



ACEA GROUP 2021



CLIMATE-RELATED DISCLOSURE



ACCORDING TO THE TCFD



RECOMMENDATIONS





**ACEA GROUP 2021**



**CLIMATE-RELATED DISCLOSURE**



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**RECOMMENDATIONS**





WE ARE COMMITTED  
TO MAINTAINING A HIGH  
LEVEL OF AWARENESS,  
EQUIPPING ACEA WITH  
INCREASINGLY ADVANCED  
TOOLS FOR ANALYSIS AND  
TRANSPARENT REPORTING



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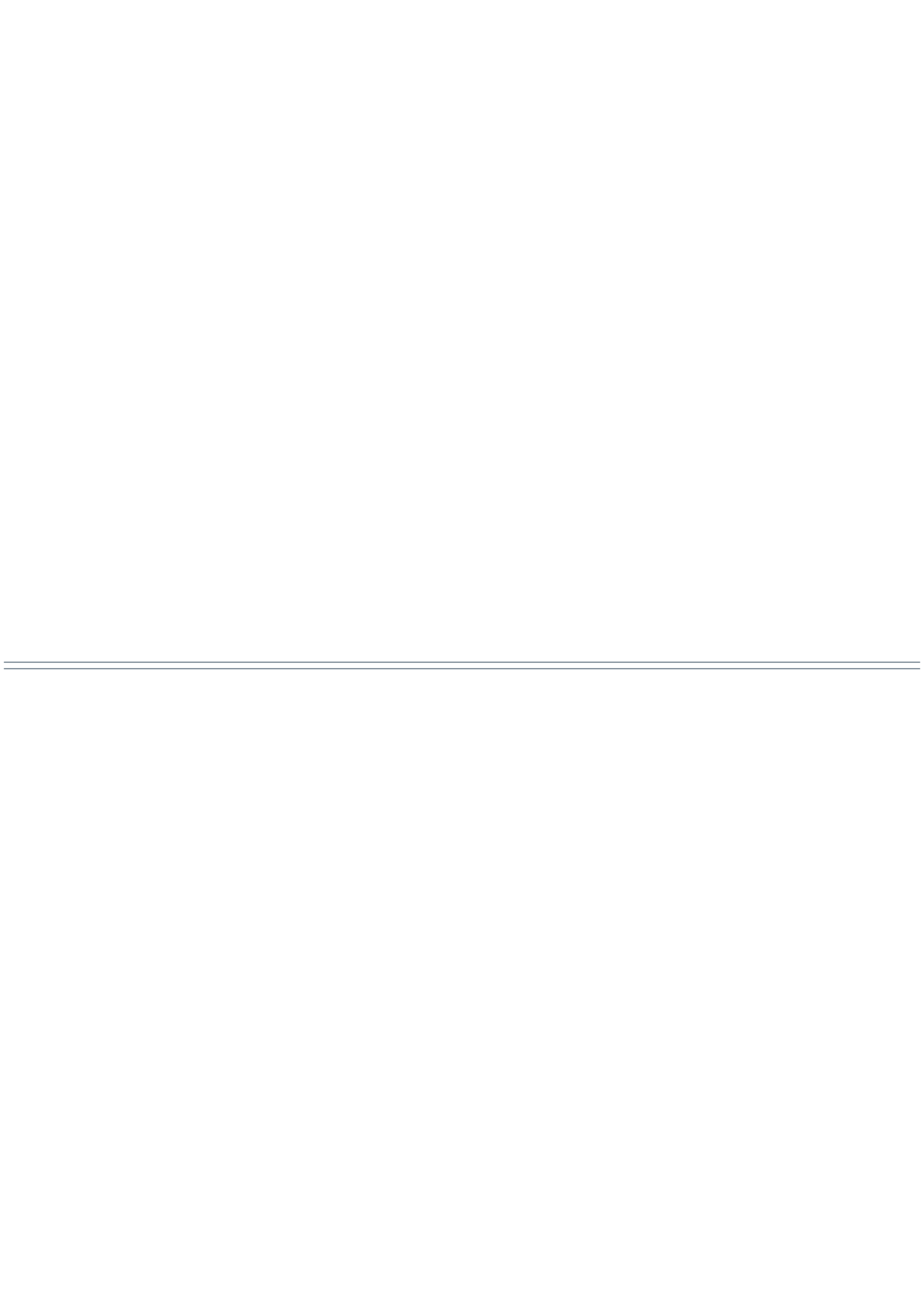
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## MESSAGE TO STAKEHOLDERS

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It is with great pleasure that we publish our first Acea Group climate-related disclosure in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). This document has been produced to illustrate to our stakeholders, in a simple but comprehensive manner, the main climate-related risks, both physical and transitional, that impact our business, the possible evolutions of these risks, including their potential economic impacts, based on an initial analysis carried out on different climate scenarios, the policy for managing these risks, and the oversight we have guaranteed on these issues at corporate governance level.

Indeed, the complexity of the scenario in which we operate, characterised by increasingly extreme and unpredictable climatic events, makes it necessary to carefully monitor these aspects which - if underestimated or neglected - could compromise, in the medium to long term, our ability to remain a successful company in the future. Precisely in order to guarantee this oversight, in recent years we have implemented a governance system that, based on the indications provided by the Board of Directors with the support of its Committees, and delivered through risk management policies and procedures and the operations of the corporate units, allows the Acea Group to effectively identify, monitor and manage the most relevant climate risks in order to pre-empt and mitigate their effects on operational capacity as well as contribute to directing strategic decisions to guarantee a prosperous future.

We are committed to maintaining a high level of awareness, equipping Acea with increasingly advanced tools for analysis and transparent reporting.

**The Chairperson**  
**Michaela Castelli**



**The Chief Executive Officer**  
**Giuseppe Gola**





THE **IEA** INDICATES FOUR  
PRIORITY AREAS FOR ACTION:

