precise targets for 2024, defined in agreement with the operating structures. The targets include those for increasing the capacity to adapt to and combat climate change: increasing the resilience of strategic infrastructures, energy efficiency, the development of services aimed at curbing urban impacts and other specific initiatives to reduce GHG emissions in the various production sectors (see also *Climate change mitigation and adaptation actions and goals*). The targets, monitored on a half-yearly basis and published in the Group’s annual sustainability report, approved by the Board of Directors, are accompanied by key performance indicators (KPIs), which serve to verify progress towards the achievement of the goals (see chapter *Performance, actions and goals*).

On numerous occasions, on which the Functions report periodically, the BoD and/or the Board Committees duly **inform themselves and discuss** issues directly or indirectly related to climate; for example, with regard to the risk analysis report, the issue of sustainability in remuneration, the annual update of the Code of Ethics, sustainable finance instruments (Green Bonds and related projects), the Carbon Disclosure Project, the monitoring of the Sustainability Plan goals, and initiatives to promote and integrate sustainability into the company’s strategies and culture, including the setting up, in 2022, of the “green transition tables” and the Open call Innovation project: Sustainable Smart Cities, at presentations of business results, or investment planning, etc. The Board Committees held a total of 29 meetings in 2022.

Regarding climate change, Acea has repeatedly taken a public stance. For example, on 19 January 2022, the position paper *Italian businesses moving towards decarbonisation: a fair and inclusive transition* was presented at the Italian Pavilion at Expo Dubai. It was defined by a working group within the UN Global Compact Network Italy, in which Acea participated. The position paper set itself “the goal of demonstrating and developing the commitment of Italian companies that have signed the UN Global Compact on Decarbonisation, to play their role in achieving the objectives of the Paris Accords and the goals the European Union has set itself, to achieve climate neutrality by 2050”.

32 For more in-depth information, please refer to the dedicated webpage of the Acea Group outlining its integrated strategy: The Acea business plan, an integrated strategy - Acea Group.

33 Reference is made to the press release presenting the 2020-2024 Industrial Plan (www.gruppo.acea.it/content/dam/acea-corporate/acea-foundation/pdf/en/company/media/comunicati-ps/2020/10/AceaCPS-27102020-en.pdf). Please note that, at the time of publishing this document related to the 2022 fiscal year, the definition of the new Group strategy is currently underway.

34 *Sustainability Report Acea Group 2022*, page 46.

35 *Sustainability Report Acea Group 2022*, pages 46-69. Please also refer to Acea Group, *Sustainability Plan 2020-2024*.

36 In 2022, following the update of the materiality analysis, the sustainability planning was verified and confirmed to align with the most relevant themes identified through multi-stakeholder engagement, please also refer to *Sustainability Report Acea Group 2022*, page 46.

In addition, in 2022 Acea **formally committed to the Science Based Targets initiative (SBTi)**³⁷ **to define a short-term emission reduction target in line with climate science; after the end of the financial year to which this document refers, the target presented by Acea was validated**³⁸. By signing this pledge, Acea wanted to emphasise the importance of the contribution that each organisation can and must make to decarbonisation and to curb the impacts of climate change.

This is consistent with the provisions of the *Code of Ethics*, in which, in accordance with the principle of environmental protection and enhancement, Acea is committed to developing a **targeted strategy of mitigation and adaptation to climate change**. This strategy will focus on actions to sustainably manage natural resources, optimise energy use, promote the use of renewable energy sources and enhance the resilience of infrastructure³⁹.

Concerning the issue of **GHG emissions**, which are reported and published annually in the Group's *Sustainability Report*⁴⁰, prepared in accordance with GRI Standards, and in compliance with Legislative Decree 254/2016 (see chapter *Performance, actions and goals*), Acea has been responding to the Carbon Disclosure Project (CDP)⁴¹ questionnaire for over 15 years and in 2022 received a B rating, which places the Company in the "management" class.

Acea has also introduced **sustainable finance instruments**, such as the Green Bond and the Sustainability rating linked loan, to support investments in green activities. These instruments make it possible to finance projects and initiatives that promote the transition to a low-carbon economy and the preservation and protection of natural resources.

CLIMATE-RELATED INCENTIVE SYSTEMS

Acea, as already mentioned, promotes the integration of industrial and sustainability perspectives in the planning of strategic objectives. Management is empowered through a **reward policy** that includes quantitative sustainability targets in short- and long-term variable incentive schemes. This approach emphasises Acea's commitment to aligning financial objectives with sustainability goals, and encouraging accountability and the achievement of sustainable results in company management⁴² (see also paragraph *Roles and responsibilities of Board Committees: Ethics and Sustainability, Control and Risk, Appointments and Remuneration*).

"The remuneration policy of the Acea Group is defined to ensure that the interests of the management team are in line with those of the shareholders, pursuing the priority goal of creating value sustainable in the medium and long-term by consolidating the bond between individual and Group remuneration and performance."

*"The Acea Group is continuing to plan its incentive systems so that the results achieved with regard to the strategic objectives are effectively recognised, at the same time enhancing the value, social responsibility and sharing of sustainable conduct that characterises the Group as a whole, and adherence to the corporate values and personal commitment"*⁴³.

Report on the Remuneration policy and the remuneration paid, year 2023 (financial year 2022)

37 The Science Based Targets initiative (SBTi) is a partnership between CDP (Carbon Disclosure Project), UN Global Compact (UNGC), World Resource Institute (WRI), and World Wide Fund for Nature (WWF). It encourages companies to align their strategies with the goals of the Paris Agreement and supports them in the process of defining science-based emission reduction targets. Currently, it has the participation of over 3,000 companies worldwide committed to ambitious climate action. For more details, please visit the Science Based Targets website (<https://sciencebasedtargets.org/>).

38 The SBTi organization has publicly validated the target presented by Acea in September 2023. For more details, please refer to the Press Release at the following link: www.gruppo.acea.it/en/media/press-releases-and-news/press-releases/2023/09/acea-to-achieve-56-percent-reduction-in-greenhouse-gas-emissions-by-2032.

39 Acea Group *Code of Ethics – Sustainability, Stakeholder Responsibility, and Environmental Protection* (2022), page 22.

40 *Sustainability Reports* of the Acea Group are published annually and are available online on the dedicated page (www.gruppo.acea.it/en/our-commitment/sustainability-report).

41 For further details, please visit the dedicated website of the Carbon Disclosure Project (www.cdp.net/en).

42 For more information, please refer to the *Report on corporate governance and shareholdings*, financial year 2022, pages 48-50.

43 *Report on the Remuneration policy and the remuneration paid, year 2023 (financial year 2022)*, chapter 2 *The Remuneration Policy of the Acea Group*, paragraph 2.1 *Purposes and guiding principles*, page 20.

In 2022, Acea introduced a **new Performance Management Model** for company personnel, linked to the evolution of the Leadership Model and designed to assess performance and skills. The remuneration policy includes both fixed and variable short- and long-term remuneration measures, such as the Management by Objectives (MbO) and the Long Term Incentive Plan 2021-2023 (LTIP).

The **Long Term Incentive Plan (LTIP)** applies to Executives with Strategic Responsibilities and other key Group Executives. The plan has a triple three-year cycle, at the end of which a bonus is paid if targets are achieved. The targets include economic and financial aspects as well as the Group's sustainable success, measured via a composite sustainability indicator that accounts for 10% of the overall weight and also includes climate change-related goals⁴⁴.

The short-term (annual) incentive system uses the **Management by Objectives (MbO)** approach, which applies to top and middle management. A monetary bonus is awarded based on the achievement of targets set for the year. The system provides for Group, Area (cross-area) and individual targets. For the Group targets, which apply to 100% of the participants in the MbO incentive scheme, there are four indicators (KPIs): three are economic-financial in nature and one is composite sustainability, which accounts for 10% of the overall weight.

By reinforcing the link between remuneration mechanisms and the achievement of socio-environmental objectives, both for staff involved in the MbO system and for senior figures in the LTIP, Acea facilitates the full **integration** of sustainability in company activities.

CLIMATE CHANGE-RELATED RISKS AND OPPORTUNITIES, METRICS AND ECONOMIC-FINANCIAL IMPACTS

THE RISK IDENTIFICATION, ASSESSMENT AND MANAGEMENT PROCESS

The nature of Acea Group's business entails the potential **exposure to different types of risk**, including those related to natural events and climatic variations (see also the next paragraph), which are analysed, monitored and managed. Each Group Company carries out these activities within the framework of a **structured process, coordinated centrally** by a designated Function of the Holding Company. The process **integrates two complementary approaches: Enterprise Risk Management and Continuous Risk Management**. This allows the main risks of the entire organisation to be correctly identified and adequately measured, managed and monitored, ensuring consistent management of the Group's overall exposure, in accordance with the goals of the Business and Sustainability Plan⁴⁵ and in line with the risk appetite. This provides management with the information it needs to make appropriate decisions to achieve strategic and business objectives, thereby fostering the protection, growth and value creation of the company.

Acea implements an **Internal Control and Risk Management System (SCIGR)**⁴⁶ consisting of the set of people, tools, organisational structures, standards and corporate rules. These means, through an adequate process of identification, measurement, management and monitoring of the main risks as well as adequate information flows, aim to facilitate the correct and coherent management of the Group, including **sustainable success**⁴⁷. Risk management is understood as a transversal process, with **wide-ranging responsibilities**: the Board of Directors and the Board Committees, the Director in charge of

⁴⁴ Report on the Remuneration policy and the remuneration paid, year 2023 (financial year 2022), pages 21-23.

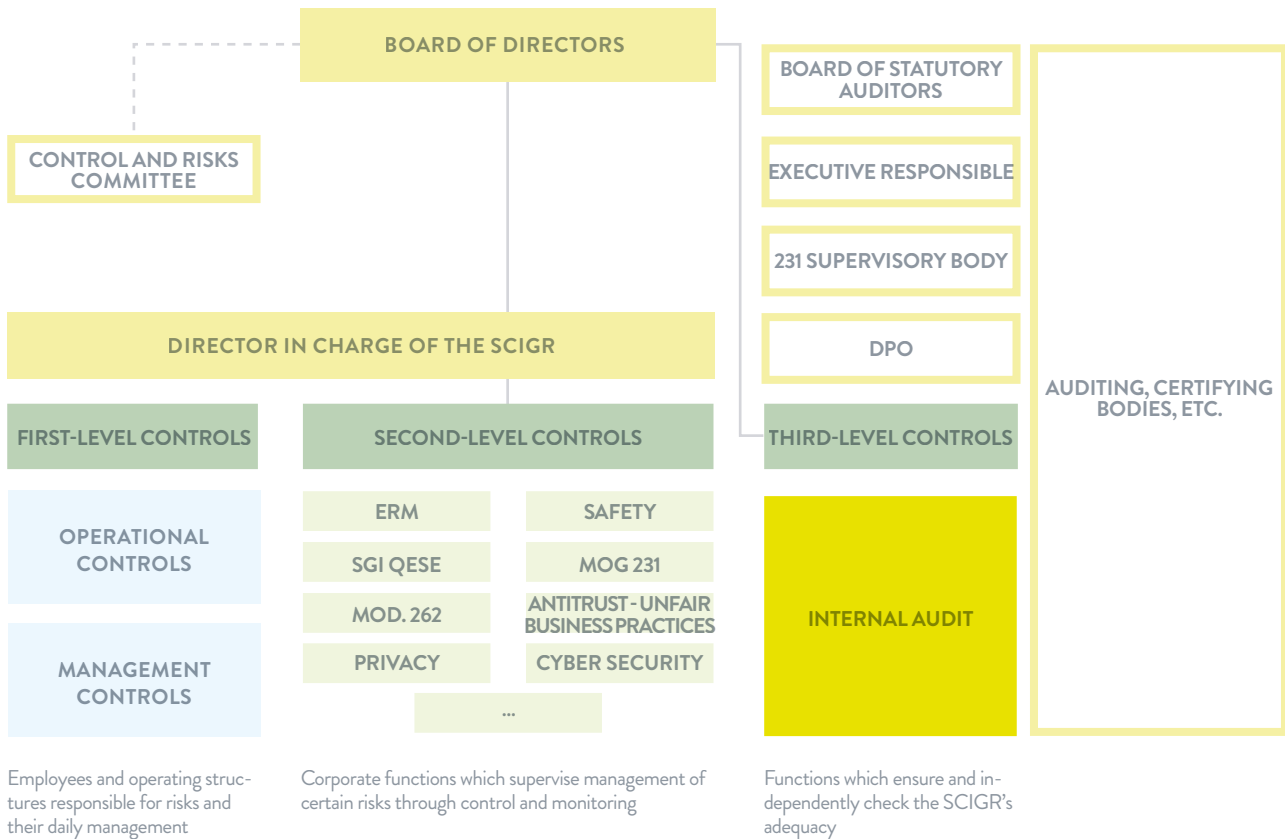
⁴⁵ Report on corporate governance and shareholdings, financial year 2022, page 56.

⁴⁶ For further details, please refer to the dedicated webpage of the Internal Control System and Risk Management of the Acea Group (www.gruppo.acea.it/en/governance/internal-control-and-risk-management-system).

⁴⁷ See, for example, the illustration of this in the Acea Group Sustainability Report 2022, pages 74-79.

the SCIGR (coinciding with the CEO), the Board of Statutory Auditors, the managers and employees, the Executive Responsible, the second level Supervisors, the Supervisory Body, the Data Protection Officer, the Internal Audit Function, the Risk & Compliance Function.

Figure No. 5 – The architecture of the SCIGR (activities, actors, and responsibilities)



The Internal Control and Risk Management System⁴⁸ Guidelines take into account the recommendations of the Code of Corporate Governance and are based on existing best practices, in particular the CoSO - Internal Controls and CoSO - ERM Framework models issued by the *Committee of Sponsoring Organisations of the Treadway Commission*. The ERM (Enterprise Risk Management) process involves several steps that are carried out with the coordination of the main actors involved, as well as a periodic review of the SCIGR to verify its adequacy.

The Risk & Compliance Function provides support to Group management in identifying, assessing and managing risks:

- **Identification** of risks: the main risks that could affect the achievement of the company's goals are identified and described, taking into account the different industrial areas, companies, processes and organisational functions;
- **Risk assessment** and risk analysis: the magnitude and significance of the identified risks are determined, taking into account the economic-financial and/or reputational impact related to the occurrence of the risk, as well as the likelihood of the risk occurring and the mitigation actions already in place or required;
- **Management Mode:** involves the identification of the appropriate mitigation strategy, which may include avoiding, reducing or accepting the identified risk.

The main relevant risks that emerged from the process carried out for each Group Company and Holding Company Function, focus management's attention on priority risk areas, ongoing mitigation activities and treatment strategies to be adopted and are the subject of a summary prepared by the Risk

⁴⁸ Guidelines for the Internal Control System and Risk Management, approved by the Board of Directors on January 22, 2020.

& Compliance Function to support the Corporate Governance Bodies.

The methodology and tools used to identify risks and to assess their severity - the **Risk Model** - also deepen the analysis of ESG aspects and the **risk scenarios associated with the Group's "material themes"**⁴⁹. During the annual **Risk Assessment**, the Risk Owners identify the risk scenarios linked to the material themes (among which are the following environmental themes "sustainable and circular management of water resources", "protection of ecosystems and biodiversity", "climate change and energy transition", "waste management and treatment with a view to the circular economy"), highlighting the possible impacts and the control activities adopted to manage and mitigate them.

The results of the Enterprise Risk Management process are also taken into account in the planning of risk mitigation and opportunity exploitation actions by Group Companies equipped with **Certified Management Systems** compliant with UNI EN ISO9001/14001/45001/50001 standards.

The risk integration process is being **continually reviewed and improved** through its annual cycle.

CLIMATE-RELATED RISKS AND OPPORTUNITIES IN THE SHORT, MEDIUM AND LONG TERM

The **ACEA Group is active in sectors closely tied to climate risks and opportunities**; so the integration of this type of risk into the ERM process reflects Acea's commitment to understand, monitor and effectively manage the impacts of climate change, creating a solid basis for a resilient and future-oriented business management.

The annual participation in the **Carbon Disclosure Project (CDP)**⁵⁰ Questionnaire has also contributed to this approach. The Function in charge of the ERM process has been involved in the project for over 15 years, facilitating the identification of transition and physical risks and opportunities connected to the activities managed and deriving specifically from the effects of climate change, and pinpointing the most significant implications for the company - in economic-financial, reputational and operational-management terms - and, consequently, for customers (see table No. 1)⁵¹.

Acea assesses risks, impacts and opportunities both in the **short term**, focusing on the immediate actions and decisions needed to address current challenges, and in the **medium term**, defining strategic industrial and sustainability planning that guides business development while also taking these aspects into account. It also looks at the **longer term**, developing, for example, the climate scenario analyses outlined in this document and adopting a forward-looking vision that considers long-term climate change challenges and opportunities, regulatory changes and market trends.

Climate change is having a significant impact on electricity and gas consumption levels. **Variations in weather conditions** affect energy demand from customers, while **extreme weather events** can cause grid damage and service interruptions.

Poor rainfall and high temperatures combined with increased water consumption can cause drinking water shortages at certain times or even the depletion of water springs. Prolonged periods of **drought** may affect the regular production of water resources and may lead to increased energy consumption due to water withdrawal from disadvantaged springs. There may also be impacts on the availability of water capacity for hydroelectric plants.

Extreme events such as **floods** can cause asset damage and service disruptions (equipment failures, blackouts, etc.) or, for the water network, overflowing of drains connected to wastewater systems and can cause turbidity of water springs. Such impacts may affect the provision of services in compliance with applicable laws and regulations, resulting in the **risk of financial penalties**.

Climate change is also having **political and economic effects**: the economic system is having to deal with the transition to a decarbonised economy to counter climate change. This will result in stricter **carbon tax policies**, changes in **incentive programmes** and increased financial risks for companies that do not

49 In 2022, Acea conducted a new cycle of materiality analysis, which identified, through stakeholder and management consultations, the key "material" economic and governance, social, and environmental themes related to the Group's businesses. For the process of identifying material topics, through the direct involvement of stakeholders (materiality analysis), see the Note on Methodology of the Acea Group Sustainability Report (2022), page 10.

50 For further details, please visit the dedicated website of the Carbon Disclosure Project (www.cdp.net/en).

51 See also the Sustainability Report of the Acea Group (2022), pages 82-84.

meet environmental standards. This transition can also create **reputational risks** related to climate change if not adequately addressed.