1

**BOOSTING CLEAN  
ELECTRIFICATION**

2

**TAPPING THE FULL POTENTIAL  
OF ENERGY EFFICIENCY**

3

**PREVENTING METHANE LEAKS  
FROM FOSSIL FUEL OPERATIONS**

4

**PROMOTING INNOVATION  
IN THE CLEAN ENERGY SECTOR**



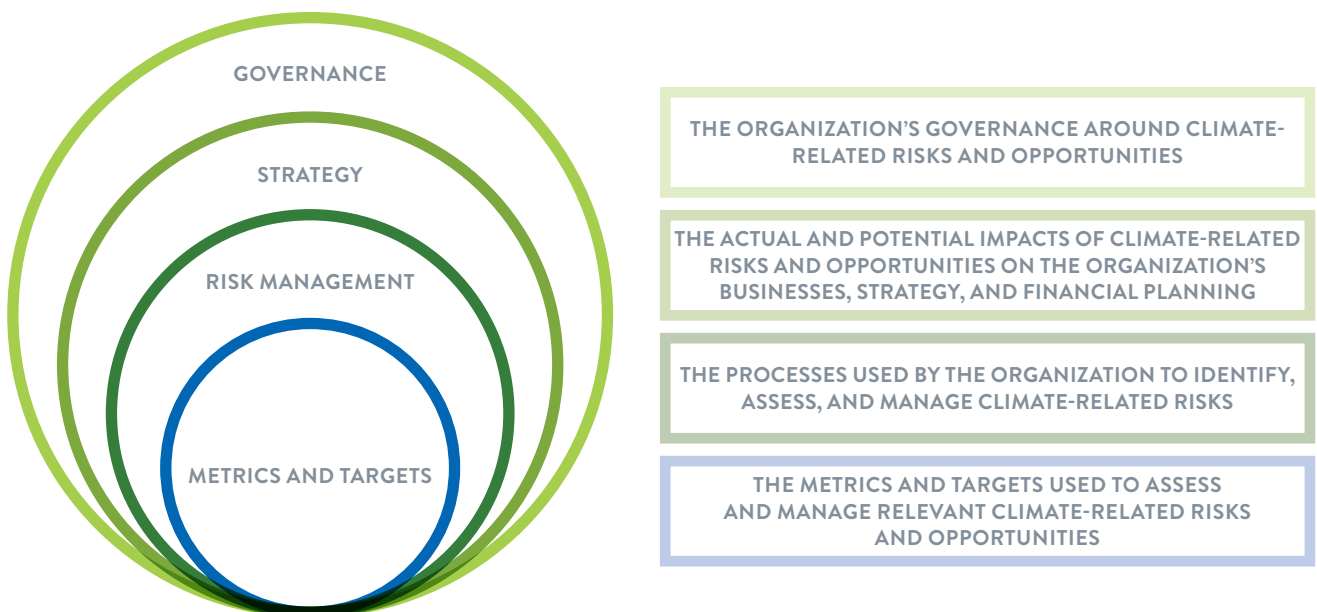
# INTRODUCTION

*Climate change* has been a priority area for the Acea Group for some time. The analyses carried out by the main international reference bodies outline the possible scenarios to be faced, while international and national agreements and policies define tools and guidelines that enable individual companies to outline their own strategies to progressively reduce impacts and increase the capacity to adapt, as well as to adopt longer-term development decisions able to respond to evolving trends in the reference scenario, highlighting the desire to contribute proactively to limiting climate change.

In order to express this ongoing commitment to its stakeholders, Acea has prepared this document for the first time, in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB)<sup>1</sup>. The report describes the roles and responsibilities of the organisation for managing climate change aspects (governance); the strategy and the identification, through scenario analysis, of the risks and opportunities associated with climate change, including their 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 mentioned above, provide guidance both for investors, who are increasingly inclined to evaluate *climate-related* information, and for companies wishing to share documents on climate-related risks and opportunities that are as clear and comparable as possible.

**Figure 1 – The 4 key thematic areas for climate-related financial disclosures**



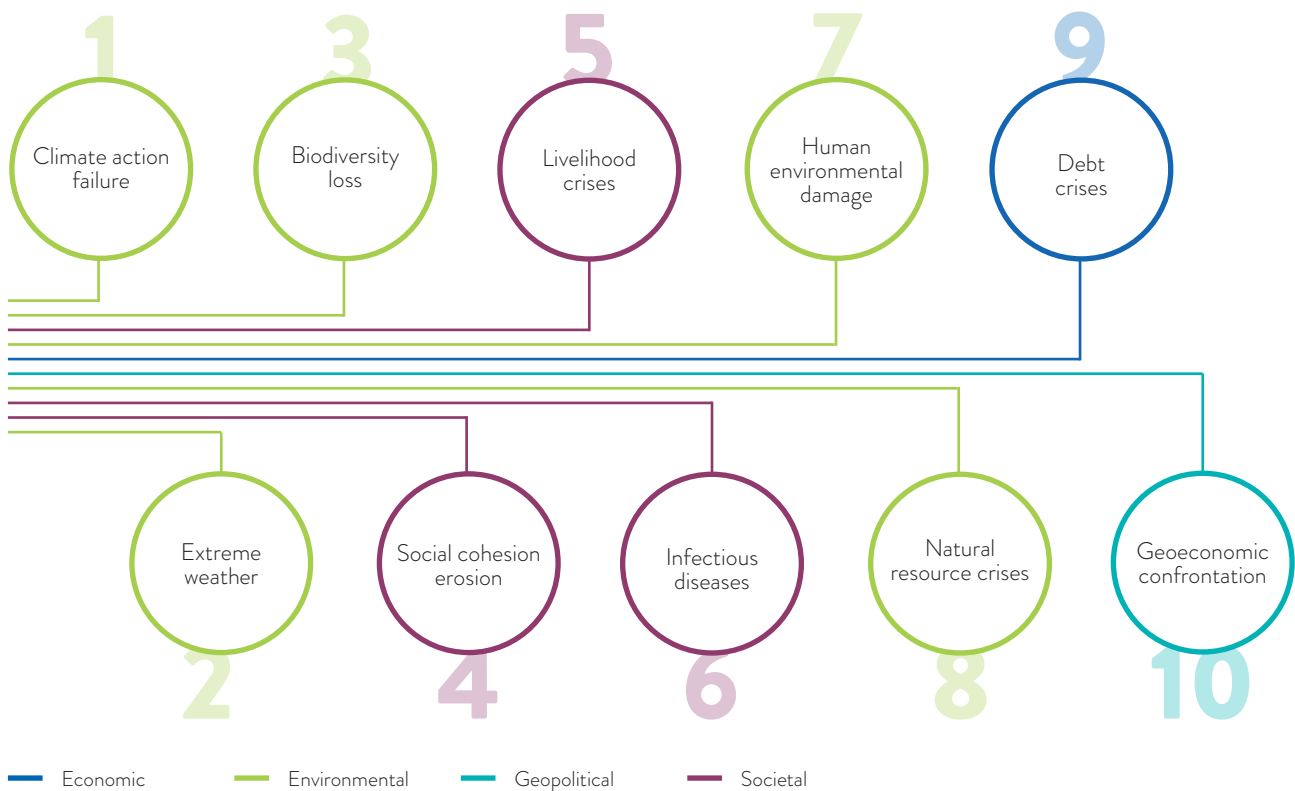
Source: Recommendations of the Task Force on Climate-related Financial Disclosures (2017).

<sup>1</sup> Recommendations of the Task Force on Climate-related Financial Disclosures (2017).