Table No. 1 – Risks and opportunities of the Acea Group related to climate change

RISKS				
Drivers	Risk type and description	Industrial areas affected	Time frame	Potential financial impacts
TRANSITION Risks arising from the ongoing transition to a decarbonised economic system (e.g. regulatory, technological, market)	Legislative/Regulatory These risks may manifest in the following ways: higher carbon tax policies and white certificates; changes to incentive schemes; tightening of the values linked to the Emission Trading Scheme (both in terms of emissions allowed and the cost of actual emission allowances); regulatory developments that require the reduction of impacts in the conduct of business operations	<ul style="list-style-type: none"> • Energy production (thermoelectric and waste-to-energy) • Electricity grid management • Water management 	Short/medium/long term	<ul style="list-style-type: none"> • Increase in direct costs • Increase in indirect (operating) costs • Decrease in asset value or useful life of assets
	Technology Technological evolution may impose the reconversion of the design of processes in order to make them less polluting (for example replacing existing plants or parts thereof with other low-emission technologies)	<ul style="list-style-type: none"> • Energy production (thermoelectric and waste-to-energy) • Electricity grid management • Water management 	Medium	<ul style="list-style-type: none"> • Increase in direct costs • Increase in indirect (operating) costs • Decrease in asset value or useful life of assets
	Legal These include risks related to the worsening of legal and economic sanctions for failure to comply with technical quality and performance standards in the electricity and water services (fines and incremental compliance costs)	<ul style="list-style-type: none"> • Electricity grid management • Water management 	Medium/long	<ul style="list-style-type: none"> • Legal action • Penalties
	Market Commercial risks are attributable to the failure to adapt the products/services of the Group companies to the new requirements of customers, who are more aware of the topics of sustainability, or to the increase in poverty, also caused by climate change, which changes the habits of consumers/customers	<ul style="list-style-type: none"> • All businesses and Commercial in particular 	Medium/long	<ul style="list-style-type: none"> • Reduction in turnover
	Reputational Reputation risk derives from a negative perception of the company's image by its stakeholders as a result of negative events/conditions associated with climate change (e.g. interruption in services caused by the scarcity of water or by extreme weather events)	<ul style="list-style-type: none"> • The Acea Group 	Short/medium term	<ul style="list-style-type: none"> • Reduction in revenue due to (disrupted services, loss of customers)

PHYSICAL					
Risks arising from the physical effects of climatic events (acute if related to episodic phenomena, or chronic if related to long-term changes)	Acute	Extreme weather events such as heavy rainfall and cloudbursts place stress on the resilience of the electricity grid (interruption to power supply) but also create difficulties in the normal management of over-abundance of water in the water service: cloudbursts can also cause a temporary service disruption in wastewater treatment plants or the entire sewerage network service. Heat waves cause peaks in demand for energy/water on the electricity distribution grid/water network.	<ul style="list-style-type: none"> • Electricity grid management • Water management • Energy production 	Short/medium/long term	<ul style="list-style-type: none"> • Increase in capital expenditure • Reduction in turnover
	Chronic	<p>The reduction in rainfall can have a negative impact on the electricity distribution service, the production of electricity by the hydroelectric plants and the availability of water for human consumption, thus causing an increase in energy consumption for the withdrawal of water.</p> <p>The risk of more frequent lightning strikes can cause interruptions to the distribution of electricity and thus economic damage.</p> <p>Temperature changes can cause variations in the composition of incoming waste (decomposition) in waste-to-energy plants, even changing the technological/operating needs associated with variations in emissions and the necessary processing. Incentives are also linked to the biodegradable quantity of the waste</p>	<ul style="list-style-type: none"> • Electricity grid management • Water management • Energy production • Environment Segment 	Short/medium/long term	<ul style="list-style-type: none"> • Increase in direct costs • Decrease in revenue due to reduced production capacity
OPPORTUNITIES					
Drivers	Opportunity type and description	Industrial areas affected	Time frame	Potential financial impacts	
Circular economy	Promotion of circular economy models and waste recovery projects, for example with waste-to-energy processes combined with material recovery (for example: bottom and fly ash recovery)	• Environment Segment	Medium	• Decrease in indirect (operating) costs	
Development of photovoltaic plants	Diversification of production facilities with the acquisition and/or construction of photovoltaic plants that, in addition to receiving incentives for the feeding of electricity produced into the grid, allow balancing any reductions in hydroelectric production.	• Production of electricity; technological innovation	Medium	• Increased revenue due to an increase in customers	
Increase in network resilience	Investments to improve the resilience of the electricity grid promoted by ARERA.	• Distribution of electricity	Medium	• Increased revenues and reduced operating costs	
Market and services	Opportunities arising from the change in energy demand related to changes in peak ambient temperatures and the increase of the average temperature, with an impact on price growth and volumes sold	• Energy sales	Short/medium term	• Increased revenues from increased demand for products and services	

The Group companies active in the water, electricity distribution, environment and power generation industries, which have **ISO 14001:2015 certified Environmental Management Systems**, identify not only climate risks, but other types of **environmental risks** and potential negative impacts generated or suffered by their activities, in relation to specific events⁵². The **water area** is exposed to risks that include not only acute or chronic climatic events, but also: earthquakes, which could cause structural damage or malfunctioning of plants and networks, causing service disruptions, water shortages or accidental pollutant spills; inefficient water resource management that could lead to high levels of leakage and consequently excessive consumption; water stress; possible overruns of resource control parameters with consequent environmental impacts; inadequate sewage and purification systems with the risk of soil

52 Sustainability Report of the Acea Group (2022), page 84.

and water contamination; the risk of purification plant fires and explosions linked to biogas production with possible atmospheric emissions. In **energy networks**, the main environmental risks are related to: overhead and underground infrastructures, which affect land and subsoil use; waste generation and impacts on ecosystems; generation of electromagnetic fields, which could cause exposure; processing plant maintenance, which could lead to contamination of soil and subsoil by hazardous materials; plant maintenance and construction, which generate special waste. For **electricity generation** activities, whether from renewable or conventional sources, potential environmental risks arise from the day-to-day operation of plants or from critical events such as fires or explosions, which could cause the accidental spillage of pollutants (into surface water and sewers) or could exceed atmospheric emission threshold levels. An environmental risk profile arises from possible structural failure of the hydraulic works serving the hydroelectric power plants, due to critical natural phenomena such as high-intensity earthquakes or millenary deluges, which could have effects in the surrounding area, such as flooding. In the **environmental area**, potential risks include hazardous substance spills that could contaminate soil, groundwater or surface water, and above-legal-limits emissions into the air or water. Critical issues may occur in connection with non-compliant waste treatment processes, with consequences for plant operations. Unintentional fires could disrupt plant operations and cause pollution in the surrounding areas. In addition, delays in issuing authorisations for investments or work on plants could affect the company's operations. Finally, there may be environmental exposure to noise, odours and dust during extraordinary plant maintenance activities.

Aware of these risks/impacts, the Acea Group **programmes investment initiatives and takes measures to increase the resilience of its infrastructure and to ensure the continuity of the services provided**, while preserving the quality and safety of its operations.

IMPLEMENTATION OF CLIMATE SCENARIO ANALYSES ON PHYSICAL AND TRANSITION RISKS AND OPPORTUNITIES

The performance of **climate scenario analyses** supports operating companies in their assessments of priority risks related to the various businesses, and in quantifying said risks, particularly in the medium and long term. To this end, the Acea Group set out on a targeted path in 2020, in line with the recommendations of the Task Force on Climate-related Financial Disclosure (TCFD)⁵³.

After an **initial project**, carried out over the 2020-2021 two-year period, and involving the Group's most relevant companies in terms of profiles and emissions, such as Acea Ato 2, Acea Produzione, Areti and Acea Ambiente (Working Group 1 - WG1)⁵⁴, a **second project** was carried out in 2022, in which other water companies in the Group also participated - Acea Ato 5, Gori, AdF and Gesesa - (Working Group 2 - WG2)⁵⁵. The activities conducted aimed to **implement and strengthen the climate scenario analysis** in accordance with the recommendations of the TCFD, updating the data from the previous survey and also delving into other types of risks and opportunities, as detailed below.

53 For further details, refer to the website of the Task Force on Climate-related Financial Disclosures (Task Force on Climate-Related Financial Disclosures | TCFD) ([fsb-tcfd.org](https://www.fsb-tcfd.org)).

54 Refer to the *Acea Group - Climate-related Disclosure (2022, on the 2021 financial year)*, which illustrates the outcomes of the project.

55 In terms of Group representativeness, it should be noted that in 2022, based on 2021 data, Areti accounted for 100% of the DSO (Distribution System Operators) business, while Acea Produzione and Acea Ambiente covered 92% of the energy production of the fully consolidated companies. In terms of water, Acea Ato 2, Acea Ato 5, Gori, Gesesa and AdF supplied and invoiced water volumes equating to 97% of the total supplied by the fully consolidated companies operating in Italy. The emissions of the listed companies included in the project accounted for about 83% of the Group's total GHG emissions. The weight of the companies considered on EBITDA was 86.8% of the total.

CLIMATE SCENARIOS AND THE PRIORITISATION OF CLIMATE CHANGE RISKS AND OPPORTUNITIES

To conduct the activity, the Acea Group has adopted a systematic approach, taking into consideration the main **international climate scenarios** developed by international reference bodies (see table No. 2) and identifying **the most representative** scenarios on which to base the analyses⁵⁶.

Table No. 2 – Main international climate scenarios of physical risks and transition risks

PHYSICAL RISK SCENARIOS

Scenarios developed by the **Intergovernmental Panel on Climate Change (IPCC)**:

- **RCP** (*Representative Concentration Pathways*) **8.5 scenario** (high-emission scenario)
- **RCP 6.0 scenario** (high to intermediate emission scenario)
- **RCP 4.5 scenario** (intermediate emission scenario)
- **RCP 2.6 scenario** (low emission scenario)

SCENARIOS OF TRANSITION RISKS

Scenarios developed by the **International Energy Agency (IEA)**:

- **SDS** - *Sustainable Development Scenario*
- **STEPS** - *Stated Policies Scenario*
- **APS** - *Announced Pledges Scenario*

Scenarios developed by the **Network for Greening the Financial System (NGFS)**:

- **NDCs** - *Nationally Determined Contributions*
- **Below 2°C Scenario**

As part of **the climate scenarios relevant to the assessment of physical risks**, Acea chose to use two scenarios developed by the Intergovernmental Panel on Climate Change (IPCC)⁵⁷, described in table No. 3. Regarding the **climate scenarios on transition risks**, Acea selected the two scenarios most recently developed by the International Energy Agency (IEA), as shown in Table No. 4. Scenarios developed by authoritative international organisations such as the IPCC and IEA allow for the exploration of future conditions over different time horizons, providing a solid basis for analysis to assess climate risks and to adopt appropriate adaptation and mitigation strategies.

Table No. 3 – The physical climate scenarios used by Acea

Physical scenario	Description	Expected average global temperature rise by 2100 (probable range in °C)	
		2046-2065	2081-2100
RCP 8.5	The RCP 8.5 scenario represents a business-as-usual scenario (BAU), with a continuation of the current GHG emissions trajectory, i.e. the increase in greenhouse gas concentrations. It is therefore classified as a high-emission scenario.	1.4-2.6	2.6-4.8
RCP 4.5	The RCP 4.5 scenario assumes the implementation of moderate to strong mitigation actions and that by 2080 the emissions will be half of today's levels. According to this scenario, an increase in global temperature above 2°C is less likely. It is therefore classified as an intermediate-emission scenario.	0.8-1.8	1.1-2.6

⁵⁶ For more in-depth information, refer to the TCFD *The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities report* (2017).

⁵⁷ The four physical hazard climate scenarios, developed by the Intergovernmental Panel on Climate Change (IPCC), represent different projections of the Earth's climate system's response to changes in atmospheric concentrations of greenhouse gases (GHGs). These scenarios are called RCPs (Representative Concentration Pathways). Most of the tools used to study the effects of climate change are based on RCP scenarios.

Table No. 4 – The climate transition scenarios used by Acea

Transition scenario	Description
Business-As-Usual	Scenario based on the IEA's Stated Policies Scenario (STEPS), as well as European and national level scenarios, such as the EU reference scenario. STEPS reflects the policy currently in force and the commitments made through appropriate policies to achieve it ⁵⁸ .
Below 2°C	Scenario based on the Announced Pledges Scenario (APS) of the IEA. The APS scenario takes into account the most challenging climate commitments made by governments with the Nationally Determined Contributions and the long-term “zero net emissions” targets, assuming that all commitments are fully met ⁵⁹ .

In order to identify the most relevant climate risks and opportunities, projections reported by various accredited sources - such as the National Energy and Climate Plan (PNIEC), the International Energy Agency's World Energy Outlook Report and the Euro-Mediterranean Center of Climate Change (CMCC) - were taken into account, and a questionnaire was forwarded to the companies involved in the project, aimed at obtaining information on perceived risks in relation to business and operational contexts. This process made it possible to identify an initial set of climate risks.

Prioritisation criteria were then applied, giving consideration to the peculiarities of the different geographical areas and business sectors. This made it possible to **focus the analysis on the most significant climate risks for each Company**, taking into account the **specificities** and the potential impacts on their activities.

In the case of **physical risks**, for example, the location of assets and their possible vulnerability to certain climatic risks were assessed, critical climatic events that previously affected assets were considered, and process owners' perceptions of the importance of certain types of physical risks in relation to specific business segments were taken into account. Finally, the likelihood of future climate change causing more intense and amplified effects was also assessed. In particular, the prioritisation of risks to be analysed was based both on the current climate situation and on potential medium- and long-term climate changes, in order to also identify risks that, despite not yet having generated significant impacts, could do so in the future.

The prioritisation carried out for the 2022 analyses led to three **physical hazards**, already identified with the first project, being confirmed as priorities: **drought and water stress**; **extreme rainfall** (so-called “cloudbursts”, often related to flooding); **extreme temperature events**, i.e. “heat waves”. The risk of **lightning** was prioritised and therefore analysed under the 2020-2021 project. These risks were investigated through climate scenario analyses, depending on the selection made by the individual companies (see Table 5).

The following tools were used to explore the possible increase in the frequency and duration of the identified physical risks under the two selected RCP climate scenarios:

- the *Aqueduct Water Risk Atlas* portal of the World Resources Institute (WRI)⁶⁰, which makes available various indices to assess water availability.
- the World Bank's climate portal⁶¹, where it was possible to explore future changes at country level. It was used in the first project for drought risk and heavy rainfall assessments;
- the NASA Earth eXchange (NEX) dataset “Global Daily Downscaled Projections” (GDDP), used in the second project.

Further details are given in the following paragraph: *Climate scenario analyses of physical risks*.

For the **transition risks**, identified on the basis of the risk categories indicated by TCFD (legal, market, technological, reputational, political-regulatory) and the potential implications for Acea, **prioritisation** took into account the exposure of the business sectors in which the Group operates and the probability that certain risks may occur at European or national level in the current context, as well as in the medium and long term. The **political-regulatory risk linked to the price of CO₂ emissions** – carbon pricing –

58 For further details, visit the dedicated webpage https://energy.ec.europa.eu/data-and-analysis/energy-modelling/eu-reference-scenario-2020_en.

59 For the 2020-2021 project, the IEA's Sustainable Development Scenario (SDS) was used as a reference, but was later discontinued in energy and climate modelling (Global Energy and Climate Model); for more details, see the International Energy Agency's dedicated webpage (www.iea.org/reports/global-energy-and-climate-model/understanding-gec-model-scenarios).

60 For further details, visit the dedicated webpage of the *Water Risk Atlas* (www.wri.org/applications/aqueduct/water-risk-atlas).

61 For further details, visit the webpage *Climate Change Knowledge Portal for Development Practitioners and Policy Makers* (<https://climateknowledgeportal.worldbank.org/country/italy/climate-data-projections>).

was confirmed as the transition risk with the greatest potential impact on Acea. In addition, one of the companies operating in the water sector expressed interest in exploring the opportunity of consumption of electricity produced from renewable sources. These assessments are reported in detail in *Climate scenario analyses of transition risks*.

Table No. 5 – Selected and analysed risks and opportunities from 2020 to 2022

Company	Type	Risk/opportunity	Business area/part of the process involved	Risk analysis period
Acea Ato 2	Physical risk (chronic)	Drought and water stress	Water network	2020-2022
	Transition risk	Political-regulatory risk related to the price of CO ₂ emissions	Electricity consumption	2022
Acea Ambiente	Physical risk (acute)	Lightning	Waste-to-energy	2020-2021
	Physical risk (chronic)	Drought and water stress	Waste-to-energy and composting plants	2022
	Transition risk	Political-regulatory risk related to the price of CO ₂ emissions	Fuel consumption	2020-2022
	Physical risk (acute)	Lightning	Photovoltaic systems	2020-2021
Acea Produzione	Physical risk (chronic)	Drought and water stress	Hydroelectric power plants	2022
	Physical risk (acute)	Extreme rainfall	Thermoelectric power plants	2022
	Transition risk	Political-regulatory risk related to the price of CO ₂ emissions	Fuel consumption	2020-2022
	Physical risk (acute)	Extreme rainfall	Distribution networks ⁶²	2020-2022
Areti	Physical risk (chronic)	Extreme temperatures (“heat waves”)	Distribution networks ⁶³	2022
	Physical risk (chronic)	Drought and water stress	Water network	2022
Acea Ato 5	Transition risk	Political-regulatory risk related to the price of CO ₂ emissions	Electricity consumption	2022
	Physical risk (chronic)	Drought and water stress	Water network	2022
AdF	Transition risk	Political-regulatory risk related to the price of CO ₂ emissions	Electricity consumption	2022
	Physical risk (chronic)	Drought and water stress	Water network	2022
Gesesa	Transition opportunities	Renewable energy sources	Electricity consumption	2022
	Physical risk (chronic)	Drought and water stress	Water network	2022
Gori	Physical risk (chronic)	Drought and water stress	Water network	2022
	Physical risk (acute)	Extreme rainfall	Sewage and purification system	2022

The **results of the analyses** are represented in the respective **risk matrices**, illustrated individually below. They indicate the **probability of the risk occurring**⁶⁴ and the **magnitude of the associated potential financial impact**⁶⁵. An approach was adopted to consider a): company-specific past and possible future scenarios, combining past company information with climate scenario projections, in order to comprehensively and accurately assess specific risks, and b): the impacts associated with climate change⁶⁶.

62 In the first project, the assessment looked at the impact of river flooding caused by extreme rainfall on the electricity distribution network; in the second, the analysis assessed the impact of “cloudbursts”, i.e. heavy rainfall events, on electricity substations.

63 The risk was investigated to gain insight into the impact on Areti’s distribution network, also in the light of the results of the Resilience Plan. The secondary substations investigated are the same as those included in the Resilience Plan.

64 The probability of a risk/hazard occurring in a given year was determined by analysing information from the relevant literature. If a hazard occurs every year, the probability is 100%, and in the matrix it is “>50%”.

65 With regard to the potential financial impact, the levels defined reflect the magnitude of the impact relative to the individual Company supported in the analysis and do not refer to Group-wide impacts.

66 When relevant information was made available by the companies themselves, impact levels for the baseline, referring to 2021 or 2022 depending on the case, were calculated using company-specific historical data. With regard to future impact levels, company-specific information, such as company growth rates, was combined with information from climate scenarios, such as CO₂ price projections. For physical risks it was assumed that only the probability of the impact would undergo future change with respect to the baseline, not the economic impact, which itself is assumed unchanged over time, given the complexity of future economic variables; whereas for transition risks, in most cases the future risk matrix indicates a change in both probability and impact levels.

CLIMATE SCENARIO ANALYSES OF PHYSICAL RISKS

Once the priority physical risks had been identified by the companies involved, as illustrated in the previous section (drought and water stress, extreme rainfall and extreme temperature events), climate scenario analyses were then implemented, using the climate indicators mentioned in Table 6. With regard to lightning risk, which emerged as a priority and was analysed in the 2020-2021 project cycle, the results of the analyses are also reported here.

Table No. 6 – Climate indicators/metrics used in the physical risk assessment in 2022

Risk	Details	Indicator/metric	Company
Drought and water stress	Increased water stress and more frequent, longer and more intense droughts	Water stress SPEI: Standardized Precipitation Evapotranspiration Index Consecutive dry days Average annual rainfall	Acea Ato 2, Acea Ato 5, AdF, Gori, Gesesa, Acea Produzione and Acea Ambiente
Extreme rainfall	More frequent and intense rainfall events	<i>RX5day</i> : measures changes in the maximum cumulative rainfall value over 5 days with a return period of 25 years	Areti
Extreme rainfall	More frequent and intense rainfall events	Number of days with rainfall > 20 mm/year	Areti and Gori
Extreme temperature events (“heat waves”)	Heat waves and extreme temperatures	Monthly maximum temperature trends	Areti
Extreme rainfall	Increased frequency and extent of flooding	Changes in flood events with a return period of 50 and 100 years	Areti
Lightning	Increased number of thunderstorms and increased risk of lightning strikes	No. of days of thunderstorms/year	Acea Ambiente and Acea Produzione

The **specific analyses** for each risk considered and the respective risk matrices per company are presented below.

Drought and water stress

The *Aqueduct Water Risk Atlas*⁶⁷ tool was used to assess the water risks of about 1,500 assets of the companies involved in the project, mainly Acea Ato 2 but also Acea Ato 5, Gori, AdF and Gesesa, Acea Ambiente and Acea Produzione⁶⁸. The indicators included in the tool can be used to understand the baseline risk (i.e., the current risk), and the future risk that could result from climate change.

With regard to drought, the **Standardised Precipitation Evapotranspiration Index** (SPEI) with medium-term and beyond-2040 projections was considered among others. **Aqueduct** was used to assess water stress by analysing projections for various scenarios - the Business-As-Usual (BAU), an “optimistic” and a “pessimistic” scenario, for two future periods (2030 and 2040) with four indicators: **water stress, seasonal variability**⁶⁹, **surface water supply**⁷⁰ and **water demand**.

For Acea Ato 2, the results of the analysis carried out in 2020-2021 showed that drought events will become more extensive and intense in the future due to global warming: in particular, the annual probability of an “extreme drought” (SPEI ≤ -2.00) occurring in Italy - currently 10% - is expected to be 24% (as an average for the entire country) in a RCP 8.5 scenario and 14% in a RCP 4.5 scenario for the period 2040-2059.

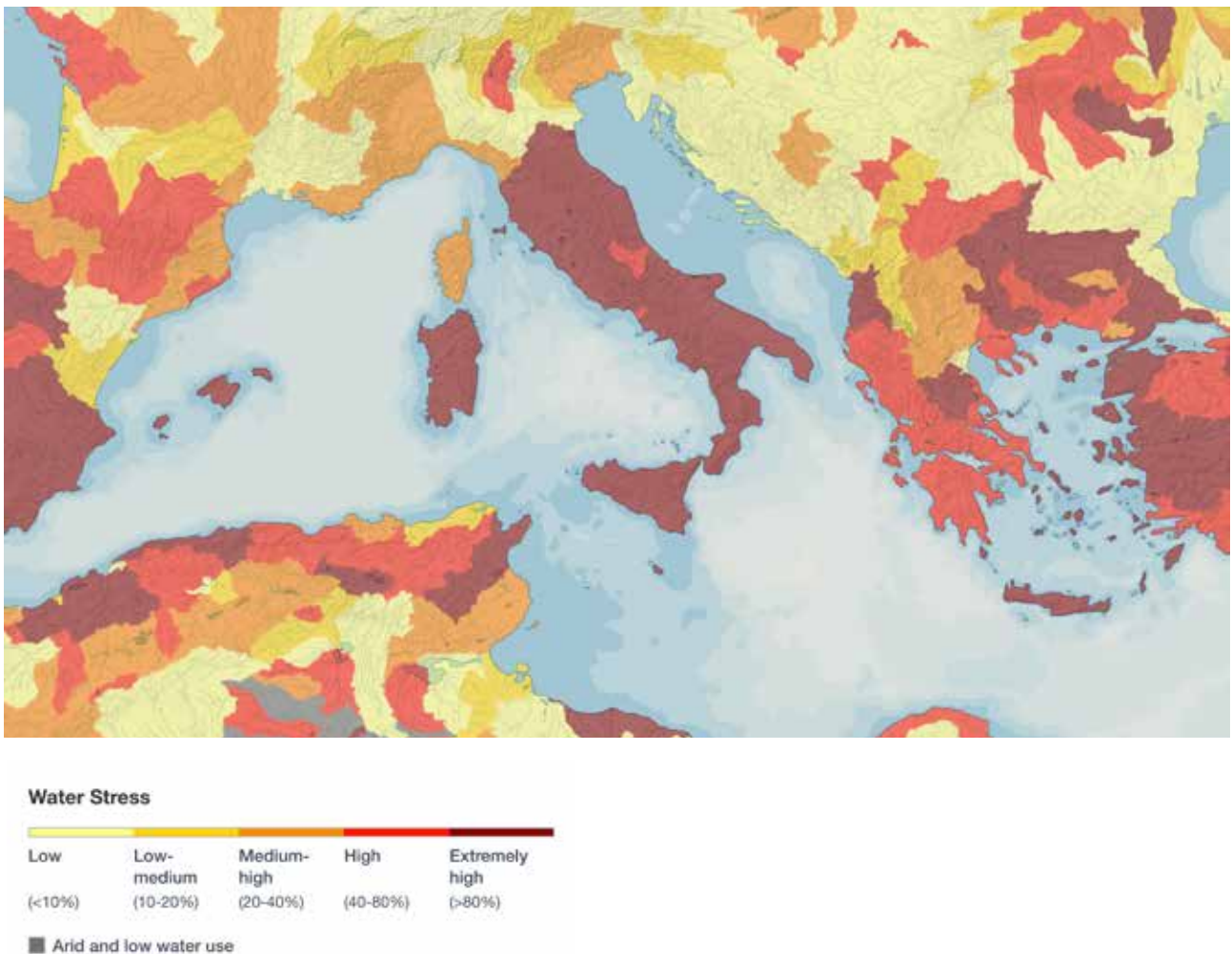
67 www.wri.org/applications/aqueduct/water-risk-atlas.

68 More than 1,100 Acea Ato 2 assets (which conducted the analysis in the 2020-2021 project), including about 240 drinking water system plants, about 300 AdF assets, mainly springs, and other key assets belonging to Acea Ato 5, as well as geographical areas affected by the assets of the other participating water companies. For Acea Produzione these are the hydroelectric plants, for Acea Ambiente the composting plants, a landfill and the two waste-to-energy plants.

69 Seasonal variability measures the average annual variability of available water supply, including surface and groundwater supplies. Higher values indicate larger variations in available supply over the year.

70 In the tool used, the water supply indicator considers surface water.

Figure No. 6 – The current physical water stress risk in Italy



Source: *Aqueduct - Water Risk Atlas*, 2022

The Acqueduct tool was also used in the second project to conduct analyses for Acea Ato 5, AdF, Gesesa and Gori. The results showed that companies already operate in regions with high or very high **water stress** and projections under both climate scenarios considered indicate that water stress values will increase in the future. In the case of Acea Produzione, the analysis was conducted for the five main hydroelectric plants; here too, they are located in areas already at risk of extremely high water stress; moreover, the risk is expected to increase under all the scenarios and time horizons considered. Similar results were also found for Acea Ambiente, as the plants are located in areas of very high water stress, except for the Monterotondo Marittimo plant. The plant is currently located in an area with “high water stress”, and this is expected to increase in both scenarios.

The other indicators analysed in 2022 (i.e. number of consecutive dry days per year and average annual rainfall) also show significant changes. It is expected, for example, that the **number of consecutive dry days** will be higher in the Campania region, where Gori’s assets are located. By 2040, there could be between 34 and 39 consecutive dry days per year in this region under both scenarios, compared to 30 days/year historically. The smallest variations are expected for the areas where Acea Produzione’s hydroelectric plants are located, with values ranging from 26 to 29 consecutive dry days per year, compared to the 24 days/year recorded historically. With regard to **annual average rainfall**, the biggest decreases are again expected to occur in the area where Gori’s assets are located. Under the RCP 4.5 scenario, by 2040 the average annual rainfall is expected to decrease by up to 6% from the historical period, while under the RCP 8.5 scenario, the projected decrease is 7%. The smallest changes are expected in the Tuscany region where AdF’s assets are located (decreases of up to -3% by 2040 for

both scenarios).

Presented below for each company are the results of the analyses, based on the above-mentioned tools, historical data, evidence from the scientific literature and applications of the IPCC RCP 8.5 and 4.5 scenarios (described in Table 3), with an analysis of the **baseline and 2040 periods** and the resulting risk matrices.

Compared to the baseline⁷¹, as already mentioned, **it was assumed for physical risks that only the probability of the impact changes, whereas the economic impact is assumed to remain constant**. It should be borne in mind that where the estimated economic impact of certain types of physical risks takes into account the purchase of energy, with measurements of the increase in consumption, these estimates vary, for the different companies, also depending on the operating mechanisms of the energy market⁷².

Acea Ato 2

As indicated above, drought events are expected to occur, by 2040, more frequently in central Italy where Acea Ato 2 carries out its Integrated Water Service (IWS) activities, according to both the RCP 4.5 and RCP 8.5 scenarios. The analysis carried out in 2022 confirmed what had emerged in the first project (2020-2021): the annual probability of drought events in the area where Acea Ato 2 plants are located is now 10% (i.e. a drought event approximately every 10 years). This probability is expected to increase for both scenarios due to climate change. In particular, according to both RCP 4.5 and RCP 8.5, it would increase to 10%-25% (level 3), showing an increase in risk exposure.

The **mitigation actions** put in place by Acea Ato 2 have **significantly reduced the impacts** of drought events on company operations and, during the 2022 drought event, Acea Ato 2 ensured the continuity of water supply without any disruption⁷³. The only resulting economic impact - an increase in operating costs - is related to the increased use of electricity necessary to ensure continuity of service. This impact is, however, contained thanks to the significant management optimisations made on the system (interconnections, pressure regulation and loss reduction). Therefore, the impact shown on the matrix reflects the costs due to the change in electricity consumption attributable to changes in the set-up of the water system during drought events compared to normal conditions. Such costs can be estimated, for 2022, at about €300,000 (equal to an increased consumption of about 2.8 GWh).

In addition, Acea Ato 2 has also launched other initiatives dedicated to furthering the analysis of climate risk and its impacts, developing the *Annual Quantification of Underground Available Resource for water Utility Management (AQUARUM)* project to assess the quantitative status of potential groundwater resources and the possible impacts related to the withdrawal from springs, in accordance with the provisions of the European Union's Water Framework Directive, and two studies: the first, in collaboration with the CNR Water Research Institute, aimed at defining useful techniques and tools to determine the probability of future default of the supply system in meeting water needs; the second, in collaboration with the University of Catania, related to the study of the main climatic variables - determining their variation over a 30-50-year time horizon - in order to develop long-term forecasts of water availability from supply sources and water resource protection strategies.

Acea Ato 5

On the basis of the analyses carried out, it is expected that, by 2040, under both scenarios (RCP 4.5 and RCP 8.5), drought events will occur more frequently in the area where Acea Ato 5 operates⁷⁴, compared to the Acea Ato 2 area of operation, although both companies manage the Integrated Water Service in the Lazio region. The annual probability of drought events in the area where Acea Ato 5's plants are located is currently 20% (i.e. an average of two drought events every 10 years), but climate change is expected to push it up to 30% - 35% (level 4), with an increase in risk exposure.

To assess the economic impact, an analysis was performed on the increase in operating costs for electricity consumption required to ensure continuity of operations. Therefore, the economic impact

71 The most recent historical period was taken as the baseline: for the probability, the baseline used was that against which a change in a climatic hazard was projected; for the economic-financial impact, recent economic data provided by the companies (Corresponding from time to time to 2021 or 2022 as specified below) were considered.

72 With variable costs depending on the period when the tender is held and market trends.

73 Noting fewer problems compared to the 2017 drought event.

74 Frosinone and its province have dust in the air, due to pollution, generating an increase in perceived temperatures due to the "heat island" effect. This could lead to an increase in water demand, resulting in the risk of a mismatch between demand and water availability.

reported in the matrix reflects the increased costs due to the variation in electricity consumption during drought events compared to normal conditions, which have been estimated at over € 500,000. The figure corresponds to the change in electricity consumption observed during the drought event of 2022 compared to 2021 (a difference of approximately 2 GWh)⁷⁵.

AdF

The analysis found that the annual probability of drought events at the location of AdF's plants is currently 20% (two drought events on average every 10 years), although it has already been found that the time gap between water crises is decreasing.

Due to climate change, the annual probability of such events is expected to increase by up to 25% under RCP scenario 8.5 and up to 30% under RCP scenario 4.5, increasing exposure to the risk in question. The related economic impact was calculated by analysing the potential increase in operating costs necessary to ensure continuity of the water supply. Therefore, the financial impact illustrated in the matrix reflects this category of cost, which has been estimated at approximately € 1,000,000⁷⁶. The figure was determined as follows:

- increased electricity consumption due to the increased need for pumping/potabilisation: approximately € 350,000;
- more interventions on the water network to maximise the availability of water resources: approximately € 450,000;
- transport of drinking water by tanker trucks: approximately € 150,000.

Gori

The analysis found that the annual probability of drought events at the location of Gori's plants is currently 20% (two drought events on average every 10 years). As mentioned, drought events are expected to occur more frequently in the Campania region under both the RCP 4.5 and RCP 8.5 scenarios by 2040 and, by that date, the probability of occurrence could reach 30%-35% (level 4), with an increase in risk exposure.

The economic impact was calculated by analysing the increase in operating costs for the consumption of electricity needed to ensure continuity of operations, relating both to the increased use of groundwater withdrawals – which would replace withdrawals from surface springs – and the pumping and treatment of wastewater. Thus, the economic impact shown in the matrix reflects the possible costs due to increased electricity consumption in the event of drought events compared to normal conditions, which have been estimated at approximately € 500,000⁷⁷.

The mitigation measures implemented as early as 2018 (leakage detection, input reduction and management efficiencies) have ensured that no critical water availability situations have arisen in the years following the extreme drought event in 2017. Gori also has analyses on the availability of water resources in the months of the current year that help in the annual forecasting and optimal management of operations.

Gesesa

The analysis found that the annual probability of drought events in the areas where Gesesa operates, in Campania, is currently 20% (two drought events on average every 10 years). This probability is expected to increase under both RCP 4.5 and RCP 8.5 scenarios to 30%-35% (level 4) with an increase in risk exposure.

The economic impact was calculated by analysing the increase in operating costs for the consumption of electricity required to ensure continuity of operations. The baseline risk matrix indicates a low economic impact, considering that in 2022, in the area where Gesesa's assets are located, there was no decrease in rainfall. For the matrices in 2040, under RCP 4.5 and RCP 8.5 scenarios, despite the higher expected frequency of drought events, the economic impact is expected to remain low, also due to the efficiency interventions already planned, which will mitigate the associated impact.

⁷⁵ The average cost of electricity in Q1 2023 (0.25 €/kWh) was taken into account.

⁷⁶ AdF entered a forecast estimate rather than an actual baseline calculation, assuming prolonged and continuous periods of drought during the summer season.

⁷⁷ Cost around 1.5 GWh (0.35 €/kWh)

Acea Ambiente

The analysis showed that the annual probability of drought events at Acea Ambiente's plant sites (waste-to-energy and composting plants, as well as the Orvieto hub) is currently between 10% and 20% (one to two drought events every 10 years). The annual probability of such events is increasing under both climate scenarios, up to 30% for RCP 4.5 and up to 25% for RCP 8.5, with Acea Ambiente having a higher exposure to this risk.

The level of economic impact was calculated by analysing historical data on Acea Ambiente's industrial-use water consumption, supplied through aqueducts, wells or water reservoirs, which in 2021 was approximately 126,000 m³. Considering the worst case scenario, i.e. the impossibility of obtaining this supply due to an extreme drought event for about six months, the economic impact would be about € 1,000,000. A slightly higher impact occurred in 2022, considering the start of the third line at San Vittore del Lazio⁷⁸. The risk matrices presented below therefore estimate a level 3 impact: between € 500,000 and € 1,500,000.

Acea Produzione

The analysis showed that the annual probability of drought events in the areas where Acea Produzione's thermoelectric plants are located is currently less than 10% (a maximum of one drought event every 10 years). This probability is expected to increase under both climate scenarios (RCP 8.5 and RCP 4.5) to 25 % (level 3), resulting in an increased exposure to drought risk.

The economic impact has been calculated assuming the worst-case scenario, in which one of Acea Produzione's main hydroelectric plants, the Sant'Angelo hydroelectric plant, suffers a three-month outage due to the water level dropping below the minimum levels necessary for operation. Such a disruption could lead to losses of approximately € 4.3 million. The figure is equal to three months of the total annual turnover generated by the Sant'Angelo hydroelectric plant in 2021⁷⁹.

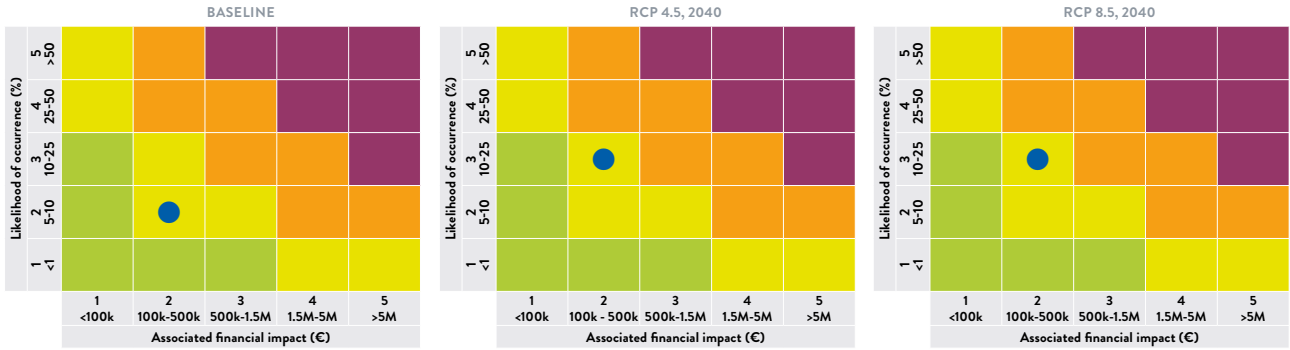
The risk matrices (or "impact matrices") in Figure No. 7 show the changes in the probability of occurrence of the average drought event and the associated potential economic impact under baseline conditions and under RCP 4.5 and RCP 8.5 scenarios in 2040.

78 Considering that in 2021 the cost of supplying one cubic metre of water with a tanker truck was € 16.6/m³, over six months the economic impact of an extreme drought event would amount to approximately € 1 million if consumption remained the same as in 2021. With water consumption/withdrawal levels equal to those of 2022, the economic impact would be higher.

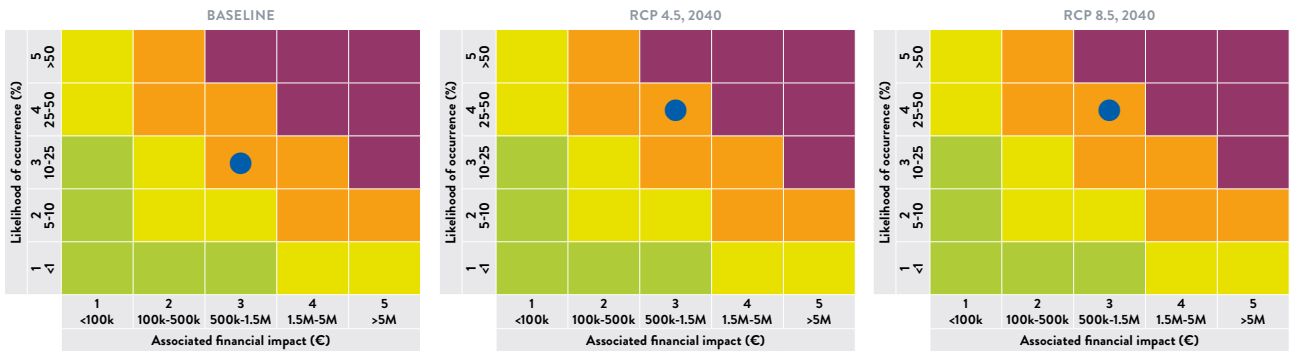
79 Reference was made to 2021, which is more in line with trends in previous years, while the cyclical increase in energy prices in 2022 could distort the impact assessment.

Figure No. 7 – Risk matrices for “drought event”: baseline and in 2040 - Acea Ato 2; Acea Ato 5, AdF, Gori, Gesesa, Acea Ambiente, Acea Produzione