# CONTEXT

Pursuant to the Paris Agreement and the UN Sustainable Development Goals, the European guidelines were redefined with the aim of rapidly achieving climate neutrality by 2050. Intermediate targets were also defined, such as a 40% renewable energy quota, indicated for 2030 by the latest *Fit for 55* package of the European Green Deal, the cessation of deforestation activities and the reduction of methane emissions by at least 30%, as provided for in the recent COP26 agreements. The World Economic Forum's *Global Risks Report 2022* reports the outcomes of the Risk Perception Survey<sup>2</sup> 2021-2022, highlighting the persistence of *climate action failure* as the number one perceived global threat for the next ten years.

**Figure 2 – WEF, Global Risk Perception Survey 2021-2022: Top 10**



Source: World Economic Forum Global Risks Perception Survey 2021-2022

Due to climate change, geophysical phenomena will be more extreme, droughts and precipitation will intensify, and sea levels will continue to rise. In general, environmental risks, if not properly controlled, could generate biodiversity loss, critical damage to the agricultural system, financial crises, damage to health and loss of life.

At the global level, as highlighted by the Intergovernmental Panel on Climate Change (IPCC), the effects of climate change are advancing faster than previously assessed; this has already caused widespread negative impacts, loss and damage to nature and people, with approximately 40% of the world's population currently recognised as highly vulnerable to climate impacts<sup>3</sup>.

An analysis by the International Energy Agency (IEA), carried out immediately after COP26 in 2021, states that even if all emission reduction targets set by governments were met by 2050, global warming

<sup>2</sup> In addition to economic, environmental, geopolitical and social risks, the WEF survey also considers technological risks; however, these are not included in the top 10.

<sup>3</sup> *Climate Change 2022: Impacts, Adaptation and Vulnerability*, IPCC.

would remain at 1.8°C by the end of the century, which, while below 2°C, would be 0.3°C above the level established by the Paris Agreement<sup>4</sup>.

Therefore, the actions developed over the next decade will be crucial to decreasing CO<sub>2</sub> emissions and meeting climate targets. To reduce the expected discrepancy, the IEA indicates four priority areas for action: boosting clean electrification, tapping the full potential of energy efficiency, preventing methane leakage from fossil fuel operations, and promoting innovation in the clean energy sector.

The energy sector contributes 34% of global greenhouse gas emissions<sup>5</sup>, thus playing a central role in the transition process towards decarbonisation and climate neutrality. The challenges span from reducing emissions and growing energy needs to the need to ensure adequate access to energy and business continuity, in a historical period marked by health emergencies and international conflicts.

In this context, despite the slowdown related to the COVID-19 pandemic, renewable energy sources continued to grow rapidly. At the same time, as recorded in 2021, the development of the energy market in the coming years could be characterised by rising prices for natural gas, coal and electricity. Electricity is playing an even greater role in the lives of consumers and, for an increasing number of households, it is the energy source they rely on for their daily needs: mobility, cooking, lighting, heating and cooling. The reliability and affordability of electricity is set to become even more critical for all aspects of people's lives and well-being<sup>6</sup>.

In its *World Energy Outlook 2021*, the International Energy Agency defined two main reference scenarios for the evolution of the energy mix. The first, the *Stated Policies Scenario* (STEPS), is in line with existing and planned policies, while the second, the *Sustainable Development Scenario* (SDS), is a decarbonised scenario. The IEA also identified the further development of renewables and energy efficiency as two of the four main levers for transitioning from the STEPS pathway to the SDS.

A development such as the one indicated by the IEA would be possible by electrifying the end-use of energy and, at the same time, raising awareness among users about more conscious consumption; by significantly decreasing emissions from the agricultural sector; and finally by developing complementary decarbonisation technologies. In order to achieve net zero emissions by 2050, the IEA also developed a *Net Zero Emissions scenario* (NZE2050) that would require much stronger measures than the *Sustainable Development Scenario*, through increased electrification, efficiency and changes in consumer lifestyles.

At the same time, achieving the climate targets would require a framework of political (commitments), financial (transition support) and technological support, as clearly outlined at COP26, e.g., with the Glasgow Financial Alliance for Net Zero, which envisages the investment of over \$130 trillion of private capital in activities related to achieving net zero emissions.

In order to contain the economic and social damage caused by the COVID-19 pandemic and promote recovery, the European Union has approved the Recovery Plan 2021-2027, which includes a Long-Term Budget and the Next Generation EU instrument, both with substantial funds to combat the climate crisis.

In Italy in 2021, within the Next Generation EU program, the *National Recovery and Resilience Plan* (Piano Nazionale di Ripresa e Resilienza, NRRP) has been implemented. This includes investments for the ecological transition and a reform package on the "Green revolution and ecological transition".

Also in 2021, the Italian Long-Term Strategy on the Reduction of Greenhouse Gas Emissions was published, which envisages achieving carbon neutrality by 2050 by reducing energy consumption by 40% compared to current levels, promoting the use of renewables. In addition, in March 2022, Italian Law Decree 17/2022 "Urgent measures for the containment of electricity and natural gas costs, the development of renewable energy and the relaunch of industrial policies"<sup>7</sup> came into force which, in addition to proposing measures to contain electricity and gas price increases for households and businesses, aims to increase domestic gas production, also in order to increase the country's energy independence from foreign sources.

Finally, the PNIEC (Integrated National Energy and Climate Plan 2030) will be updated, by 2023, with new objectives and scenarios which reflect European regulatory evolutions.

4 [www.iea.org/commentaries/cop26-climate-pledges-could-help-limit-global-warming-to-1-8-c-but-implementing-them-will-be-the-key](http://www.iea.org/commentaries/cop26-climate-pledges-could-help-limit-global-warming-to-1-8-c-but-implementing-them-will-be-the-key).

5 *IPCC Sixth Assessment Report – Mitigation of Climate Change, 2022*. [www.ipcc.ch/report/ar6/we3/](http://www.ipcc.ch/report/ar6/we3/).

6 *World Energy Outlook and the Global Energy Review - IEA, 2021*.

7 [www.gazzettaufficiale.it/eli/id/2022/03/01/22G00026/sg](http://www.gazzettaufficiale.it/eli/id/2022/03/01/22G00026/sg).