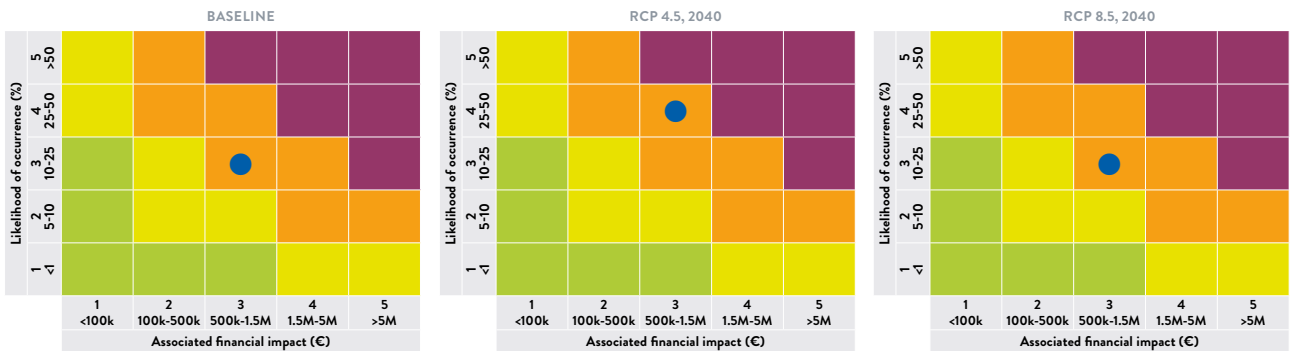
Acea Ato 2



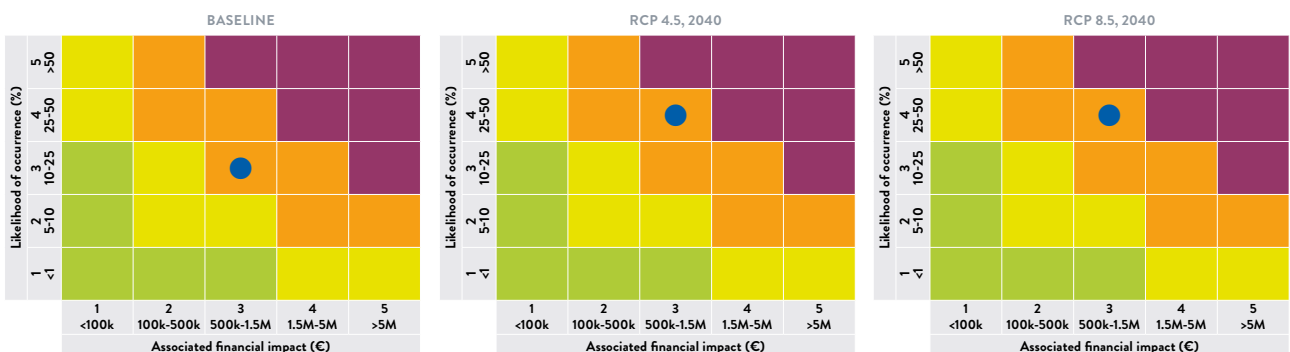
Acea Ato 5



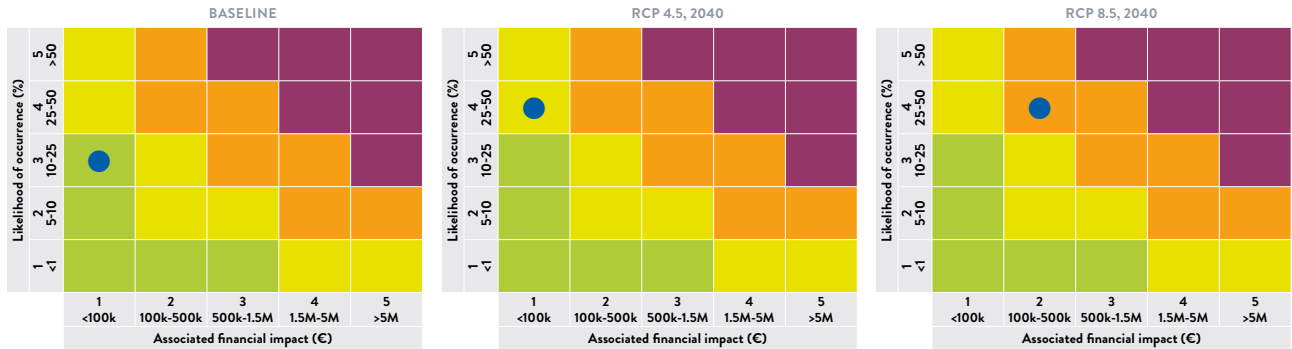
Adf



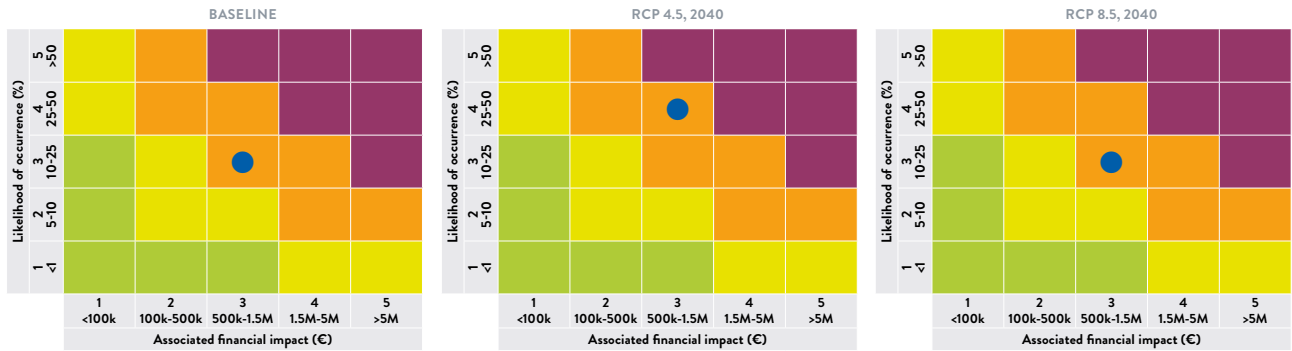
Gori



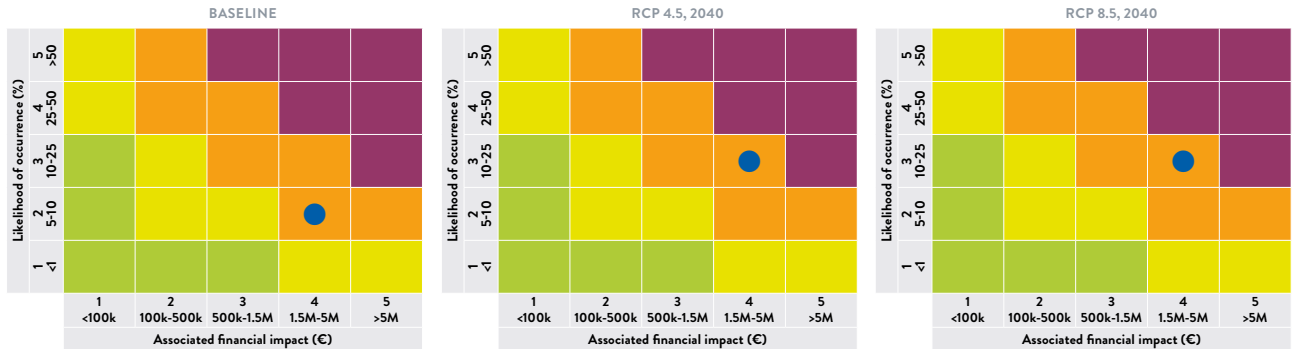
Gesesa



Acea Ambiente



Acea Produzione



Extreme rainfall and flooding

The heavy rainfall event was assessed for Areti, Gori and Acea Produzione.

During the first project the assessment focused on the impact of extreme rainfall-induced **river floods** on the electricity distribution network of Areti⁸⁰. In the 2022 project, the analysis assessed the impact of heavy rainfall-induced “**cloudbursts**” on Areti’s electricity substations, Gori’s sewage and purification system and Acea Produzione’s thermoelectric power plants.

Assessments were carried out for the three companies under the RCP 4.5 and RCP 8.5 climate scenarios, with the risk analysed to 2050.

80 For the activities involving the electricity distribution company Areti, the risks of heat wave/drought and flooding events due to particularly intense rainfall events resulting from climatic variations, and the relative mitigation actions are addressed in the Resilience Plan approved by ARERA. In accordance with the provisions issued by the Regulatory Authority, Areti annually defines its Resilience Plan with a three-year horizon (the most recent being the 2021-2024 plan), in which it describes the interventions aimed at limiting the probability of disconnection associated with the main risk factors affecting the network. The definition of the Plan therefore takes into account the expected increase of the two climate phenomena with assessments based on the analysis of historical data.

Areti

In the case of Areti, the flood risk analysis was repeated in 2022, with the issue again being considered in order to construct the risk matrix.

To assess the probability of heavy rainfall events, historical climatic data was analysed against the following indicator: **the number of days with rainfall greater than 20 mm**. The probability of this type of event in the historical period, as described below, was first determined in order to give an understanding of how this risk might change in the future.

Based on the available literature, heavy rainfall events correlated with an increased risk of cloudbursts can be expected to occur more frequently in 2050 than at baseline under the RCP 4.5 and RCP 8.5 scenarios.

The analysis developed on literature data for the historical period 1986-2005 revealed that the number of days with rainfall greater than 20 mm varied between 3.8 and 5.4 per year in the Rome area: (the average was 4.6 days); on the other hand, for the historical period 2008-2017, the data for a larger area (also suburban) showed a higher average of 8.7 days per year of rainfall above 20 mm⁸¹.

The climate scenario projections were applied taking into account the urban area, whose population density makes the risk of service disruption more significant. The outcomes, in both scenarios considered, show data that is substantially in line with the historical series, denoting slight increases that do not raise the level of risk beyond the current state: according to the RCP 4.5 scenario, in fact, the number of days with rainfall of more than 20 mm would be between 3.9 and 5.5, with an average of 4.7 days per year; according to the RCP 8.5 scenario, the number is between 4.3 and 5.6 days, with an average of 5 days per year. Therefore, both the level of probability and impact would remain unchanged.

The overall economic impact was calculated taking into account the amount of average annual energy (MWh/year) not supplied by each of the approximately 200 secondary substations already identified as “at risk of cloud burst” and included in the specific scope of action of the Resilience Plan prepared by Areti. The estimates took into account the number of underlying low-voltage consumers and an average outage of 8 hours for each event; the amount of energy not supplied, thus calculated, was valued on the basis of the overall average remuneration paid in 2021 to Areti for the portion of energy distributed. The impact is approximately € 168,000/year (for 211 interruptions). The number of power outages caused by heavy rainfall, according to the RCP 4.5 scenario, would increase slightly and amount to 216 outages/year, compared to the current 211, with an impact of about 172,000 euro/year (+2% up from the economic baseline figure). With the RCP 8.5 scenario projections, the number of power outages could reach 229, with an economic impact of about € 183,000/year (+9% up from the baseline value). It should also be considered that Areti plans and implements interventions every year to increase the resilience of the substations, and which are capable of preventing and mitigating the risk of service disruption related to possible damage caused by cloudbursts.

Gori

For Gori, the risk of heavy rainfall and flooding was assessed by first identifying the current probability of the event occurring, based on the analysis of historical data available in the scientific literature, and then by understanding how the risk of flooding might vary in the future according to the projections of the climate scenarios considered.

The analysis showed that in the historical period 1981-2010, heavy rainfall events with an intensity of 150 mm in the Campania region (where Gori operates) had a probability of 5% (i.e. one heavy rainfall event in 20 years). Compared to the baseline, applying both climate scenarios (RCP 4.5 and RCP 8.5) to 2050, the probability of heavy rainfall increases to a figure between 10% and 20% (level 3), with an increased exposure to risk.

The financial impact was calculated taking into account the increase in electricity consumption necessary for the full operation of sewage and waste water treatment services during the events in question. This increase in consumption was estimated at around 3 GWh, with related costs of around 1,000,000 euro/year⁸².

81 Outcomes of the studies taken into consideration for the Areti Resilience Plan.

82 The company figured a cost of about 3 GWh (0.350 €/kWh).

Acea Produzione

The flood risk was assessed for two of Acea Produzione’s most strategic assets: the Montemartini and Tor di Valle thermoelectric power plants. The analysis showed that this risk is not expected to change substantially from the current situation. As illustrated in the table below, the flood height correlated to an intense rainfall event, with a return period of 100 years, is approximately 0.2 m during the historical period analysed (maximum data on the Tor di Valle power station) and used to represent the baseline, and is expected to decrease further in the future under both climate scenarios considered (RCP 4.5 and RCP 8.5). Therefore, this risk has not been quantified from an economic-financial point of view.

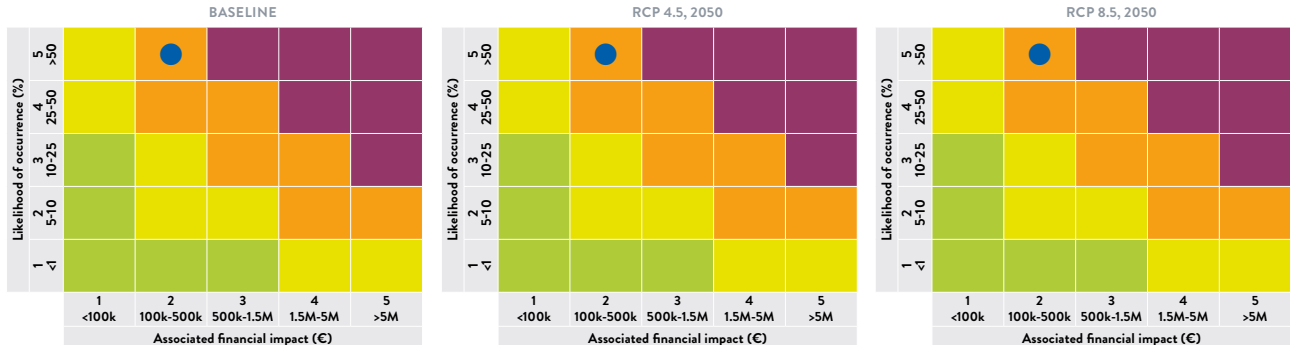
Table No. 7 – Risk of river flooding for Acea Produzione thermoelectric power plants (baseline, 2030 and 2050)

Variation in flooding (in metres)	Asset	Year / reference scenario				
		Baseline	2030		2050	
			RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
	Montemartini thermoelectric power plant	0.14	0.11	0.10	0.11	0.11
	Tor di Valle thermoelectric power plant	0.23	0.19	0.17	0.18	0.19

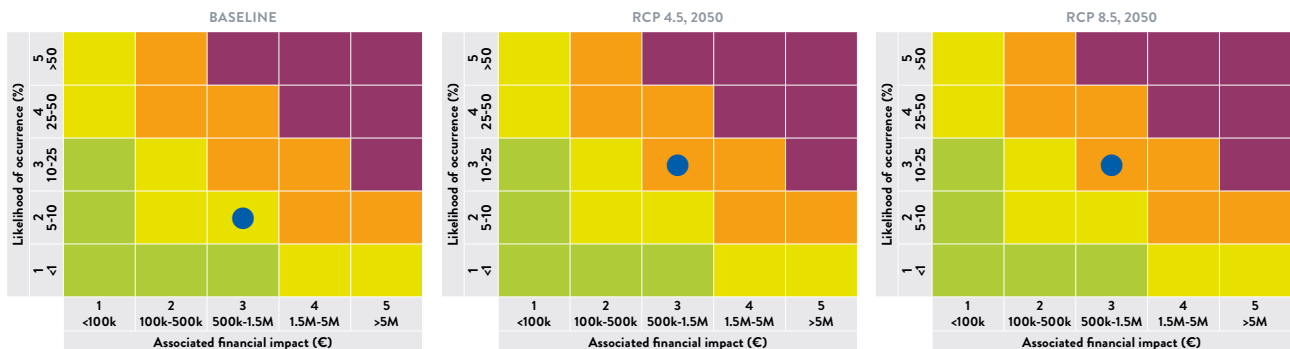
The analysed heavy rainfall risk matrices are illustrated in Figure No. 8.

Figure No. 8 – Risk matrices for “heavy rainfall event”: baseline and in 2050 - Areti and Gori

Areti



Gori



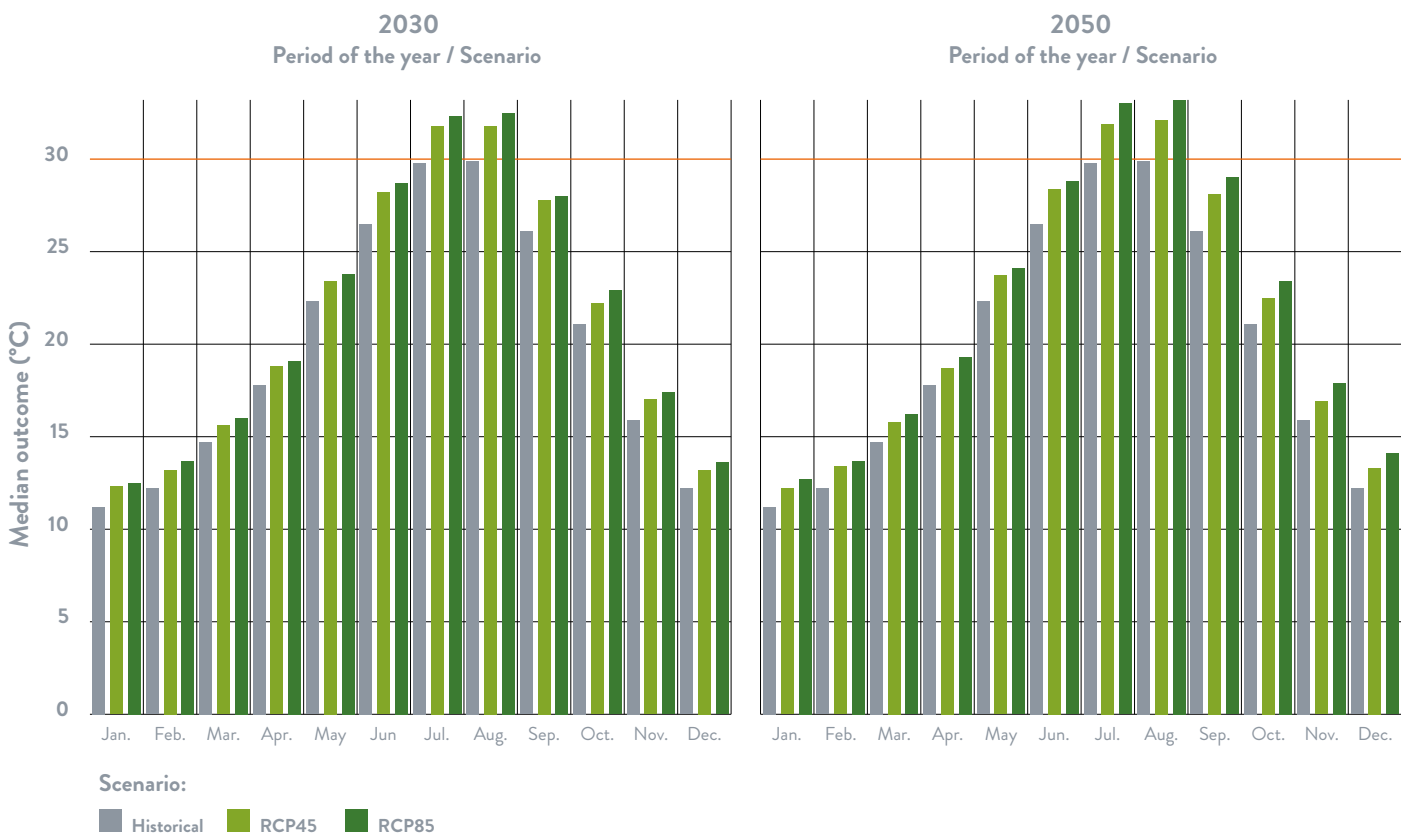
Extreme temperatures (“heat waves”)

In 2022, the risk of **extreme temperature** events and so-called **heat waves** was analysed for Areti in order to understand their impact on the distribution network, taking into consideration the area where the company’s MV/LV electrical substations are located.

The study assessed the **variations in the average maximum monthly temperature**. Compared to historical data, which shows the highest average monthly maximum temperature values of up to 30°C in July and August, both climate scenarios (RCP 4.5 and RCP 8.5) predict an upward trend, with the average monthly maximum temperature expected to increase by a few degrees to a maximum of +3°C by 2050 (see Figure No. 9). Moreover, the expected temperature increases above the historical threshold could occur in all months of the year. Such circumstances could have negative consequences for infrastructure management, as higher temperatures, together with fluctuations in electricity demand, could affect the expected lifespan of cables, leading to increased maintenance costs.

Heat waves have an almost uniform impact on the entire area where the electricity distribution infrastructure is, which is particularly extensive, differentiated and interconnected. The mitigation interventions planned and progressively implemented by the Company to cope with this problem and with prolonged periods of drought – such as increasing the network meshing, replacing critical sections to minimise the number of junctions, reconfiguring the network layout or doubling power lines stemming from the primary substation – are included in the Resilience Plan, which also defines the economic dimension, to which we refer⁸³.

Figure No. 9 – Average monthly maximum temperatures in 2030 and 2050 - Areti



Source: South Pole analysis for Acea, 2022.

83 See the *Development Plan 2023* and related *Annexes*, available online, at www.aret.it.

Lightning

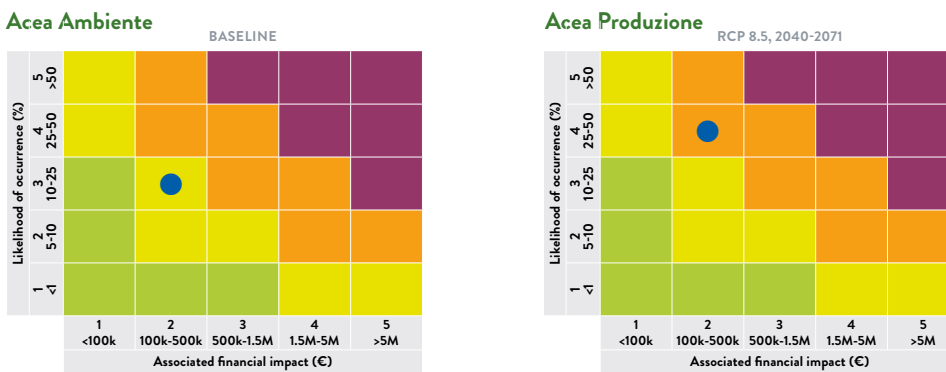
The risk of **lightning**, as mentioned, was **examined in the 2020-2021 project** and not reconsidered as a priority risk in 2022. Therefore, the results of the analyses already carried out are presented here. The goal of the study was to assess the possible intensification of this type of climate change-related risk on the assets of Acea Ambiente and Acea Produzione, which were considered to be most exposed. In particular, the indicator related to the **number of days with thunder risk** over Italy was analysed, over two time horizons (2040-2071 and 2071-2100), considering RCP 4.5 and RCP 8.5 scenarios. The scientific literature consulted showed an increased occurrence of thunderstorms and lightning throughout Europe, including central and southern Italy and the area where the plants are located. Warmer temperatures and greater atmospheric instability could in fact increase the number of days with conditions that could facilitate the development of severe thunderstorms and, consequently, increase the risk of lightning events. The projections of the **RCP 4.5 climate scenario** showed an increase in the number of days with the possible occurrence of this type of event, with moderate, not very significant impact in the medium term and more pronounced impact in the long term. In contrast, for the **RCP 8.5 scenario**, the expected changes are more pronounced and significant, with the prediction of 10-20 additional days per year compared to the current situation already by 2040 and for the long term (2071-2100).

The **risk mitigation interventions** provide for investment in increasing plant monitoring and maintenance, including the reliability of power lines, and insurance measures (e.g. against damage/loss to plants and networks or business interruption).

The potential financial impact on Acea Ambiente and Acea Produzione was classified considering the expected changes in the frequency and intensity of storms due to climate change, but also the events that the assets (plants, particularly photovoltaic plants, power lines, etc.) of both companies have already been subjected to.

The matrices illustrated in Figure No. 10 show the changes in the probability of occurrence of moderate lightning events (classified as level 3) and the associated financial impact⁸⁴ under baseline (current) conditions and according to RCP scenario 8.5, for the 2040-2071 period. In general, the financial impact for Acea Ambiente and Acea Produzione due to lightning events is expected to increase, albeit not to the extent shown in the matrix⁸⁵, with the probability of the event increasing from level 3 to level 4 in the medium term (RCP scenario 8.5) and in the long term (RCP scenarios 4.5 and 8.5).