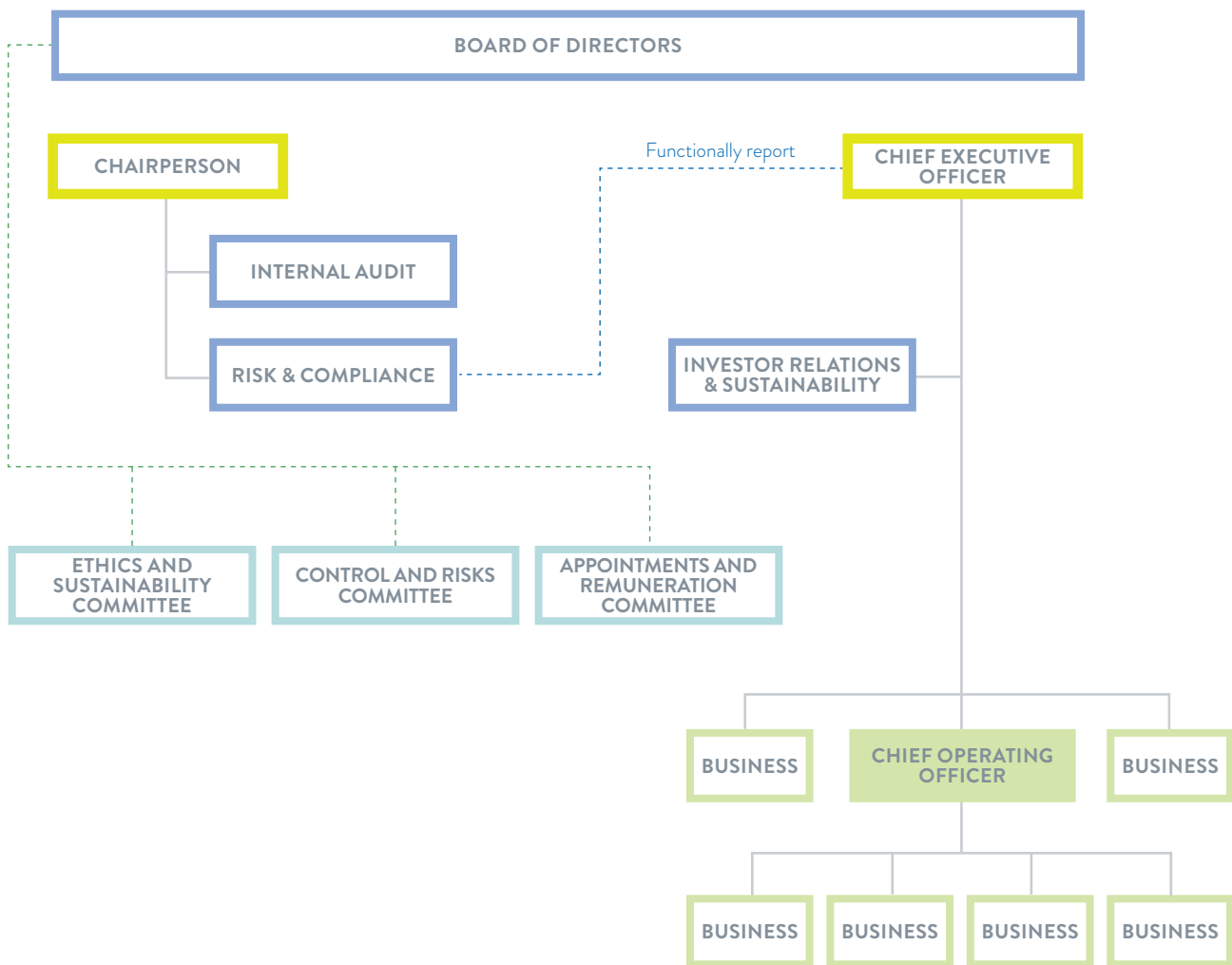
## GOVERNANCE - ROLES AND RESPONSIBILITIES OF THE ORGANISATION FOR HANDLING ASPECTS PERTAINING TO CLIMATE CHANGE

Acea's governance system also includes the monitoring of ESG (Environmental, Social & Governance) issues, including climate change. In this regard, a significant role is played by the activities carried out by the Board of Directors (BoD), assisted by the Board Committees, and specific functions of the Chairperson, the Chief Executive Officer (CEO) and the management, who - within their respective roles and responsibilities - contribute to ensuring the monitoring and proper management of these issues in business activities.

*“Acea pursues sustainable performance through the use of consistent organisational, procedural and cultural tools: the company has established an internal Ethics and Sustainability Committee, and procedures have been implemented to monitor sustainability targets and activity classifications, including in relation to recent European legislation (European Taxonomy for Sustainable Activities). Furthermore, procedures have been adopted to facilitate engagement with significant stakeholders and the company constantly promotes the integration of sustainability into its corporate ecosystem through initiatives aimed at Acea personnel, training and management culture programmes, and strategic analysis. With regard to the risk factors that may impact the generation of long-term value, the Company has launched a study to explore the relationship between ERM logics and methods and the most relevant sustainability topics.”*

*Report on corporate governance and ownership structure, financial year 2021, page 7.*

Figure 3 – Flowchart: the governance of climate issues



## THE ROLE OF THE BOARD OF DIRECTORS, THE CHAIRPERSON AND THE CEO

The guidelines that led to the definition of the current Board of Directors state that: “the Board should also be in possession, in overall terms, of a high level of orientation towards strategies and results in respect of the principles of proper corporate and business management, and also skills regarding the governance of risks, in a corporate and regulatory framework, the economic and financial context and the financial statements, the structure and development of corporate governance processes and systems in listed companies, the topics of sustainability and social responsibility and digital innovation”<sup>8</sup>.

Within the Board of Directors, the Chair of the Ethics and Sustainability Committee has proven expertise on ESG issues.

The Board of Directors defines the **policies and strategic guidelines** which form the basis of the business plan, also with regard to sustainability issues, while the CEO operates **on the basis of the multi-year plans approved by the BoD**, ensuring and verifying compliance with the resulting management guidelines; the CEO is also responsible for establishing and maintaining the **Internal Control and Risk Management System**. The Chair of the Board of Directors ensures that adequate information flows are organised

<sup>8</sup> Views of the Board of Directors of Acea to the Shareholders on the dimensions and composition of the New Board of Directors, 9 March 2020, page 3, available online, [www.gruppo.aceait](http://www.gruppo.aceait).

between Acea and the Group companies in order to monitor the **consistency between the Group's strategic guidelines and its performance**; the Chair also oversees the **issues relating to environmental impacts and social sustainability** (*corporate social responsibility*) of company activities and processes<sup>9</sup>.

Specifically, as described in the *Report on corporate governance and ownership structure 2021*, “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**”<sup>10</sup>.

Among others, the following tasks are reserved for the BoD:

- “define strategic and general management guidelines and steer the Company’s development; economic-financial coordination of the Group’s activities by approving medium-term strategic plans which incorporate the Group’s development guidelines, the investment plan, the financial plan and the annual budgets;
- by proposal of the Control and Risks Committee, define the guidelines of the Internal Control and Risk Management System so that the main risks concerning Acea and its subsidiaries – **including the various risks that can become relevant in the light of sustainability over the medium-long term period** – are correctly identified and adequately measured, managed and monitored;
- define the nature and level of risk compatible with the identified strategic objectives;
- define the Guidelines, after hearing from the Control and Risks Committee (...), so that **the main risks** relative to Acea and the main Group companies **are properly identified, measured, managed and monitored**”<sup>11</sup>.