Figure No. 10 – Risk matrices for “lightning event”: baseline and in 2040-2071 - Acea Ambiente and Acea Produzione



84 To assess the potential economic impact, the first project saw data provided by Acea Produzione’s insurance company analysed and associated with the frequency of occurrence of events.

85 The impact may increase, however, with the expected increase in the number of photovoltaic plants, and further assessments will be necessary in the future.

CLIMATE SCENARIO ANALYSES OF TRANSITION RISKS

Political-regulatory (“policy”) developments, and **technology** and **market** developments aimed at combating climate change can have various impacts on Acea’s business. In order to comprehend these impacts, an analysis of the main transition risks and opportunities was carried out, and then, as mentioned above, a study was conducted, also from an economic perspective, of the risk considered to have the greatest potential impact on Group companies, as well as an opportunity. Both are described below.

The analyses carried out in 2020-2021 considered a “business-as-usual” (BAU) climate scenario and a “Below 2°C” scenario created by consulting four different sources⁸⁶. In 2022, the two scenarios were constructed using assumptions from the *World Energy Outlook* report published by the International Energy Agency (IEA), corresponding mainly to the **Stated Policies Scenario** (STEPS) and **Announced Pledges Scenario** (APS) scenarios (see Table No. 4 above).

For the time horizon to be assessed, the year 2030 was identified as being of particular relevance, as the EU has announced important policies and plans for 2030, including adjustments to the 2030 targets⁸⁷, with possible immediate implications for Acea.

The main climate change transition risk/opportunity categories, their evolutions and, in some cases, implications for Acea, as analysed in the first project, are summarised below.

With regard to **legal risk**, the growing scientific evidence on the cause-and-effect relationship between human activities⁸⁸ and climate change, with particular reference to energy-intensive sectors and companies, has led to a new trend in climate-related litigation risk, in which plaintiffs sue companies holding them responsible for causing climate change, as a result of which they claim to have suffered damage. In recent years, specifically in the United States, Australia, but also in some European countries, cases against private companies have increased, especially against the so-called “Carbon Majors”⁸⁹.

Regarding **market risk**, the transition to a low-carbon economy is likely to lead to changes in the prices of key commodities and increased demand for renewable energy sources. Effects on the energy market were, as is well known, as much a consequence of the Covid-19 pandemic (prolonged production shutdowns, increased domestic consumption, etc.) as of the international conflict situation. In both climate scenarios (BAU and below 2°C), energy demand in the European Union is expected to decrease and, at the same time, renewable energy sources will account for an increasingly substantial share of future electricity demand, especially in a below 2°C global warming scenario. Italy has set ambitious goals to support the growth of the renewable energy sector; for example, to achieve the objectives and targets set in the National Integrated Energy and Climate Plan (NIEC), investments in photovoltaic systems amount to € 27.5 billion, in addition to existing planned investments⁹⁰. These trends may imply new opportunities for Acea, both in the renewable energy sector and in the evolution of electricity distribution infrastructures.

Exposure to **technological risks** varies widely: sometimes technological developments may simply require new investments while in other cases (e.g. large-scale technological transitions) they may require the business model to be adjusted to maintain competitiveness.

The adoption of batteries in large tertiary and domestic sectors as a substitute energy source for fossil fuels could result in both new **opportunities** for the energy production and trading business, as well as an additional burden in terms of managing and implementing the distribution of electricity.

As an electricity producer and distributor, Acea could benefit from the role that key technologies,

86 During the first project, four types of source were examined to extract the key assumptions needed to construct the scenarios: 1) the assumptions derived from the energy scenarios developed by the International Energy Agency (IEA): the Stated Policies Scenario (STEPS) and the Sustainable Development Scenario (SDS); 2) the scenarios used, at European level, to assess which policy changes were needed to support the Green Deal and for the upcoming adjustments to the 2030 targets, such as the EU 2020 Reference Scenario; 3) the projections of future developments underlying the National Integrated Energy and Climate Plan (NIEC); 4) the scenarios and specific Policies for the water business.

87 For more information, refer to www.consilium.europa.eu/it/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/.

88 For further details, refer to the IPCC Special Report: *Global Warming of 1.5°C*.

89 The Carbon Majors are a group of 100 companies considered to be the world’s largest emitters, consisting mainly of fossil fuel producers. With regard to new trends in climate change-related litigation risks, see, for example, the article by G. Ganguly, J. Setzer, V. Heyvaert, *If at First You Don’t Succeed: Suing Corporations for Climate Change*, *Oxford Journal of Legal Studies*, vol. 38, No. 4 (2018), pages 841-868.

90 *National Integrated Energy and Climate Plan* (NIEC), 2019 www.mase.gov.it/sites/default/files/archivio/pniec_finale_17012020.pdf, p. 287. In the new NIEC sent to the Commission in July 2023 (www.mase.gov.it/sites/default/files/PNIEC_2023.pdf), it is estimated that in the photovoltaic sector alone, some € 20 billion of additional investment will be needed in the period 2023-2030 to reach the new targets.

such as grid-scale batteries, will play in the future to enhance resilience. Another major technological development expected to play a key role is carbon capture, utilisation and storage (CCUS). For Acea, these technologies, once they have reached the appropriate level of maturity, could create the opportunity to achieve carbon neutrality in the long term by reducing emissions from the waste-to-energy plants and the Tor di Valle thermoelectric plant.

Furthermore, according to the PNIEC⁹¹, the growth potential of district heating and high-efficiency cogeneration systems (with a focus on natural gas, biomass and waste) will be further explored by the Italian government, representing another opportunity for several Group companies.

However, the time frame required for the full maturity of the expected technological developments in a below 2°C global warming scenario is such that in the medium term there is an increase in risk in terms of higher investment requirements, while in the long term there will be more opportunities in the areas of energy efficiency, new services and products, and access to new markets.

Energy-intensive sectors are already exposed to **reputational risks** due to their impact on climate change. Although there are no specific hypothetical scenarios to help analyse how reputational risk might change in the future, it is certain that all other risks (legal, market, technological and policy) related to climate change, if not properly managed, would result in reputational risk. In addition, reputational risk may also arise from the general **lack of action against** climate change and the failure to adapt to physical climate risks.

In contrast to energy transition policies, for which projections are available in most international scenarios with regard to **policy risk**, the situation in the **water sector**, which is more relevant for Acea, is more complex. At the international level, the issue of water is addressed both directly and indirectly by various major initiatives such as the UN 2030 Agenda and the Paris Agreement. Water issues are integrated into the Sustainable Development Goals (SDGs) and most governments place water as one of the priority areas for the *Nationally Determined Contributions* (NDCs) presented following the Paris Agreement.

In the European Union, the *Water Framework Directive* (WFD⁹²) addresses the issue in a comprehensive and integrated manner⁹³.

With the risk of water stress increasing in the EU and droughts set to become more intense and frequent, two lines of action will become crucial to ensure sustainable water management: demand control and more efficient water use.

For example, the link between the efficacy of water use and the efficiency of water operators at national level, was explored in a study that considered 53 Italian public utility operators⁹⁴. According to the study, the efficiency of most Italian operators is not particularly high (Acea Ato 2 is among the most efficient operators) due to the fact that water tariffs in the country are among the lowest in Europe, a situation that would partly affect the companies' ability to invest in infrastructure modernisation.

According to the European Commission's 2019 report on River Basin Management Plans in Italy⁹⁵, there is a trend towards the adoption of water efficiency measures and upward water pricing policies.

91 PNIEC 2019; perspective also confirmed in PNIEC 2023.

92 The Water Framework Directive (WFD) is Directive 2000/60/EC.

93 The WFD came into force in 2000 with the aim of achieving good status for all surface water and groundwater bodies in the EU by 2027. The most innovative aspects of the Water Framework Directive include the desire to guarantee a fair price for all water services, taking into account their real economic cost and the shift from an administrative water management approach to a river basin management approach (independent of administrative structures).

94 See Corrado Lo Storto, Efficiency, Conflicting Goals and Trade-Offs: A Nonparametric Analysis of the Water and Wastewater Service Industry in Italy, 2018, Department of Industrial Engineering, University of Naples Federico II. www.mdpi.com/2071-1050/10/4/919/htm.

95 <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2019:0051:FIN:EN:PDF>.

In conclusion, while water efficiency policies at EU and national level currently only extend to minimum requirements for companies, they may lead to some impacts for Acea in the near future. A reduction in consumption, as a result of water efficiency legislation, could result in better control of the growing issue of water stress and potential water shortages, especially when combined with infrastructure improvements and leakage monitoring, prevention and control.

The **policy** climate change **risk** analysis for the **energy sector**, which began in 2020, assessed policies and measures adopted at EU and national level to combat climate change, including carbon pricing schemes (such as those linked to the EU *Emissions Trading System* or ETS) or new energy efficiency regulations, which could affect the related economic impacts. Moreover, these interventions may evolve depending on the climate scenarios considered.

The most relevant topics that emerged from the assessment carried out in 2022 are related to **policy risk** deriving from **carbon pricing** and **to the opportunity arising from the consumption of electricity from renewable energy sources**. The following were considered as related indicators: the price per tonne of carbon dioxide related to CO₂ (€/t CO₂ emitted); the “pass-through rate” (for the indirect cost on the water sector) and the energy cost (€/kWh) – for the carbon pricing risk; and changes in the *Levelised Cost of Energy* (LCOE) indicator for the cost of energy produced from renewable sources.

In particular, it emerged that carbon pricing risk is linked to all local, national and supranational policies and regulations that are in place or may be implemented in the future to facilitate the transition to a low-carbon economy. This aspect was assessed by means of a more in-depth scenario analysis on different time perspectives, although it is weighed down by the effects and uncertainties related to the current conflict crisis in Europe.

The assumptions of the scenarios prepared by the International Energy Agency are useful for assessing “policy” risk and future market and technological developments that could generate both new risks and opportunities for Acea.

With the analysis carried out in 2022, this risk was also assessed for some water companies, which, due to the significant energy consumption necessary for their operations, showed interest in exploring the extent to which the price of electricity could increase, also because of the transfer of the cost of CO₂ emissions from the energy sector to end consumers.

For the same reason, the opportunity arising from the consumption of electricity from renewable energy sources was evaluated, as it could mitigate the risk of exposure to the price of CO₂.

Carbon Pricing Risk

Acea Produzione

To evaluate the potential economic impact on Acea Produzione due to joining the European emissions market (EU ETS), in particular with regard to the two thermoelectric energy production plants of Tor di Valle and Montemartini, the analysis took into account the **Scope 1 emissions** data from the two plants, and data relating to the expected **price of CO₂** in order to be able to calculate the cost and impact of these emissions in the future. As already mentioned, the EU ETS market is one of the main policy instruments established by the European Union to support the achievement of its climate targets. The rules of this mechanism are expected to become progressively more stringent, significantly impacting the companies that are subject to them. For example, fewer and fewer free allowances will be allocated in the coming years, and it is possible that the allocation of free allowances will be completely eliminated before 2030. This trend, combined with rising CO₂ prices, represents a risk for Acea Produzione, as the operating costs of the two thermoelectric power plants will increase as a consequence.

The analysis carried out in 2020-2021 was updated in 2022 to include the latest CO₂ price projections. The financial impact was calculated on the basis of the following assumptions:

- an annual growth rate of 3% was applied to calculate the amount of future emissions;
- the price of CO₂ was assumed, in the business-as-usual (BAU) scenario, to be approximately € 76 (\$90) per tonne to 2030; in the Below 2°C scenario, it was assumed to be approximately € 114 (\$135) to 2030.

Based on these assumptions, estimates of the final cost Acea Produzione might face for the two thermoelectric plants were calculated. As shown in the risk matrix (Figure No. 11), both the probability and impact of the carbon pricing risk have been estimated to be very high already under current conditions (approximately € 2.5 million⁹⁶). In the future, assuming that allowances will no longer be allocated free of charge and that the price of CO₂ will increase significantly, an increase in cost is expected: up to about € 5 million under the BAU scenario and about € 8 million under the scenario with more stringent CO₂ policies.

The main **risk mitigation** action undertaken by Acea Produzione is the diversification of power generation, in particular by increasing production from renewable sources. Furthermore, it is expected that, in the longer term, carbon capture and storage technologies will be commercially available and compatible with thermoelectric power plants.

Acea Ambiente

In order to assess the potential economic impact on Acea Ambiente in the event of the inclusion of the waste-to-energy plants in the EU ETS (Terni and San Vittore del Lazio plants), consideration was given to the Scope 1 emission data of the two plants and the CO₂ price data expected in the future.

The Terni plant was bound to the EU ETS until 2021, with costs for purchased allowances amounting to around € 2.5 million in the last year. As per Resolution No. 66/2022 of the National Committee for the Management of Directive 2003/87, the plant is no longer subject to the EU ETS. From 2026, however, the EU could include municipal waste incineration plants, with and without energy recovery, in the European emissions market. In this case, both Acea Ambiente's WtE plants would be included in the ETS mechanism, with higher operating costs. This eventuality, combined with rising CO₂ prices, therefore represents a real economic risk for the Company.

In the risk matrix, the baseline represents both probability and economic impact at the low level, precisely because both WtE installations are currently excluded from the EU ETS market. To 2030, the probability of occurrence was still considered low, as the European regulation path with respect to the inclusion or non-inclusion of WtE plants in the ETS mechanism has not yet been fully defined; however, the economic impact would be high considering the 2030 emissions of the two plants and the same assumptions made for Acea Produzione (3% annual growth rate for the calculation of the amount of future emissions⁹⁷ and the increase in the price of CO₂ equal to approximately 76 €/t in 2030 in the BAU scenario and approximately 114 €/t CO₂ in 2030 in the Below 2°C scenario).

On the basis of these assumptions, estimates of the final cost Acea Ambiente could face for the two WtE plants were calculated: this amounts to approximately € 32 million in the BAU scenario and approximately € 48 million in the Below 2°C scenario⁹⁸.

The issue is certainly being monitored; again, it is expected that, in the longer term, carbon capture and storage technologies will be commercially available and compatible with the plants in question.

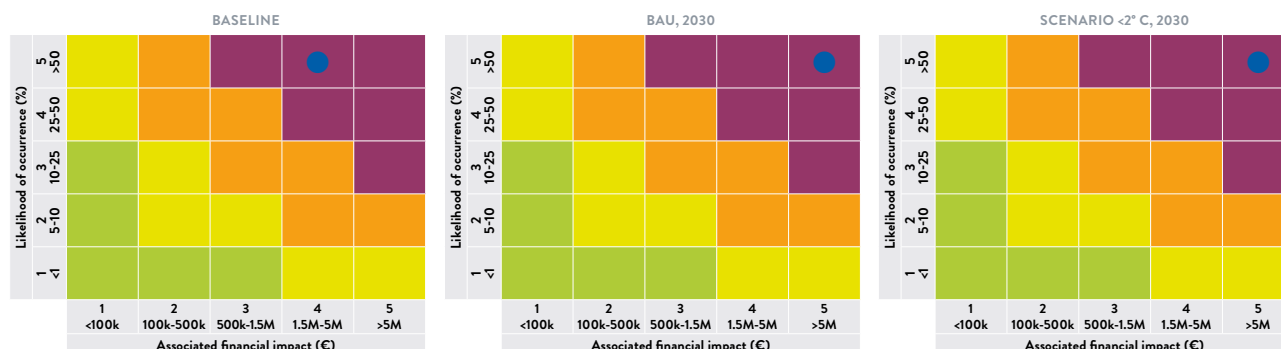
96 In this study, the intention was to illustrate the risk associated with the costs of emissions without deducting the earnings associated with the production and sale of electricity. The cost applied for the baseline is 50 euro/tonne of CO₂.

97 The calculation was carried out based on the CO₂ 2021 emissions of the two WTE plants in Terni and San Vittore del Lazio, equal to 325,684 t.

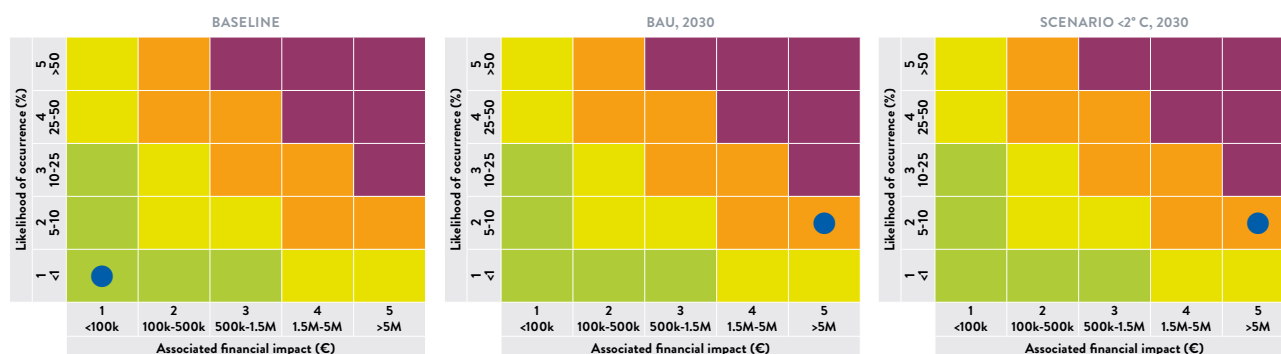
98 In this study, the intention was to illustrate the risk associated with the costs of emissions without deducting the earnings associated with the production and sale of electricity.

Figure No. 11 – Risk matrices for “carbon pricing”: baseline and in BAU scenario and < 2°C scenario - Acea Produzione, Acea Ambiente

Acea Produzione



Acea Ambiente



Acea Ato 2, Acea Ato 5 and AdF

As already explained, the EU ETS is one of the main policy instruments established by the European Union to support the achievement of emission reduction targets. Although it is unlikely that the water sector will be included in existing mandatory CO₂ pricing schemes, the sector would be indirectly affected because of the impact that “carbon pricing” regulation has on consumer electricity prices. Some studies have found that, in Italy, this “pass-through rate”⁹⁹ on electricity prices is about 10%, a percentage that has been taken into account in the assessments¹⁰⁰.

In a first step, the risk probability for the reference scenario and 2030 was determined.

In order to assess the indirect economic-financial impact on Acea Ato 2, Acea Ato 5 and AdF, consideration was given to the Scope 2 emissions of each company (related to electricity consumption) and the assumptions on future prices of CO₂ emissions (under the ETS regime) that determine the amount of the “pass-through rate” on final electricity consumption in Italy. The projections are based on the assumption that the companies procure electricity from traditional sources. For this reason, the risk matrices illustrate the baseline also for the companies (Acea Ato 2 and Acea Ato 5), which had purchased G.O. certified electricity in 2021, since the purchase of green energy for internal consumption is already a risk mitigation action. The resulting financial impacts for the companies are influenced by their energy consumption, from which Scope 2 emissions are calculated. In summary, the potential economic and financial impact to 2030 was calculated on the basis of the following assumptions:

- the possible purchase of G.O. was not considered;
- an annual growth rate of 3% was applied for the calculation of future Scope 2 emissions (related to electricity consumption);
- the cost of CO₂ (under the ETS regime) was assumed, in the Business-As-Usual (BAU) scenario, to be approximately € 76 (\$90) per tonne in 2030; in the Below 2°C scenario it was approximately € 114 (\$135) in 2030);
- from the costs of CO₂ (under the ETS regime) a pass-through rate of 10% was considered for electricity prices¹⁰¹.

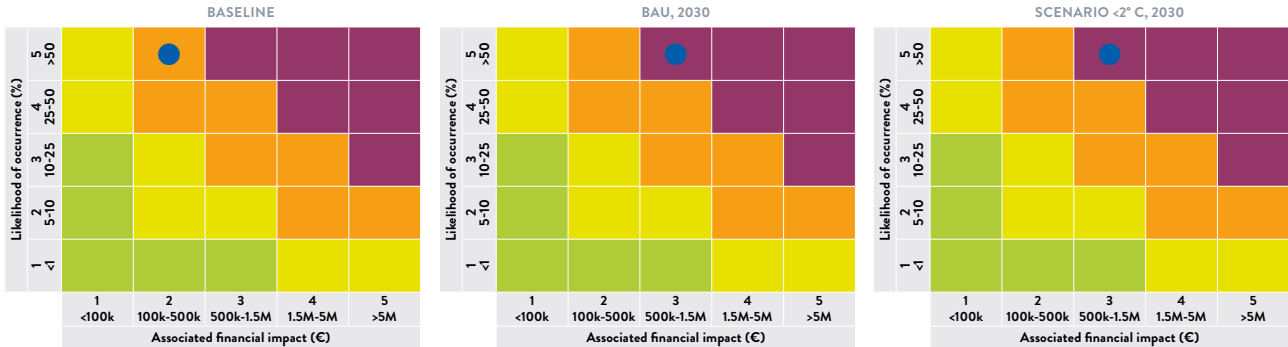
99 The pass-through rate represents the percentage of costs on CO₂ passed on to consumers, in this case the water companies. The rate varies depending on the sector.

100 Caporin, M., Fontini, F., Segato, S. (2021) Has the EU-ETS Financed the Energy Transition of the Italian Power System? International Journal of Financial Studies. <https://doi.org/10.3390/ijfs9040071>

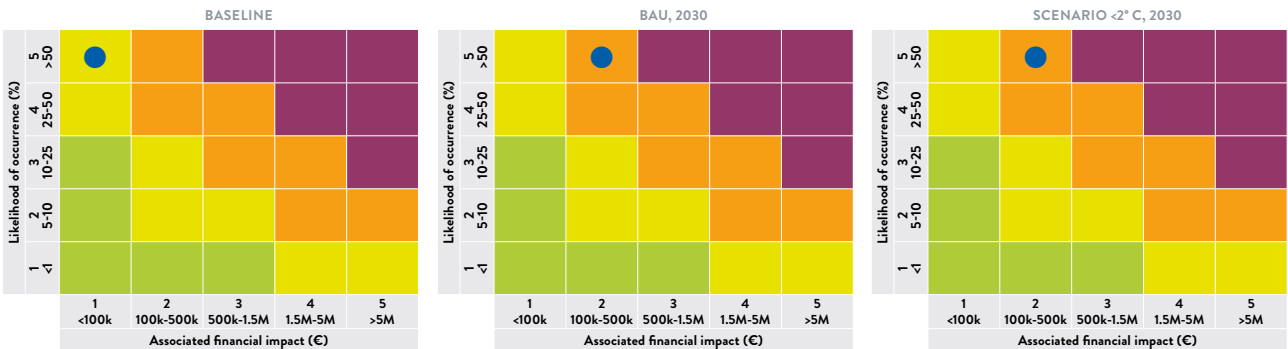
101 For the baseline calculations (2021), a pass-through rate of 10% of € 50 was considered.

Figure No. 12 – Risk matrices for “carbon pricing”: baseline and in BAU scenario and < 2°C scenario - Acea Ato 2, Acea Ato 5 and AdF

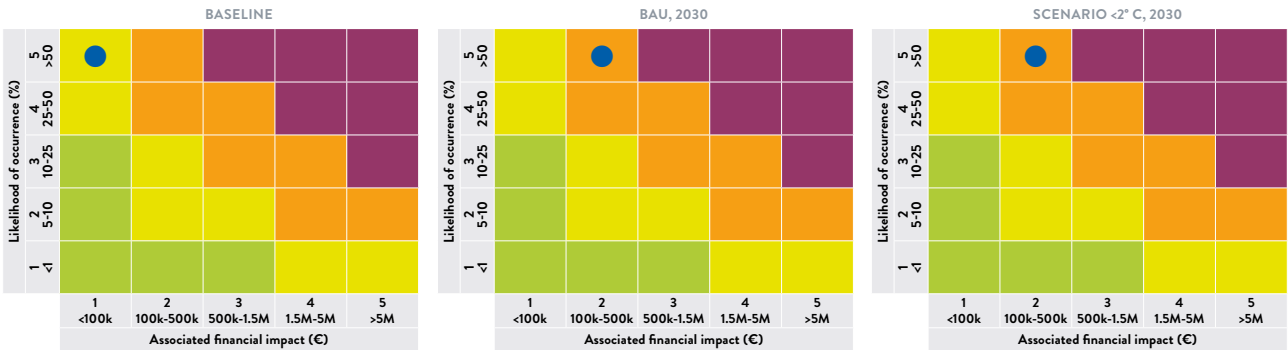
Acea Ato 2



Acea Ato 5



AdF



Opportunities - electricity consumption from renewable energy sources

Electricity is still mainly produced in Italy from fossil fuels (about 65%), particularly natural gas and oil, while renewables account for about 35% of consumption¹⁰².

The global energy crisis of 2022 has driven up the cost of fossil fuel energy¹⁰³ and renewables are increasingly highlighted as a viable and desirable alternative; power generation through energy sources such as solar and wind in the future could be cheaper even than generation from natural gas. The International Renewable Energy Agency’s 2022 Report (Irena Report) indicates that the cost of generating new solar and wind capacity in Europe should be, on average, four to six times lower than the marginal generation costs of fossil fuels. The electricity generation costs of renewables remained competitive even during the commodity crisis. As it is extremely complex to predict future electricity prices, a parameter commonly used to measure the costs required to produce one MWh of electricity is the **Levelised Cost of Energy (LCOE)**, which represents the minimum price at which a producer would have to sell electricity (generated from fossil or renewable sources) for the transaction to be considered profitable¹⁰⁴. Although in Italy the

102 See, for example, https://download.terna.it/terna/Terna_Annuario_Statistico_2021_8dafd2a9a68989c.pdf, and also the *Document Description of 2022 Scenarios*, Terna and Snam, p. 41, which assumes, according to the FF55 scenario, an increase from 35% RES production share in 2019, to 65% in 2030.

103 www.iea.org/topics/global-energy-crisis?language=it.

104 The Levelised Cost of Energy (LCOE) represents the average revenue per unit of electricity generated needed to recover the

Power Exchange market has a wholesale reference price for electricity (SNP- Single National Price), there are a number of options that can be considered to protect against future electricity price fluctuations: Certifications of Guarantee of Origin (G.O.) or Power Purchase Agreements (PPA). Decreasing the LCOE in the future and increasing renewable energy sources in the energy mix would further reduce the price of electricity purchased from renewable energy sources.

The aforementioned Irena Report in fact shows the LCOE trends, for wind and solar¹⁰⁵, showing how, in the medium and long term, companies with high energy requirements for operations could benefit from a reduction in costs through the purchase of electricity produced from renewable sources. The following is a concrete example of this in relation to the Gesesa company.

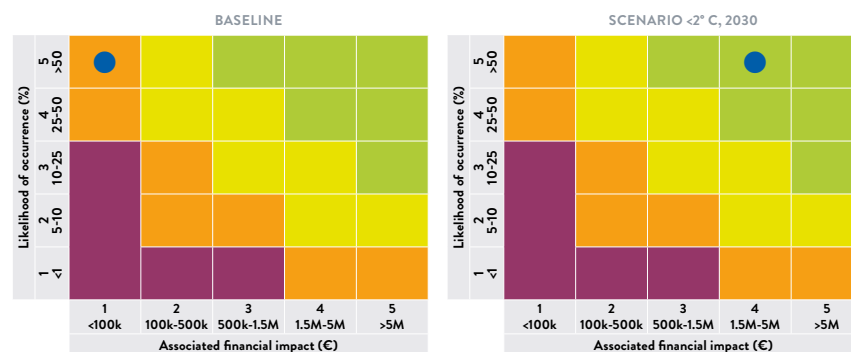
Gesesa

In an initial step, the probability of the analysed opportunity, under current conditions and in 2030 (Below 2°C scenario), was determined.

The economic impact was calculated on the basis of the following information: Gesesa’s electricity consumption in 2021 (11,452 MWh¹⁰⁶) and the forecast LCOE value for fossil fuels and renewable energy sources. In 2021, the cost incurred by the Company for the purchase of electricity produced from fossil fuels amounted to approximately € 2.6 million. On the basis of the forecasts outlined, the final costs that Gesesa would incur in a Below 2°C scenario would be about € 2.8 million¹⁰⁷ for the purchase of electricity from traditional sources, and about € 400,000 for the purchase of electricity from renewable sources, with an expected saving of about € 2.4 million.

As can be seen from the matrix, which in this case values the opportunity and not the risk, the probability of occurrence was estimated to be very high already in the current (baseline) conditions, while the economic impact arising from the opportunity is low, as the Company has not procured electricity from renewable sources; on the contrary, at the same level of probability of occurrence, in the 2030 scenario the positive financial impact that could derive from the purchase of green energy for internal consumption is highlighted.

Figure No. 13 – Opportunity matrices for “energy consumption from renewables”: baseline and in < 2°C scenario - Gesesa



construction and operating costs of a generation plant during an assumed financial and operating life cycle. The LCOE is often cited as a summary measure of the overall competitiveness of different generation technologies. Key inputs for the LCOE calculation include capital costs, fuel costs, fixed and variable operating and maintenance (O&M) costs, financing costs and an assumed utilisation rate for each type of plant. The importance of each of these factors varies between technologies.

105 www.irena.org/-/media/Files/IRENA/Agency/Press-Release/2022/Jul/Costs2021_IT.pdf; www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jul/IRENA_Power_Generation_Costs_2021.pdf?rev=34c22a4b244d434da0accde7de7c73d8.

106 Estimate used for the calculation. The figure of 11,496 MWh was subsequently finalised and was only slightly different from the estimate.

107 Figure calculated on the basis of LCOE forecasts to 2030.

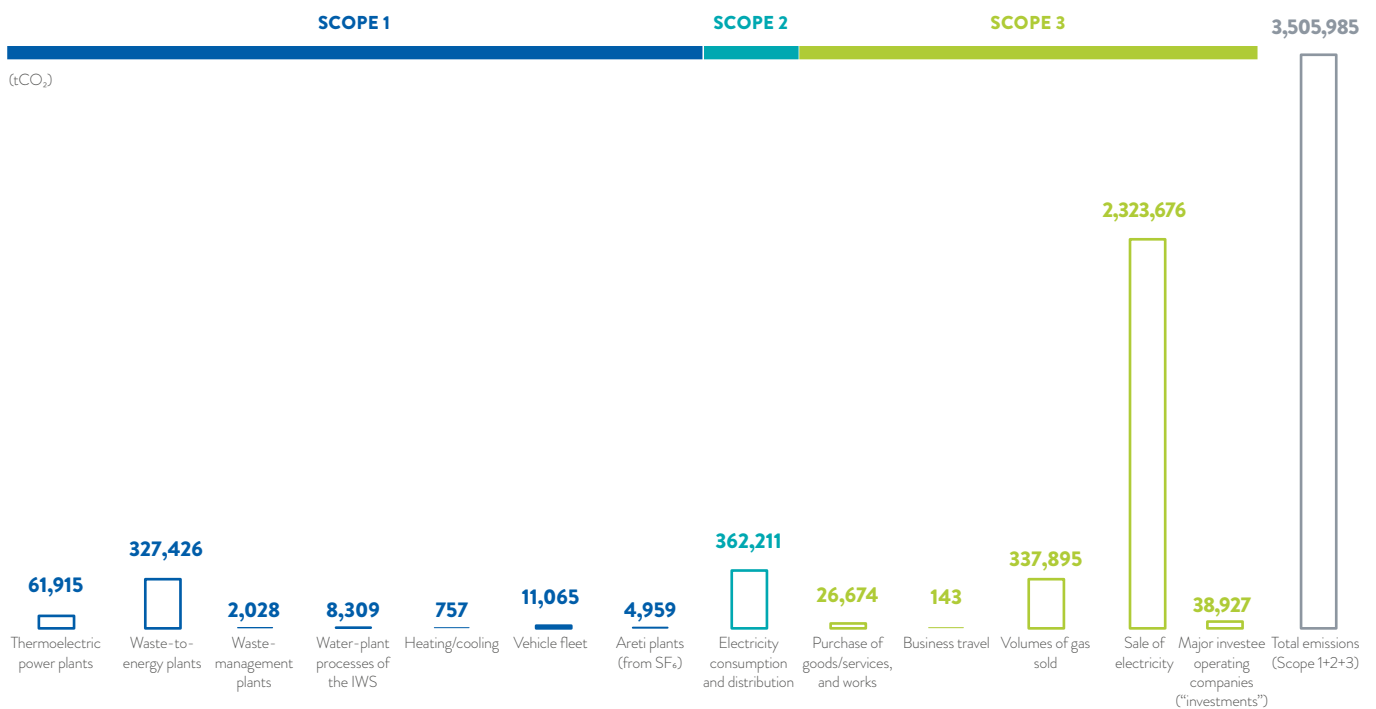
PERFORMANCE, ACTIONS AND GOALS

THE EMISSIONS OF THE ACEA GROUP AND PERFORMANCE INDICATORS

Acea quantifies its greenhouse gas emissions (Scope 1, Scope 2 and Scope 3)¹⁰⁸, monitoring and assessing the carbon footprint of individual operational macro-processes and identifying mitigation actions and other initiatives to reduce its carbon emissions¹⁰⁹.

In 2022 Acea Group recorded emissions totalling 3.5 mln tCO₂ (3.6 mln in 2021¹¹⁰) broken down into approximately 416.5 ktCO₂ of Scope 1 emissions (414.9 ktCO₂ in 2021), 362.2 ktCO₂ of Scope 2 emissions¹¹¹ and 2.7 MtCO₂ of Scope 3 emissions (respectively 357.7 ktCO₂ and 2.9 MtCO₂ the previous year)¹¹². Figure No. 14 presents the different components of emissions in the reporting year.

Figure No. 14 – Scope 1, Scope 2 and Scope 3 CO₂ emissions (2022)



Direct Scope 1 emissions come mainly from the two waste-to-energy plants (327,426 t) and the Group’s thermoelectric power plants (61,915 t) but include other components deriving from some processes pertaining to waste management plants (composting, waste treatment and disposal), sludge drying at the largest waste water treatment plants, vehicles in the car fleet, sulphur hexafluoride (SF₆) leaks that may occur at the Areti plants and, to a lesser extent, from heating/cooling processes at headquarters and offices.

108 The emissions recorded are attributable to the companies considered in the NFS scope, which, for 2022, were estimated to be about 95% of the total emissions of all of the Group’s companies in the full consolidation area. See also *Acea Group Sustainability Report/NFS 2022* available online, pages 15-17, for details on the companies included in the reporting scope. Data on emissions, mitigation interventions, consumption, etc. are published annually in the Report.

109 The Acea Group reports GHG emissions calculated in line with the GHG Protocol methodology.

110 It should be noted that some breakdown data for 2021 was slightly adjusted as a result of consolidation.

111 Below are the emissions calculated using the location-based method.

112 See Table 69, p. 229 of the *Acea Group Sustainability Report 2022*.

Scope 2 emissions are derived from electricity consumption and losses on the electricity distribution network (the latter amounting to 101,596 t).

Scope 3 emissions include those from the sale of gas (for 337,895 t), from the sale of electricity (for 2,323,676 t, calculated using the location-based method), from suppliers from whom we purchase goods, services and works (supply chain), from employees' business trips and from the major investee operating companies of the water sector¹¹³ (in the Scope 3 category "investments").

Table No. 8 – CO₂ emissions, greenhouse gas intensity indices (2020-2022)

CO₂ EMISSIONS (*)				
SCOPE 1 EMISSIONS				
FROM ENERGY PRODUCTION PLANTS				
	u. m.	2020	2021	2022
Acea Produzione thermoelectric power plants	t	45,773	53,551	56,724
Ecogena plants	t	9,607	7,829	5,191
Acea Ambiente waste-to-energy plants	t	341,763	325,684	327,426
FROM WASTE MANAGEMENT, INTEGRATED WATER SYSTEM, ENERGY DISTRIBUTION, HEATING PLANTS, VEHICLE FLEET, COOLING				
Waste-management plants	t	1,582	1,895	2,028
Water-plant processes of the IWS	t	6,979	7,486	8,309
Areti plants (from SF ₆)	t	8,695	7,045	4,959
Heating	t	872	881	755
Vehicle fleet	t	9,705	10,533	11,065
Cooling (refrigerants HCFCs)	t	1	0	2
TOTAL SCOPE 1 EMISSIONS	t	424,977	414,904	416,459¹⁴
SCOPE 2 EMISSIONS				
Electricity consumption and distribution - location based (<i>market based</i>)	t	384,323 (284,433)	357,669 (271,973)	362,211 (299,385)
<i>of which network leaks</i>	t	100,489	97,301	101,596
TOTAL SCOPE 1 + SCOPE 2 LOCATION BASED EMISSIONS	t	809,300	772,573	778,670
TOTAL SCOPE 1 + SCOPE 2 MARKET BASED EMISSIONS	t	709,410	686,877	715,844
SCOPE 3 EMISSIONS				
Purchase of goods/services, and works	t	11,642	31,701	26,674
Business travel	t	46	38	143
Volumes of gas sold	t	276,284	346,567	337,895
Sale of electricity - location based (<i>market based</i>)	t	2,200,491 (2,382,384)	2,447,005 (2,555,276)	2,323,676 (2,210,141)
Major investee operating companies ("investments")	t	39,793	38,224	38,927
TOTAL SCOPE 3 LOCATION BASED EMISSIONS	t	2,528,256	2,863,535	2,727,315
TOTAL SCOPE 3 MARKET BASED EMISSIONS	t	2,710,149	2,971,806	2,613,780
TOTAL SCOPE 1 + SCOPE 2 + SCOPE 3 LOCATION BASED	t	3,337,556	3,636,108	3,505,985
TOTAL SCOPE 1 + SCOPE 2 + SCOPE 3 MARKET BASED	t	3,419,559	3,658,683	3,329,624
INTENSITY INDICES FOR GREENHOUSE GAS EMISSIONS				
(Scope 1+ Scope 2)/Acea Group added value	t/k€	568.3	504.3	483.6
Scope 1/gross electricity production	g/kWh	428.7	381.1	462.1
Scope 2 deriving from losses on the electrical energy distribution network/electricity fed into the grid	t/MWh	0.0104	0.0099	0.0101
Scope 3 deriving from the sale of electricity (market based)/total sales	t/MWh	0.364	0.329	0.300

(*) Some figures for 2020-2021, which are also the basis for some of the graphs in the document, have undergone slight adjustments following consolidation.

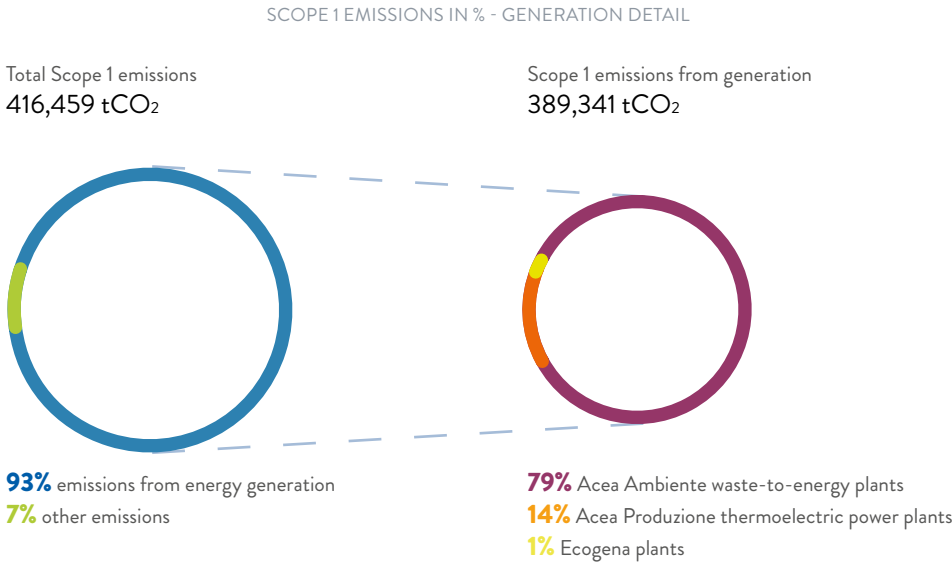
113 The main water companies Acque, Publicacqua and Umbra Acque, which are consolidated in the financial statements using the equity method.

114 The discrepancy between the data reported and that published in the Sustainability Report (equal to 416,458) is due to rounding off.

SCOPE 1

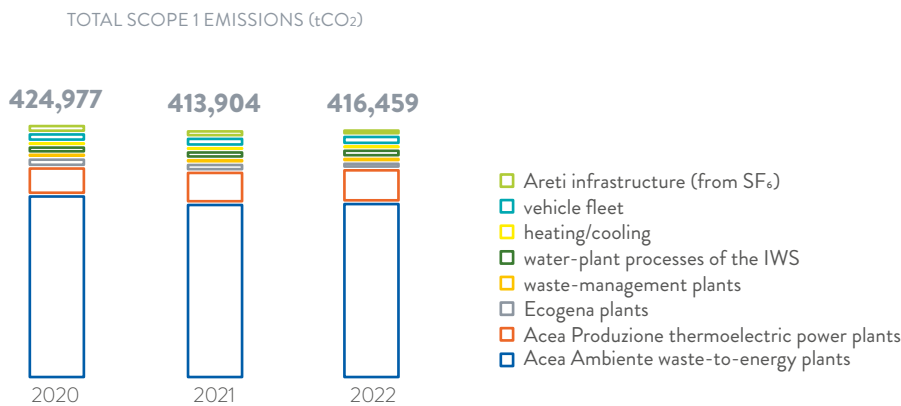
The total of 416,459 tCO₂ of Scope 1 emissions, measured in 2022, is more than 90% attributable to power generation, specifically electricity (see Figure No. 15).