The **2020-2024 Business Plan** approved by the Board of Directors and presented to the market in October 2020 identified sustainability as one of its strategic pillars and defined specific targets necessary to reduce CO<sub>2</sub>emissions, including a marked increase in the amount of green energy produced and used, but also a strong push in favour of sustainable mobility, in order to make Acea one of the leading operators on the market. In December 2020, the Board also approved the **2020-2024 Sustainability Plan** which includes numerous objectives aimed at increasing adaptive capacity and combating climate change: these range from the resilience of strategic infrastructures to energy efficiency, the development of services to contain urban impacts, and other specific initiatives to reduce climate-changing emissions in the various production sectors. The Board of Directors is informed about the main risks and opportunities for the Group, including those related to climate change, both in the medium and long term, through meetings with the Audit and Risk Committee.

## THE ROLE OF BOARD COMMITTEES: ETHICS AND SUSTAINABILITY, CONTROL AND RISK, APPOINTMENTS AND REMUNERATION

The Board Committees, which are composed of company Directors, engage with the company's organisational units and support, through consultative and advisory duties, the Board of Directors on key areas **that also include climate issues**, particularly with regard to the Ethics and Sustainability, Control and Risk, and Appointments and Remuneration Committees<sup>12</sup>.

The Ethics and Sustainability Committee has specific expertise in business ethics and Environmental, Social and Governance (ESG) issues, which it promotes, supervises and monitors. It therefore receives regular updates on the various sustainability-related initiatives and projects, **also with reference to the Carbon Disclosure Project questionnaire**. The Ethics and Sustainability Committee reviews the guidelines of the **sustainability plan**, approved by the Board of Directors, and **monitors its implementation**; it also carries out the necessary activities to support the Board of Directors in examining and approving the business plan, also based on the analysis of issues relevant to the generation of long-term value. 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

<sup>9</sup> *Report on corporate governance and ownership structure*, financial year 2021, pages 30-33, available online, [www.gruppo.acea.it](http://www.gruppo.acea.it).

<sup>10</sup> *Report on corporate governance and ownership structure*, financial year 2021, page 13.

<sup>11</sup> *Report on corporate governance and ownership structure*, financial year 2021, pages 13-14.

<sup>12</sup> For more details, see the *Report on corporate governance and ownership structure*, financial year 2021, pages 43 and following, page 49 and following, page 62 and following - available online, [www.gruppo.acea.it](http://www.gruppo.acea.it).



represent the business model, the company strategies, the impact of its business and the performance achieved.

The Control and Risks Committee, in particular, issues opinions to the Board regarding the definition of guidelines for the Internal Control and Risk Management System, “including the various risks that can become relevant in the light of sustainability over the medium-long term period”, so that they are properly identified, as well as adequately measured, managed and monitored. Plus, the Committee issues opinions with regard to determining the degree to which key risks are compatible with management which is consistent with identified strategic objectives.

Finally, 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 promoting sustainability and the creation of value in the medium-long term” and monitors its actual implementation<sup>13</sup>. In 2021, the Committee formulated a proposal to the Board of Directors concerning the setting of performance targets related to the short-term variable component (*MbO- Management by Objectives*) which, in line with previous years, envisages both economic-financial and sustainability-related objectives, and submitted to the Board for approval the **new long-term variable incentive system - Long Term Incentive Plan (LTIP) 2021-2023** - which includes a **composite sustainability indicator** including an **emissions intensity target**.

**Figure 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 <b>definition of the Guidelines for the Internal Control and Risk Management System</b> for the Group companies, <b>including those relevant for medium/long-term sustainability</b> , 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 <b>the correct use of accounting standards adopted in order to draw up the consolidated non-financial statement</b> as per Legislative Decree 254/2016. For the matters within its remit, monitors the <b>adequacy and effective implementation of the Code of Ethics</b> .
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: <b>size, adequacy of skills, compatibility of positions</b> . Proposes the <b>remuneration policy</b> for Directors and Executives to the Board of Directors, <b>promoting medium-long term sustainability</b> .
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 <b>corporate ethics and environmental, social and governance topics</b> . Promotes the <b>integration of sustainability into the corporate strategy and culture</b> . Supervises the main sustainability issues related to business activities and interactions with stakeholders. Examines the guidelines of the <b>Sustainability Plan</b> and once approved by the Board of Directors, supervises its monitoring. Checks the adequacy and implementation of the Code of Ethics. <b>Promotes a culture of diversity and fighting discrimination</b> in the company.

<sup>13</sup> Report on corporate governance and ownership structure, financial year 2021, page 44. For more details, see the Report on the Remuneration policy and the remuneration paid – year 2022 – available online, [www.gruppo.acea.it](http://www.gruppo.acea.it).

*“The objective of the present Remuneration Policy, as well as being that of establishing an instrument for achieving the medium- and long-term strategic objectives generating value for the Shareholders, aims also to promote the engagement of all the employees in supporting the achievement of the corporate objectives, through promoting the criteria of fairness and sustainability”.*

*“Therefore, also for 2022 the variable incentive systems, both short- and long-term, maintain a composite sustainability indicator with a weight of 10%, which covers all the strategic areas contributing in this way to ensuring achievement of the business objectives as provided for in the Acea Group’s Strategic Plan and in line with the expectations of a market increasingly attentive and demanding on these issues”.*

*Letter by the Chairperson of the Appointments and Remuneration Committee, in the Report on the Remuneration policy and the remuneration paid, 2022, page 3.*

## THE ROLE OF MANAGEMENT IN ASSESSING AND MANAGING 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 far as the management of climate-related risks and opportunities is concerned, reference must be made to the broader and more complex Internal Control and Risk Management System, which transversally shapes business management (see also the paragraph on *The organisation’s processes for identifying and assessing climate-related risks and their integration into overall risk management*) and involves both corporate governance bodies and specific departments - such as Risk & Compliance and Internal Audit - which implement *Enterprise Risk Management* as well as control activities - and the operational units, i.e. management, in charge of the daily management of risks.

The Risk & Compliance department 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 department is involved in preparing responses to the CDP Questionnaire and works with internal working groups on climate scenario analyses.

The Investor Relations & Sustainability department is responsible for the promotion, general coordination and functional oversight of sustainability issues, including climate change aspects. In particular, within the framework of the Group’s strategic sustainability planning - defined with the involvement of the operating units and monitored in its implementation - it also oversees the planning of climate change-related objectives 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 personnel involved in operational processes assess and manage sustainability impacts relevant to the business, including impacts related to climate change, in line with the Group’s business and sustainability guidelines.



THE RISK & COMPLIANCE  
DEPARTMENT

*DESIGNS,  
IMPLEMENTS  
AND MONITORS*

THE GROUP'S  
**RISK GOVERNANCE**  
MODEL



# FIVE CONTEXTUAL MEGA-TRENDS

1

SUSTAINABILITY  
AND CIRCULAR  
ECONOMY

2

CUSTOMER-CENTRIC  
APPROACHES

3

ENERGY  
TRANSITION

4

INNOVATION  
AND DIGITISATION

5

IMPROVED  
COMPETITIVE  
POSITION



# STRATEGY AND RISK MANAGEMENT

## INTEGRATION OF SUSTAINABILITY INTO THE CORPORATE STRATEGY

“The principles of fairness, sustainability, precaution, care and respect for the environment represent the ethical bedrock of the relations that the company intends to establish with all its stakeholders”<sup>14</sup>, so states the Acea’s Code of Ethics, in its general principles, which shape the conduct of the Group and its strategic choices.

Considering the opportunities arising from the changing scenario and new economic, social and environmental challenges, the 2020-2024 Business Plan was drawn up on the basis of five mega-trends characterising the utilities sector: sustainability and the circular economy, customer-centric approaches, energy transition, innovation and digitalisation, and improving competitive position; and divides the Group’s growth guidelines into five strategic pillars summarised by the acronym GRIDS: Growth - growth driven by the regulated market; Renewables - investments in renewables; Innovation - investments in new innovative services; Delivery - results exceeding targets; Sustainability - increasing focus on environmental impact and the circular economy (see also *The Role of the Board of Directors, the Chairperson and the CEO in Governance*).

“(…) Acea undertakes to adopt strategies aimed at the constant improvement of results in the area of environmental protection and care, focusing its efforts on the prevention of pollution and the minimisation of risks and environmental impacts. In this connection, Acea undertakes to:

- manage natural resources and energy in a sustainable manner, enhancing the correct usage thereof and increasing recourse to renewable sources, paying special attention to the reduction of waste and rational use of resources, also on the part of consumers;
- manage production processes by promoting the Circular Economy;
- adopt the principle of precaution in the case of even potential danger for human health and the environment;
- define specific environmental objectives and improvement programmes designed to minimise significant environmental aspects;
- use adequate control tools and monitoring systems over the main environmental aspects generated by its activities and the enhancement programmes used;
- adopt certified environmental management and quality systems;
- promote in-company environmental awareness and training activities, pursuing the growth and spreading of ecological awareness and sense of responsibility”.

Code of Ethics Acea, art. 18 – Environment, circular economy, page 21.

<sup>14</sup> Code of Ethics Acea (edition 2018), Art. 2 – General principles, page 5, available online [www.gruppo.acea.it](http://www.gruppo.acea.it).

Acea has taken a strong public stance on **climate change**. In 2019, the CEO signed the letter “*Business leadership for a climate-neutral economy*”, signed by some 170 companies and investors and addressed to EU President Ursula von der Leyen, to support a more challenging climate-neutral emissions reduction target by 2030<sup>15</sup>. In addition, Acea also proactively participates in external initiatives: since 2019, it has been part of the FEEM (Fondazione Eni Enrico Mattei) De RiskCO Project, together with other companies and organisations, aimed at exploring the risks and opportunities associated with climate change with businesses and local communities through workshops and seminars with experts in the field<sup>16</sup>. In 2021 Acea was part of a working group, along with other companies, to produce the position paper *Italian businesses toward decarbonisation: a just and inclusive transition*. Presented on January 19, 2022 at the Italian Pavilion at Expo Dubai, the position paper set out to “the aim to showcase and highlight the commitment of Italian companies adhering to the United Nations Global Compact on decarbonisation, in order to play their part in achieving the objectives of the Paris Agreement and the target set by the European Union of achieving climate neutrality by 2050”.

The Group’s actions at operational level reflect its strategic position, and it undertakes initiatives aimed at supporting climate change adaptation, i.e., by making infrastructure more resilient and incorporating the analysis of critical scenarios into operations, and at mitigating these changes through the progressive reduction of climate-changing emissions.

In particular, with regard to GHG emissions, which are reported and published annually in the Group’s *Sustainability Report*<sup>17</sup> prepared in accordance (Comprehensive level) with GRI Standards, and in compliance with Italian Legislative Decree 254/2016, Acea has been responding to the CDP Questionnaire since 2006 and re-entered in the “leadership” class with an A- score since 2019.

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

The *Carbon Disclosure Project* (now CDP) questionnaire has emboldened Acea with an approach aimed at identifying transitional and physical risks and opportunities associated with its business that derive from the effects caused by climate change, over a short, medium and long term horizon, and the most significant implications for the Group - in economic-financial, reputational and operational-management terms - and, as a result, for its customers (see Table 1)<sup>18</sup>.

Following the more detailed application of the first climate scenario analyses, other types of risks and opportunities were also discussed in more detail, in line with the recommendations of the Task Force on Climate-related Financial Disclosures, as explained in more detail below.

15 [www.corporateleadersgroup.com/reports-evidence-and-insights/ceos-urge-eu-to-raise-emissions-targets](http://www.corporateleadersgroup.com/reports-evidence-and-insights/ceos-urge-eu-to-raise-emissions-targets).

16 [www.feem.it/it/ricerca/programmi/firms-and-cities-towards-sustainability/ongoing-projects/de-risk-co/](http://www.feem.it/it/ricerca/programmi/firms-and-cities-towards-sustainability/ongoing-projects/de-risk-co/).

17 Acea Group Sustainability Reports are published annually and are available online.

18 See also the *Sustainability Report Acea Group 2021*, available online.

**Table 1 – Risks and opportunities related to climate change: CDP evidence**

RISKS			
TYPE OF RISK	TYPE DETAILS AND RISK DESCRIPTION	MOST IMPACTED INDUSTRIAL AREAS	TIME FRAME
<b>TRANSITION</b> Risks arising from the ongoing transition to a decarbonised economic system (e.g. regulatory, technological, market).	<b>Legislative/Regulatory</b> These risks can manifest in the following ways: increasing carbon tax policies and white certificates; changes in incentive programmes; tightening of the values associated with the Emission Trading Scheme (both in terms of allowances – paid or not – and actual emission allowance costs); regulatory developments that impose the reduction of impacts during conduct of operations.	Energy production (thermoelectric and waste-to-energy) Electricity grid management Water management	short/medium term
	<b>Technology</b> 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).	Energy production (thermoelectric and waste-to-energy) Electricity grid management Water management	medium
	<b>Legal</b> 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).	Electricity grid management Water management	medium/long
	<b>Market</b> Commercial risks are attributable to the failure to adapt the products/services of the Group companies to the new requirements of customers, who are increasingly 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.	All businesses and commercial in particular	medium/long
	<b>Reputational</b> 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).	The Acea Group	short/medium term
<b>PHYSICAL</b> Risks arising from the physical effects of climatic events (acute if related to episodic phenomena, or chronic if related to long-term changes).	<b>Acute</b> 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 overabundance 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.	Electricity grid management Water management Energy production	short/medium/long
	<b>Chronic</b> 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.  The risk of more frequent lightning strikes can cause interruptions to the distribution of electricity and thus economic damage.  Temperature changes can cause variations in the composition of incoming waste 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.	Electricity grid management Water management Energy production	short/medium/long