Figure No. 15 – Focus on Scope 1 emissions and generation detail (2022)



Over the last three years, total Scope 1 emissions first decreased in 2021 compared to 2020, and then increased slightly in 2022 compared to 2021, as shown in Figure No. 16. In 2021, the slight increase in the biodegradable portion delivered to the two waste-to-energy plants (in San Vittore del Lazio and Terni) led to a 4% reduction in emissions compared to the 2020 figures (they were 341,763 t in 2020 and 325,684 t in 2021). In 2022, however, there was a slight increase in CO₂ emitted compared to 2021, due mainly to a lower share of biodegradable waste entering the Terni plant (which dropped from 43.4% in 2021 to around 41 % in 2022); a second cause was the higher production of thermoelectric energy from Acea Produzione plants, with an increase in the use of fossil fuel; the third cause was the greater use of fuels for the integrated water service processes.

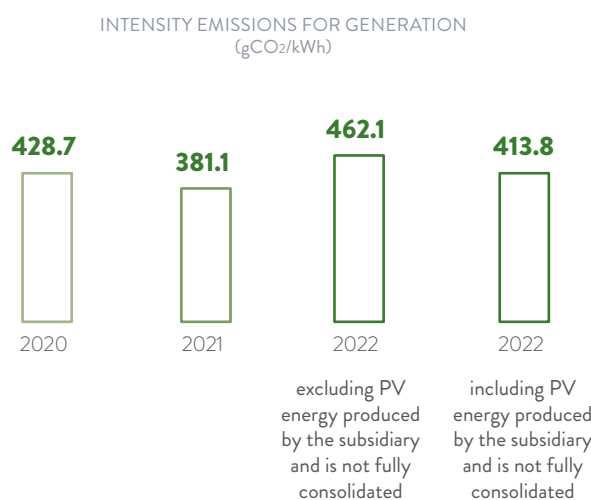
Figure No. 16 – Scope 1 CO₂ emissions (2020-2022)



The Scope 1 **emissions index on energy generated** by Acea Produzione production plants (photovoltaic, hydroelectric and thermoelectric), Acea Ambiente plants (biogas and waste-to-energy), Ecogena plants (thermoelectric) and Deco plants¹¹⁵ (biogas), compared with the total energy produced by the same plants, has been fluctuating over the three-year period 2020-2022: it decreased in 2021 from 2020 and then increased in 2022 (see Figure No. 17). The increase from 2021 to 2022 is due to both the slight increase in emissions and the reduction in hydroelectric generation (-23%), due to the drought period that resulted in less water flowing to the plants.

Specifically, the indicator in 2022 is equal to 462.1 gCO₂/kWh; considering also the photovoltaic production of the investee company not fully consolidated¹¹⁶, the indicator would be equal to 413.8 gCO₂/kWh.

Figure No. 17 – Emission intensity index by generation type (2020-2022)



SCOPE 2

The Acea Group's indirect CO₂ Scope 2 emissions come mainly from the consumption of electricity for operational processes and from network losses. The emissions were determined according to two approaches:

- **location based**, obtained by multiplying electricity consumption (including grid losses) by the average emission factor of the national electricity grid¹¹⁷;
- **market based**, which attributes a zero GHG emission factor for electricity consumption from certified renewable sources (Guarantee of Origin - G.O.) and a residual emission factor¹¹⁸, which, for the remaining portion of the electricity supplied, excludes the renewable part from the average value of the national electricity grid. This methodology makes it possible to highlight the Scope 2 emission reduction efforts achieved through the purchase of G.O.-certified electricity

Over the past three years, there has been a change in total Scope 2 emissions: in 2021, there was a decrease from 2020, followed by a minimal increase in 2022 compared to the previous year (see Figure No. 18).

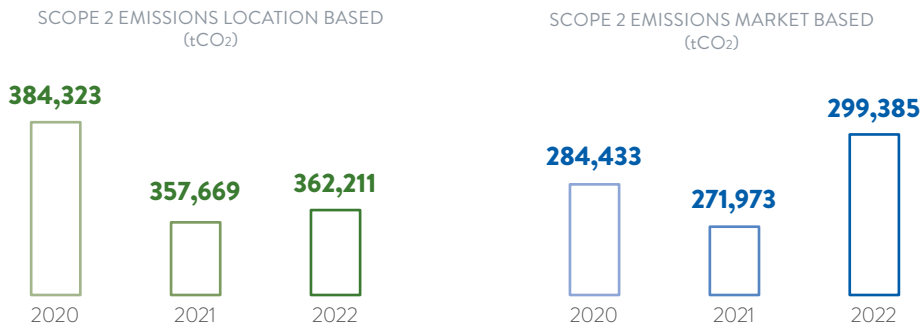
¹¹⁵ It should be noted that the Deco Company entered the NFS scope in 2022.

¹¹⁶ We refer in particular to the company AE Sun Capital Srl, 40% owned by Acea Produzione and 60% by the Equitix Investment Management investment fund, consisting of a series of plants producing photovoltaic energy and which left the full consolidation area in March 2022 and produced 98.42 GWh in the same year.

¹¹⁷ The location-based factor used by Acea refers to the one published by Terna, the Italian TSO - Transmission System Operator - in the document "International Comparisons", available at www.terna.it/.

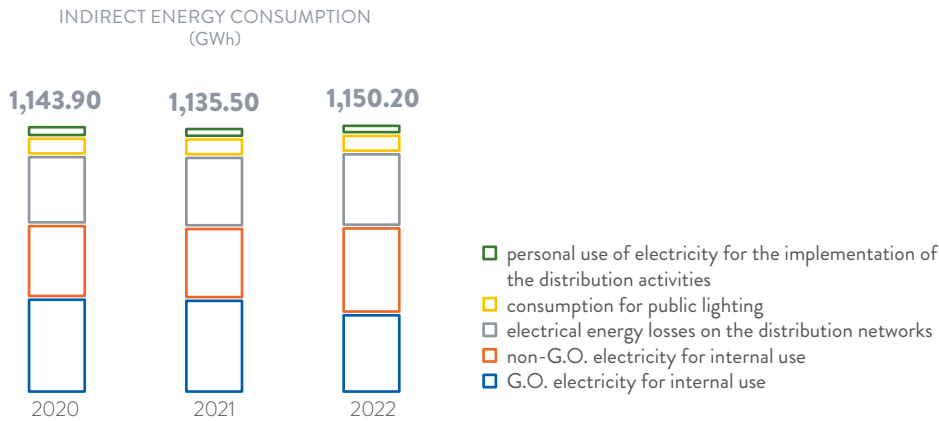
¹¹⁸ The factor is updated annually by the AIB Association of Issuing Bodies and published in the document "European Residual Mixes" available at on the website www.aib-net.org/.

Figure No. 18 – Scope 2 CO₂ emissions - location and market based (2020-2022)



Specifically, for 2022, the Scope 2 location-based emissions are almost stable at 362,211 tCO₂ (+1.3%) and corresponding to the trend in indirect electricity consumption (see Figure No. 19).

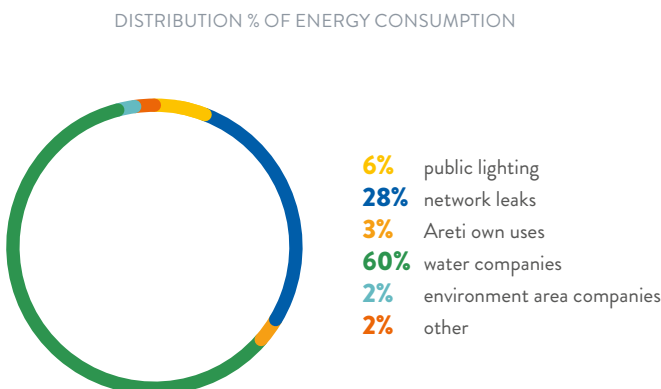
Figure No. 19 – Indirect electricity consumption (2020-2022) (*)



(*) The figures for 2020-2021 have been slightly adjusted due to consolidation.

In 2022, 60% of this consumption was attributable to the water sector (distribution of drinking water and treatment of waste water - under the heading of electricity for internal consumption), 28% to network losses, 6% to public lighting, 3% to Areti’s own uses, 2% to plants in the Environment area and the remaining 2% to other consumption (including that of Acea SpA, Acea Energia, Acea Elabori, the Acea Produzione and Ecogena plants. A residual amount was attributable to the electric car fleet) (see Figure No. 20).

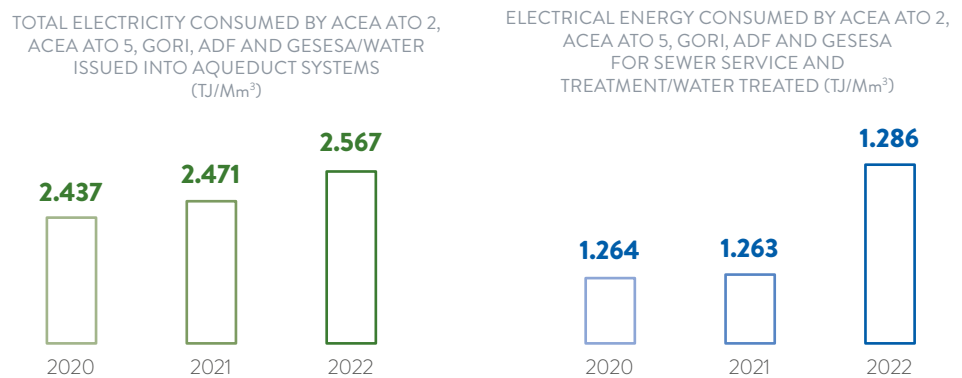
Figure No. 20 – Distribution of indirect electricity consumption (2022)



The main **performance indicators** monitored in electricity consumption are related to the efficiency of the water and purification sector and to the distribution of electricity.

For the water sector¹¹⁹ in the last three years, the KPI of the distribution of drinking water (electricity consumed for the companies in the water sector¹²⁰/water issued into the aqueduct systems, calculated as consumption in TJ over Mm³ of water issued into the aqueduct systems) shows increases over the last three years, while the KPI of the waste water treatment sector (electricity consumed for sewerage and purification/treated water, calculated as consumption in TJ on Mm³ treated at the waste water treatment plants) is substantially unchanged with a minimum increase of 2% in the last year (see Figure No. 21). The water service indices were both affected by the low rainfall year, which led to an increase in consumption for water collection/pumping and a decrease in water treated in waste water treatment plants.

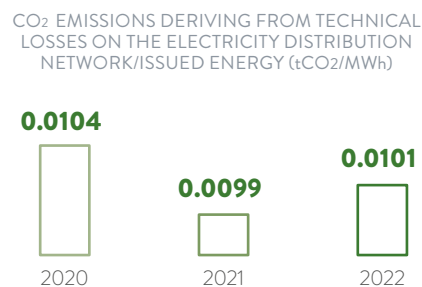
Figure No. 21 – Indirect electricity consumption: KPI water sector (2020-2022) (*)



(*) The figures for 2020-2021 have been slightly adjusted due to consolidation.

For the electricity distribution sector (see Figure No. 22), the KPI considered, calculated as tonnes of CO₂ resulting from technical losses on the electricity distribution network on MWh input, shows that there has been no substantial change over the last two years. Specifically, it goes from 0.0099 t/MWh in 2021 to 0.0101 t/MWh in 2022.

Figure No. 22 – Emissions from technical losses of Areti/issued energy: KPI distribution of electricity (2020-2022) (*)



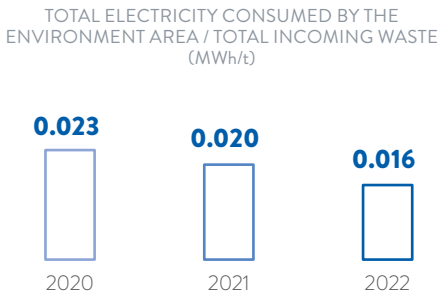
(*) The figure for 2021 has been slightly adjusted due to consolidation.

For the environment area (see Figure No. 23), the KPI considered (total electricity consumed in the environment area in MWh/total incoming waste into the environment area in t) shows a downward trend for the three-year period 2020-2022, from 0.020 MWh/t in 2021 to 0.016 MWh/t in 2022 (21%).

¹¹⁹ The data refers to the water companies in the NFS scope (Acea Ato 2, Acea Ato 5, Gori, AdF and Gesesa).

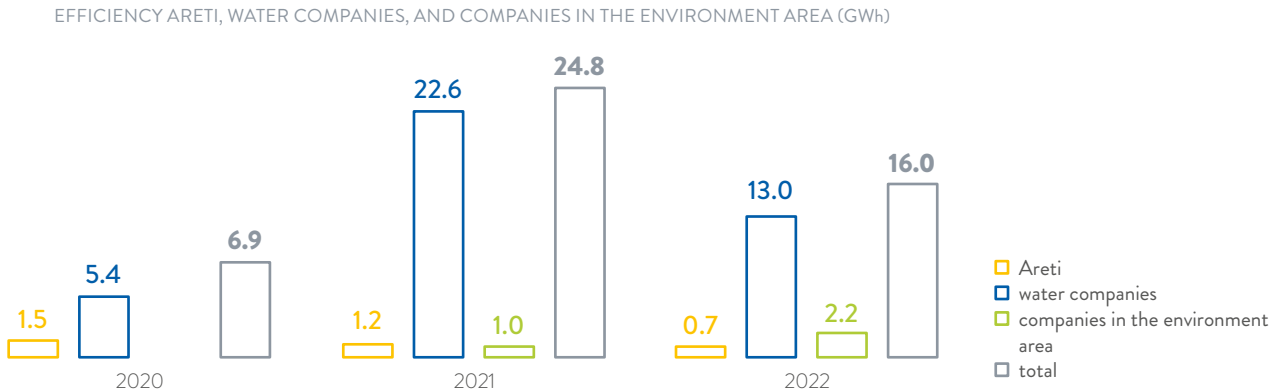
¹²⁰ This is the total energy consumed for all services performed (water and sewerage).

Figure No. 23 – Indirect electricity consumption: KPI environment (2020-2022)



In order to curb emissions from electricity consumption, all companies undertake energy efficiency measures every year; in 2022, in particular, electricity efficiency will amount to a total of 16.0 GWh of savings/year¹²¹ equivalent to approximately 5,000 tonnes of CO₂ avoided. The fluctuating trend of efficiency gains for the three-year period 2020-2022, illustrated in Figure No. 24, is in line with the trend of planned interventions in the water sector; thermal efficiency gains are excluded from the environment sector for uniformity of results, amounting to about 9 GWh in 2023. For more details on energy efficiency measures, please refer to *Climate change mitigation and adaptation actions and GHG emission reduction targets*.

Figure No. 24 – Efficiency of indirect consumption (Areti, Companies in the water and environment area) (2020-2022)

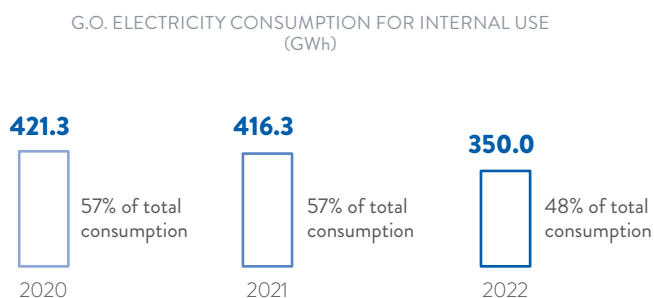


Furthermore, by 2022, approximately 350 GWh of electricity consumption supplied from the grid by Group companies will come from G.O.-certified renewable energy.¹²² (see Figure No. 25) equal to 48% of internal consumption for operational processes in 2022.

121 The figure differs from that reported in the *Sustainability Report 2022* due to adjustments made after the publication of the document.

122 The G.O. (Guarantee of Origin) is the electronic certification attesting to the renewable origin of the sources used for electricity production.

Figure No. 25 – G.O. energy purchased for domestic consumption and G.O. percentage of total consumption (2020-2022) (*)



(*) The figures for 2020-2021 have been slightly adjusted due to consolidation.

Thanks to the purchase of certified electricity, the Scope 2 market-based emissions (see Figure No. 18), are 299,385 tCO₂, a 10% year-on-year increase (271,973 tCO₂ in 2021) attributable to the contraction in the purchase of G.O. electricity as a result of electricity market trends, which also made the purchase of certified green energy burdensome.

SCOPE 3

The Scope 3 categories reported concern the energy consumption of Group suppliers of goods, services and works, business travel, the sale of gas, the sale of electricity and major shareholdings in companies in the watersector ("Investments" category).

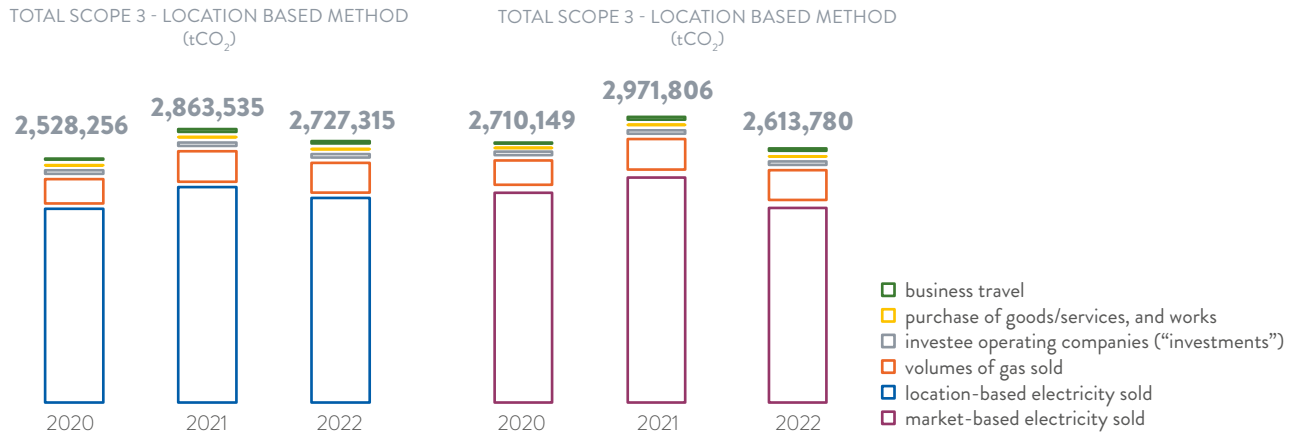
Emissions related to electricity sold by Acea Energia represent **about 85%** of total Scope 3 emissions and are reported according to the dual location-based and market-based approach, as described for Scope 2 emissions.

Over the last three years, as illustrated in Figure No. 26, the trend in Scope 3 emissions shows an increase from 2020 to 2021 and then a 2022 decrease in relation to the trend in electricity sales. Using the location based approach to calculate the share of Scope 3 emissions from energy sales, total Scope 3 emissions decreased by 5% in 2022 compared to the 2021 figure (they were 2,863,535 tCO₂ in 2021 and 2,727,315 tCO₂ in 2022). Applying the market based approach instead shows an overall decrease of 12% for the same year (it was 2,971,806 tCO₂ in 2021 and 2,613,780 tCO₂ in 2022), thanks to the increase in the sale of renewable, G.O.-certified electricity, out of the total electricity sold. In fact, to reduce emissions from the sale of electricity, from 2021 Acea Energia is proposing to new domestic and SME customers on the free market a 100% ECO light and gas offer, which includes the supply of renewable electricity and offsetting carbon dioxide emissions from gas through the purchase of certified carbon credits (VER - Verified Emission Reduction) that allow the financing of environmental sustainability projects.

Green energy sold to free market customers in 2022, according to the best available estimate, amounted to approximately 2,536 GWh (it was 2,196 GWh in 2021), equal to 42% of the total energy sold to that market segment and 34 % of total electricity sold (free market and enhanced protection service) – an increase compared to the previous year¹²³.

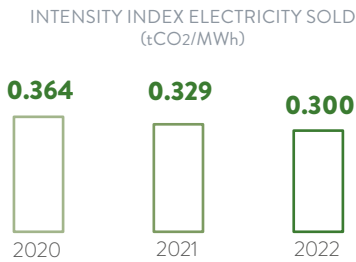
¹²³ In 2021, the green electricity sold to free market customers accounted for 34% of total electricity sold to free market customers and 28% of total electricity sold (free market and higher protection service).

Figure No. 26 – Scope 3 CO₂ emissions - location and market based (2020-2022)



The main Scope 3 performance indicator monitored concerns the emission intensity index of electricity sold¹²⁴, calculated as t of CO₂ emitted from market-based electricity sales per MWh of electricity sold. The KPI, reported for the last three years in Figure No. 27, shows the company's progress in the sale of green energy and the consequent decrease in the ratio between tons of CO₂ emitted and MWh of electricity sold: in 2022, in fact, there is a contraction of approximately 9% compared to 2021 and 18 % on 2020.