OPPORTUNITIES			
DRIVERS	TYPE DETAILS AND OPPORTUNITY DESCRIPTION	INDUSTRIAL AREAS AFFECTED	TIME FRAME
Circular economy	Promotion of circular economy models and waste recovery projects, for example with waste-to-energy processes combined with material recovery (for example: sodium and ash recovery).	Environment Segment	medium
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
Increase in network resilience	Investments to improve the resilience of the electricity grid promoted by ARERA.	Distribution of electricity	medium
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

## THE ORGANISATION'S PROCESSES FOR IDENTIFYING AND ASSESSING CLIMATE-RELATED RISKS AND THEIR INTEGRATION INTO OVERALL RISK MANAGEMENT

Acea operates an structured Internal Control and Risk Management System (SCIGR) which consists of a set of tools, organisational structures, people, standards and corporate regulations that, through an adequate process of identification, measurement, management and monitoring **of the main risks**, as well as adequate information flows, aims to facilitate the Group's sound business performance and action consistent with corporate objectives, including **sustainable success**<sup>19</sup>.

*“Given the nature of its business, the Acea Group is exposed to various types of risks, therefore to manage these risks, analyses and monitoring are carried out by each company as part of a structured and coordinated process implemented at a Group level through the integration of two complementary approaches (Enterprise Risk Management and Continuous Risk Management), aimed at assessing and treating the risks of the entire organisation in an integrated logic, consistent with its risk appetite, with the aim of providing management with the information needed to make the most appropriate decisions to achieve strategic and business objectives, to safeguard, grow and create value for the company. This combination is designed to ensure effective control of the entire universe of main risks the Group is potentially exposed to, guaranteeing management of the Group's overall exposure in line with the objectives of the Business Plan and Sustainability.*”

<sup>19</sup> See, for example, the illustration of this in the *Acea Group Sustainability Report 2021*, pages 65-76.



*Group management is responsible for identifying and evaluating risks, on the basis of the guidelines and methodological instruments defined. These activities are done so as to guarantee appropriate responses are suitably defined, to mitigate and monitor risks. The Risk & Compliance function and other second-level control functions for specialised risks provide support throughout the entire risk identification, assessment and management process.*

*The control activities are wholly or partially integrated into the operations, involve all organisational levels and include a set of various operations, like approvals, authorisations, checks, comparisons, review of operational performance, controls of information systems, controls to safeguard company assets, separation of duties, etc.”*

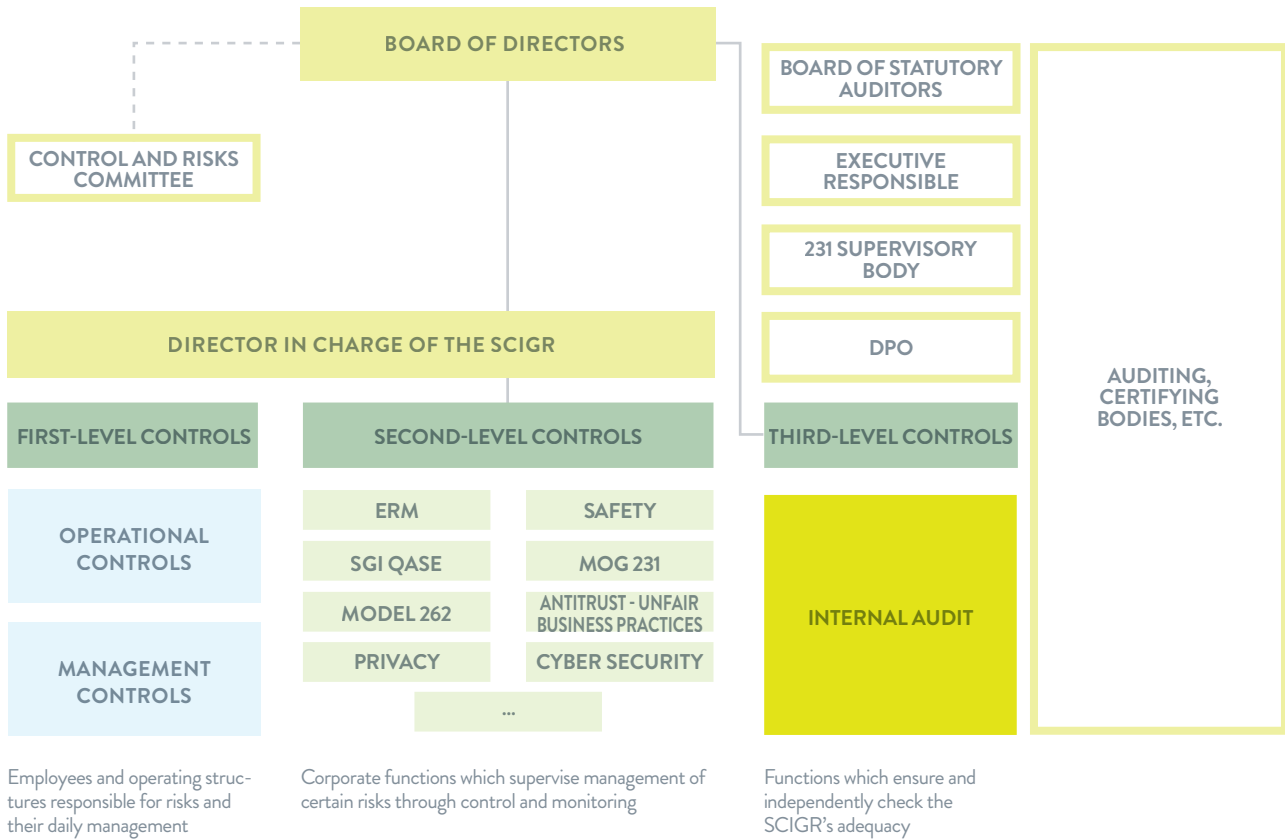
*Report on corporate governance and ownership structure, financial year 2021, pages 52-53.*

The SCIGR Guidelines take into account the recommendations of the *Corporate Governance Code* of Borsa Italiana and are inspired by existing best practices, in particular CoSO – Internal Control – Integrated Framework (Committee of Sponsoring Organisations of the Treadway Commission) and are intended to:

- provide guidance to those involved in the SCIGR, so that the main risks pertaining to the Acea Group, including those regarding sustainability in the medium-long term, are correctly identified and adequately measured, managed and monitored;
- identify principles and responsibilities with regards to governing, managing and monitoring risks linked to company activities;
- propose control activities at all operational levels and identify tasks and responsibilities to ensure coordination between the main figures involved in the SCIGR.