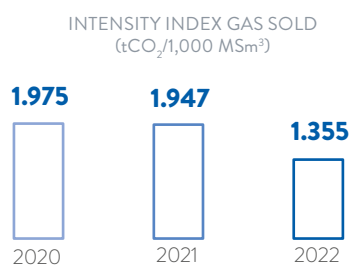
Figure No. 27 – Scope 3: KPI electricity sold (2020-2022)



Another monitored performance indicator concerns the emissions intensity index of gas sold (calculated as t of CO₂ emitted by the volumes of gas sold, **net of those offset** on the quantity of gas sold by Acea Energia in Italy expressed in MSm³ x 1,000), shown, for the three-year period 2020-2022, in Figure No. 28. The value of the KPI has decreased over the last two years, with a significant drop in 2022 from 2021, from 1.9 to 1.4 per tCO₂/1,000 MSm³. This decrease is attributable in particular to the increase in offsetting activities: from about 6,500 tCO₂ in 2021 (for gas volumes sold of 3.3 MSm³) to about 107,000 tCO₂ in 2022 (for 54 MSm³)¹²⁵.

In particular, thanks to the purchase of carbon credits, Acea Energia has been able to guarantee the absorption or non-emission of one tonne of CO₂ for each credit procured, thus supporting two environmental sustainability projects, one of which involves the construction of a hydroelectric plant in India.

Figure No. 28 – Scope 3: KPI gas sold (2020-2022)



NB Emission offsets were started in 2021.

¹²⁴ Calculating emissions from energy sales using the market-based approach.

¹²⁵ The figure is the best estimate available.

CLIMATE CHANGE MITIGATION AND ADAPTATION ACTIONS AND GOALS

CLIMATE CHANGE MITIGATION AND ADAPTATION ACTIONS

The Acea Group implements a climate change mitigation and adaptation strategy, integrating scenario analyses at executive level and working to reduce GHG emissions through energy efficiency and energy saving measures and by planning a significant increase in the production of energy from renewable sources. It also adopts a circular economy logic for the optimisation of water resource management, promoting the reuse of purified wastewater, and increasing the resilience of water and energy infrastructures. Moreover, as mentioned, in 2022 Acea formally committed to a science-based emission reduction target¹²⁶.

Each company, considering the specificities of its operational sector, commits directly in this regard. For example, looking at the details of the abovementioned **energy efficiency** measures taken in 2022 for the water sector, Acea Ato 2 carried out interventions on several water centres and optimisation measures in two purification plants, making total savings of 2.1 GWh, and adopted measures to control water losses, which helped generate further savings. In Acea Ato 5, about 0.8 GWh of energy efficiency was achieved mainly through the replacement of pumps at sampling points in springs and wells, the installation of inverters, and the revamping of a waste water treatment plant. Gori carried out interventions totalling 8.5 GWh, based on exploiting more efficient water supply sources, optimising the management of water plants, using more efficient electric pumps and improving the efficiency of waste water treatment plants. AdF achieved energy savings of about 1.3 GWh through the replacement of pumps in the aqueduct system and districting, pressure management and leak detection. Finally, Gesesa achieved 0.3 GWh of energy efficiency through pressure management interventions in the ongoing districting process. These actions, in the water sector as a whole, avoided the emission of 4,075 tonnes of CO₂¹²⁷.

In the Environment area, interventions were carried out at the San Vittore del Lazio plant to optimise combustion on line one, which resulted in an overall annual efficiency gain of approximately 869 MWh of electricity and 715 kSm³ of natural gas. At the Aprilia composting site, energy efficiencies of approximately 1 GWh of electricity and 208 kNm³ of biogas were achieved thanks to the optimisation of the anaerobic digester and more efficient management of plant downtime, which increased biogas productivity. Several measures were taken at the Monterotondo Marittimo site, including the replacement of halogen lamps with LED lamps and other process interventions, which led to 254 MWh of energy efficiency. In addition, plant optimisation interventions were carried out through the use of inverters at a Berg plant, saving 18 MWh per year, and the replacement of conventional lamps with LED lamps for Demap, saving 3 MWh per year. In total, 2,406 tonnes of CO₂ were avoided at sites in the Environment area, including the two waste-to-energy plants.

In the Networks segment, the Areti company replaced 173 traditional MV/LV transformers with ultra-low-loss transformers and carried out other interventions aimed at optimising the set-up of the MV network and upgrading the HV and LV lines on the HV/MV/LV distribution network. The total estimated energy saving was about 0.7 GWh, equal to about 230 tonnes of CO₂ avoided.

Overall, the environment and water and power distribution areas avoided emissions of approximately 6,700 tCO₂.

¹²⁶ The emission reduction target presented by Acea, and validated by the SBTi organisation in 2023, is based on the three types (Scope 1, Scope 2 and Scope 3). For more details, please refer to the Press Release at the following link: www.gruppo.acea.it/en/media/press-releases-and-news/press-releases/2023/09/acea-to-achieve-56-percent-reduction-in-greenhouse-gas-emissions-by-2032.

¹²⁷ The discrepancy between the figure reported and the one published in the *Sustainability Report* is due to a later finalisation of data.

With regard to the vehicle fleet used by the company's operating personnel, a total of 87 electric vehicles were deployed in 2022. Of these, 25 vehicles were used in car sharing mode, while the other 62 vehicles were individually assigned to operational staff working 24 hours a day. During the year, the total mileage monitored by Areti was approximately 260,000 km, with an energy consumption of about 42 MWh. Thanks to the use of electric vehicles as an alternative to diesel-powered transport, it was possible to avoid the emission of approximately 26,200 kg of CO₂.















In recent years, Acea has taken a leading role in climate change mitigation through the **circular economy**. The company is committed to promoting activities aimed at **reducing resource waste**, e.g. by using process waste, and **promoting the recovery of energy and secondary raw materials**. In addition to the waste-to-energy plants, Acea's plants, including those in the water sector, promote the consumption of energy from renewable sources through harnessing energy from the biogas produced. In 2022, electricity produced from biogas amounted to 36.3 GWh.

With regard to adaptation in the electricity system, every year, in accordance with the directives of the ARERA national authority, Areti defines a three-year Resilience Plan to reduce the probability of power outages deriving from the main risk factors affecting the grid (see the paragraph *Climate scenario analyses of physical risks*). Specifically, the Plan describes targeted interventions aimed at addressing the risks associated with heat waves, drought and flooding caused by climatic change. These interventions resulted in a reduction of the Intervention Risk Index (IRI) by 63% in 2022 compared to 2020 values, and exceeded the 40% reduction target set in the Group's Sustainability Plan.

In the water sector, Acea is making major investments to **ensure the safety** of the drinking water system, also with respect to the risks linked to climate change (see the paragraph *Climate scenario analyses of physical risks*). In particular, to increase the resilience of the aqueduct system serving Rome and the Metropolitan Area, Acea Ato 2 has started new strategic works on the Marcio and Peschiera aqueducts, to be continued in the coming years (see the paragraph *Climate change mitigation and adaptation goals and GHG emission reduction targets*, to follow). In addition, in order to cope with the severe weather and climate conditions that led to the water crisis and rainfall deficits in recent years, the water sector operating companies carried out a series of **plant interventions**: for example, Acea Ato 2 developed aqueduct interconnections and built drinking water plants, which made it possible to efficiently manage any occurring critical situations, allowing cancellation of water shifts in the areas managed; or AdF, which has undertaken extraordinary maintenance of some sources in order to recover available flow; finally, with the aim of recovering the water resource, the companies extended districting activities, carrying out leakage research in the districts at greatest risk of shortage and implementing the monitoring of sources, faults and inefficiency reports, in order to limit intervention times.

CLIMATE CHANGE MITIGATION AND ADAPTATION GOALS AND GHG EMISSION REDUCTION TARGETS

The Acea Group's **Sustainability Plan 2020-2024** contains several targets that aim to mitigate and adapt to the effects of climate change and to manage climate-related risks and opportunities. These objectives and performance against targets are reported each year in the Group's *Sustainability Report*¹²⁸. The main ones are presented below.

SDG	AREA OF INTERVENTION	TARGET FOR 2024	DETAILS
  	Scope 1 emissions – intensity emissions for generation (gCO ₂ /kWh)	Acquisition/construction of photovoltaic plants for a total of 747 MW of installed power with consequent expected reduction of the emission intensity index of plants managed by Acea Produzione up to 40 g CO ₂ /kWh (-55% compared to 89 g CO ₂ /kWh in 2019).	The intensity indicator refers to the Company that produces electricity and thermal energy from hydroelectric, thermoelectric, and photovoltaic plants.
   	Scope 1 emissions – intensity emissions for generation (gCO ₂ /kWh) – Circular economy	Developing biogas cogeneration (44,000 MWh of energy generated from biogas/year), with a consequent increase in green energy produced at the Acea Ambiente and Decoplants .	The increase in green energy production allows for a reduction in the emission intensity index, since biogas is a renewable energy source that is naturally formed from the fermentation of organic waste, such as waste coming from vegetable or sewage sludge.
 	Scope 2 emissions – market based	Maintaining full use of “green” energy to meet the internal electricity needs of the main Group Companies , equal to around 400,000 MWh/year and over 140,000 tonnes of CO ₂ /year avoided.	The main operating companies , in order to reduce the impact from electricity consumption, in addition to energy efficiency actions, procure G.O.-certified green energy, eliminating the impact of their own consumption.
 	Scope 2 emissions – location based, total electricity consumed/water issued into aqueduct systems; electrical energy consumed for sewer service and treatment/water treated	Increasing the efficiency of Acea Ato 2 electricity consumption through the completion of management and structural interventions in the integrated water service plants , with an expected increased energy efficiency of 12 GWh, 5% of which certified through Energy Efficiency Certificates (white certificates).	Acea Ato 2 , the Group's main water company, has set the goal of implementing energy efficiency initiatives to reduce Scope 2 location-based emissions related to electricity consumption.
  	Scope 2 emissions – losses on the electrical energy distribution network	Implementing energy leakage reduction interventions on the grid (voltage change, low-leakage transformers, etc.) and other efficiency enhancement interventions that will enable achieving around 8,500 MWh energy savings, around 2,677 tonnes of reduction of CO ₂ emissions and saving around 1,589 TOE over the course of the Plan.	Areti , the Electricity Distribution Company, has planned modernization and efficiency upgrades to the power grid to reduce emissions related to its operations.

128 The *Sustainability Reports* of the Acea Group are published annually and are available online on the dedicated page (www.gruppo.acea.it/en/our-commitment/sustainability-report). For further details regarding the targets of the Sustainability Plan 2020-2024 and performance against targets, see *Sustainability Report* (2022), pages 50-69.

SDG	AREA OF INTERVENTION	TARGET FOR 2024	DETAILS
  	Scope 3 emissions – market based	Increasing Acea Energia customers awareness of the sustainability of electricity consumption through specific initiatives aimed at promoting and increasing the purchase of “green” energy.	As of 2021, Acea Energia has offered new domestic and SME customers on the unregulated market the 100% ECO tariff, which provides for the supply of electricity certified with a “guarantee of origin” and gas with emissions that are offset by purchasing VER (Verified Emission Reduction) certified carbon credits. The Company also promotes the installation of high energy efficiency products (boilers, air conditioning units) and e-mobility services for recharging electric vehicles at domestic customers’ homes through awareness-raising campaigns on digital channels and social media.
  	System resilience – electricity grid	Increasing the resilience of the electrical system through maintenance/network development interventions with a consequent reduction of the intervention risk index (IRI) by 40% and the involvement of approximately 2,600 secondary substations by 2022.	The target applies to the electricity distribution company, Areti , which has completed interventions to improve network resilience for the critical factors “flooding” and “heat waves”.
  	System resilience – water	Increasing the resilience of the aqueduct system serving Rome and the Metropolitan City through new strategic works on the Peschiera and Marcio Aqueducts: achievement of 28% progress of the works on the Peschiera Aqueduct and completion (100%) of the authorisation phase for the works on the Marcio Aqueduct.	The indicator is associated with the Company Acea Ato 2 and the actions to secure and modernise the drinking water system through interventions on strategically important infrastructures. On the Peschiera Aqueduct, in particular, the construction of the second line of the Peschiera-Capore aqueduct is planned.
 	Sustainable management – water resources	Design of a quali-quantitative monitoring network of the main local aquifers, hydrogeological analysis, measurements and physical modelling of them and installation of 5 flow gauges, aimed at sustainable resource management and improved prediction of deficits due to climatic variations.	The target refers to the Gori Company and involves a collaboration with the DISTAR - Federico II University of Naples’ Department of Land, Environment and Resource Sciences to conduct studies on the quality of groundwater in the Sarnese Vesuviano district.
 	Efficiency – water resources	Reducing lost volumes of water compared to 2019: <ul style="list-style-type: none"> • Acea Ato 2: 27% • Acea Ato 5: 29.5% • AdF: 26% • Gesesa: 20% • Gori: 33% 	The target refers to the main Group companies operating in the water sector and includes activities such as, for example, the districting of networks and the installation of flow and pressure meters.
   	Resilience and land use – electricity grid	Removing 200 pylons by modernisation of the electrical supply system as well as high voltage transmission.	The target was set by the Areti company, and, in addition to being relevant to the modernisation and consequent improved resilience of the energy distribution infrastructure, it will allow the recovery of areas of land with high biodiversity.

On the basis of the goals defined in the strategic plans, Acea has set some specific **emission reduction targets** for Scope 1, Scope 2 and Scope 3.

With regard to **Scope 1 emissions**, as already presented in the table, since 2020 Acea has set itself a target to reduce the emission intensity index of Acea Produzione by 55% by 2024 compared to 2019 levels (in 2022, 24.4% of the target was achieved), thanks to the construction/acquisition of photovoltaic plants (also through participation¹²⁹). In the year under review, there was an increase in the coefficient due to the significant reduction in hydroelectric production as a result of historically low water inflows (inflows were 23% lower than the historical average). The 42% increase in photovoltaic production¹³⁰ was not sufficient to compensate for the decrease in hydroelectric production. In addition, as already mentioned, Acea has committed to a science-based Group emissions reduction target in 2022.

With regard to **Scope 2 emissions**, Acea has set itself the goal of reducing location- and market-based emissions. In the former case, the goal is pursued through the implementation of energy efficiency measures, aimed at achieving a reduction in emissions of approximately 13% by 2024 compared to 2016 levels. To date, about 90% of the target has been reached. Planned and current actions to achieve the target include: efficiency improvements in the environment area; on the water pumping system in the water system, water loss recovery, installation of inverters and renovation of ventilation compartments in the sewage treatment area; reduction of physical losses, installation of MV/LV transformers with very low losses, and changes in the configuration of the MV network in the electricity distribution network.

For **Scope 2** market-based **emissions**, Acea has set itself the target of achieving a 35% reduction by 2024 compared to 2016 levels, through the purchase of G.O.-certified “green” energy to meet the internal electricity needs of the Group’s main companies. The target was reached in 2022 thanks to the purchase of around 350 GWh for internal consumption.

As regards **Scope 3 emissions**, Acea has set a 15% target on the emission intensity index of electricity sales by 2024 compared to 2019 levels, by increasing the amount of green G.O. electricity sold to customers. The target was reached in 2022.

Acea’s commitments in initiatives to combat climate change, in adopting measures to mitigate the effects already happening and in developing the capacity to manage related risks and seize opportunities, will take on **longer-term perspectives** in the **new strategic guidelines**, with the intention of enhancing the Group’s contribution on an issue that affects society’s collective interest.

129 In January 2022, AE Sun Capital Srl was established, held for 40% by Acea Produzione and 60% by the investment fund Equitix Investment Management. Acea will maintain the management of the photovoltaic plants through the signing of multi-year contracts relating to operation & maintenance and asset management activities. Acea Group has also committed to withdraw energy produced by newly built plants on the basis of long-term power purchase agreements (PPAs).

130 Attributable to the investee and not fully consolidated FV Company.



TCFD CORRELATION TABLE

The aspects relating to governance, strategy, risk management, metrics and targets relating to climate change that Acea aimed to illustrate in this document, in line with the recommendations of the Task Force on Climate-related Financial Disclosures, are based on and reflected in other public documents of the Group (such as, for example, the *Report on Corporate Governance*, the new *Acea Code of Ethics*, etc.) and also in the response provided annually to the CDP Questionnaire. Please find a table of the main references below.

CORRELATION TABLE		
Core elements	TCFD Recommended Disclosure	References
GOVERNANCE The company's governance of climate-related risks and opportunities	Describe:	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Governance - roles and responsibilities of the organisation for handling aspects pertaining to climate change</i> , pages 8-12
	a) the board's oversight of climate-related risks and opportunities	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Sustainability strategy related to climate change</i> , paragraph <i>Commitment and integration of sustainability and climate change aspects in the strategy</i> , pages 13-15 <i>Report on corporate governance and ownership structure</i> , financial year 2022, pages 7-8, 13, 23-24, 31-35, 45-48, 51, and following, 65 and following <i>Views of the Board of Directors of Acea to the Shareholders on the dimensions and composition of the New Board of Directors</i> , 2023, pages 3-4 <i>Guidelines for the Internal Control and Risk Management System</i> , 2020 CDP 2022 C1 (more specifically C1.1a, C1.1b, C1.3a)
	b) management's role in assessing and managing climate-related risks and opportunities	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Governance - roles and responsibilities of the organisation for handling aspects pertaining to climate change</i> , <i>Figure No. 3 - Climate issues: governance, responsibility and information flows (as of 31.12.2022)</i> , p. 9; paragraph <i>The Management role in assessing and handling climate-related risks and opportunities</i> , pages 12-13 <i>Acea Group - Climate-related disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , paragraph <i>The risk identification, assessment and management process</i> , pages 16-18 <i>Report on corporate governance and ownership structure</i> , financial year 2022, page 56 <i>Guidelines for the Internal Control and Risk Management System</i> , 2020 CDP 2022 C1.2
STRATEGY The actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning	Describe:	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , pages 16-42
	a) the climate-related risks and opportunities the organisation has identified over the short, medium, and long term	<i>Sustainability Report Acea Group 2022</i> , page 84 CDP 2022 C2.3 and C2.4
	b) the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-associated sustainability strategy</i> , paragraph <i>Commitment and integration of sustainability and climate change impacts into the strategy</i> , pages 13-15 <i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , pages 16-42 <i>Code of Ethics - Sustainability, Stakeholder Responsibility, and Environmental Protection Acea</i> , 2022, pages 8, and 22 <i>2020-2024 Industrial Plan of the Acea Group</i> <i>Sustainability Report Acea Group 2022</i> , pages 46-69 <i>2020-2024 Sustainability Plan of the Acea Group</i> CDP 2022 C3.3 and C3.4
	c) the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-associated sustainability strategy</i> , paragraph <i>Commitment and integration of sustainability and climate change impacts into the strategy</i> , pages 13-15 <i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , paragraph <i>Climate-related risks and opportunities in the short, medium and long term</i> pages 18-21 CDP 2022 C3.1b and 3.2a

Core elements	TCFD Recommended Disclosure	References
RISK MANAGEMENT The organisation's processes for identifying, assessing and managing climate-related risks	Describe:	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , pages 16-42
	a) the organisation's processes for identifying and assessing climate-related risks	<i>Guidelines for the Internal Control and Risk Management System</i> , 2020 CDP 2022 C2.1b and C2.2
	b) the organisation's processes for managing climate-related risks	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , paragraph <i>The risk identification, assessment and management process</i> , pages 16-18 <i>Guidelines for the Internal Control and Risk Management System</i> , 2020 <i>Sustainability Report Acea Group 2022</i> , page 12 <i>Guidelines for the Internal Control and Risk Management System</i> , 2020 CDP 2022 C2.1b and C2.2
	c) how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , paragraph <i>The risk identification, assessment and management process</i> , pages 16-18 <i>Guidelines for the Internal Control and Risk Management System</i> , 2020 <i>Sustainability Report Acea Group 2022</i> , page 12 CDP 2022 C2.1b
METRICS AND TARGET The metrics and targets used to assess and manage relevant climate-related risks and opportunities	Disclose:	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-related risks and opportunities, metrics and economic-financial impacts</i> , paragraph <i>Implementation of climate scenario analyses on physical and transition risks and opportunities</i> , pages 21-42
	a) the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Climate change-associated sustainability strategy</i> , paragraph <i>Climate-related incentive systems</i> , pages 15-16 <i>Report on corporate governance and ownership structure</i> , 2023, pages 43-51 <i>Report on the Remuneration Policy and on the Fees Paid</i> , 2023 CDP 2022 C4, C6 and C7
	b) Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Performance, actions and goals</i> , paragraph <i>The emissions of the Acea Group and performance indicators</i> , pages 43-51 <i>Sustainability Report Acea Group 2022</i> , pages 227-230 CDP 2022 C7
	Describe:	<i>Acea Group - Climate-related Disclosure 2022</i> , chapter <i>Performance, actions and goals</i> , paragraph <i>Climate Change mitigation and adaptation actions and goals</i> , pages 52-56
	c) the targets used by the organisation to manage climate-related risks and opportunities and performance against targets	<i>Sustainability Report Acea Group 2022</i> , pages 50-69 <i>2020-2024 Sustainability Plan of the Acea Group</i> CDP 2022 C4



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