Risk management is a cross-cutting process with responsibilities distributed among all company representatives: the Board of Directors and the Board Committees, the Director in charge of the SCIGR (who is also the Chief Executive Officer), the Board of Statutory Auditors, all the managers and employees, the Financial Reporting Manager, the second level Supervisors, the Supervisory Body, the Data Protection Officer, the Internal Audit Function and the Risk & Compliance Function.

Figure 5 – The architecture of the SCIGR



The *Enterprise Risk Management (ERM)* Framework, based on the CoSO Framework<sup>20</sup>, is aimed at:

- representing the type and significance (probability and economic-financial and/or reputational impact) of the main risks, including sustainability risks, that may jeopardize the achievement of the Group's strategic and business objectives;
- addressing strategies and subsequent additional mitigation actions.

The methodology and tools used to identify risks and assess their severity in a consistent manner at a Group level – *definition of the Risk Model* – further focused the analysis on **ESG aspects** and the risk scenarios associated with the “material topics” identified at Group level<sup>21</sup>. During the **Risk Assessment, carried out annually** at the Group level, the Risk Owners identify risk scenarios related to material issues (among which are currently<sup>22</sup> “Sustainable water cycle management”, “air quality: reducing emissions into the atmosphere and pollution”, “decarbonisation and adaptation to climate change”, “protection of the territory and biodiversity”), highlighting the possible impacts and the typical control activities put in place in order to manage and mitigate them. The results of the ERM process, which is managed and coordinated by a dedicated Unit within the Risk & Compliance Function, are also considered in planning actions to mitigate risks, and seize opportunities by Group Companies equipped with certified Management Systems complying with UNI EN ISO9001/14001/45001/50001 standards. The risk integration process is under continuous review and improvement as part of its annual cycle.

20 *Enterprise Risk Management (ERM) - Integrating with Strategy and Performance*, 2017.

21 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 2021* (NFS pursuant to Italian Legislative Decree 254/2016), available online.

22 The next materiality analysis is scheduled to be conducted by 2022.

The most relevant climate risks for Acea, including business risks related to water stress, drought and carbon pricing, and others related to material topics, are already taken into account in the overall ERM process<sup>23</sup> and, as mentioned, the ERM Unit is involved in the response to the CDP Questionnaire as well as in projects to develop climate scenario analyses.

However, with regard to the assessment of risks and opportunities **arising from climate change**, Acea carried out **an initial project** between 2020 and 2021 that systematically considered **the main international climate scenarios** developed for this purpose by international reference bodies (see Table 2), **identifying the most representative scenarios on which to base its analyses**. Within the project, the most relevant Group companies in several aspects and also in terms of emissions were involved: Acea Ato 2, Acea Produzione, Areti, Acea Ambiente<sup>24</sup>.

**Table 2 – Main international climate scenarios of physical risks and transition risks**

PHYSICAL RISKS SCENARIOS
Scenarios developed by the <b>Intergovernmental Panel on Climate Change (IPCC)</b> :
<ul style="list-style-type: none"> <li>- <b>RCP (Representative Concentration Pathways) 8.5 scenario</b> (high-emission scenario);</li> <li>- <b>RCP 6.0 scenario</b> (high to intermediate emission scenario);</li> <li>- <b>RCP 4.5 scenario</b> (intermediate emission scenario);</li> <li>- <b>RCP 2.6 scenario</b> (low emission scenario)</li> </ul>
TRANSITION RISKS SCENARIOS
Scenarios developed by the <b>International Energy Agency (IEA)</b> :
<ul style="list-style-type: none"> <li>- <b>SDS - Sustainable Development Scenario</b></li> <li>- <b>STEPS - Stated Policies Scenario</b></li> </ul>
Scenarios developed by the <b>Network for Greening the Financial System (NGFS)</b> :
<ul style="list-style-type: none"> <li>- <b>NDCs – Nationally Determined Contributions</b></li> <li>- <b>Below 2 °C scenario</b></li> </ul>

The four **physical risk climate scenarios** developed by the IPCC show how the Earth's climate responds to changes in atmospheric greenhouse gas (GHG) concentrations and are therefore referred to as *Representative Concentration Pathways* (RCP). Most of the tools currently available and used to deal with expected changes, depending on different climate risks, are based on RCPs<sup>25</sup> and, for a company, this type of scenario is the best method for exploring future conditions over different time horizons. **Acea** therefore **used two of the scenarios developed by the IPCC** for its analysis — **RCP 8.5 and RCP 4.5** — and applied them, depending on the type of risk, to several future periods.

23 It should be noted that other types of climate risks are also progressively integrated into the ERM process cycle, which is continuously updated.

24 Areti represents 100% of the DSO (Distribution System Operators) business; Acea Produzione and Acea Ambiente account for 93% of all energy production, excluding the photovoltaic plants acquired in recent years. In terms of water, in 2020 Acea Ato 2 supplied and invoiced water volumes equating to 67% of the total supplied by the fully consolidated companies operating in Italy. The emissions of the listed companies (as at 2020) account for around 79% of the Group's total GHG emissions. To put an economic value on this figure, specifically EBITDA, in 2020 the weight of the companies considered is 73% of the total.

25 The TCFD document in which to verify the details of the RCP scenarios is *The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities report*. [www.fsb-tcf.org/wp-content/uploads/2017/06/Final-TCFD-Technical-Supplement-062917.pdf](http://www.fsb-tcf.org/wp-content/uploads/2017/06/Final-TCFD-Technical-Supplement-062917.pdf).

**Table 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
<b>RCP 8.5</b>	The RCP8.5 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.	1.4-2.6	2.6-4.8
<b>RCP 4.5</b>	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. This scenario defines an increase in global temperature more than 2°C.	0.8-1.8	1.1-2.6

After identifying an initial set of climate risks, based on their relevance to Italy and to specific business sectors (water, energy, electricity distribution, environment), Acea used certain criteria to prioritise them. In particular, **for physical risks**, the following were assessed: the location of assets and their possible vulnerability to certain climate risks, critical climate events that had already occurred in the past and affected the assets, the likelihood that more exacerbated effects from climate change might occur in the future, and the perceived greater relevance of certain physical risks to specific business sectors by process owners. The risks to be analysed were prioritised with respect to both the current climate situation and potential medium and long term climate change, so as to also identify risks that, while they may not have generated impacts to date, could do so in the future.

Acea has thus decided to focus on the following physical risks in this first climate scenario analysis application project:

- **drought and water stress** (mainly for water systems);
- **heavy precipitation and flooding** (mainly for power distribution networks);
- **lightning** (mainly for power generation assets).

In order to explore the **possible increase in the frequency and duration** of the physical risks identified, considering the two RCP climate scenarios chosen, the following were used:

- the Climate Change Knowledge Portal of the World Bank, which enables future changes to be explored at country level<sup>26</sup>;
- the *Aqueduct Water Risk Atlas* portal of the World Resources Institute (WRI), which makes available various indices to assess water availability<sup>27</sup>.

Another type of physical risk, **heat waves**, was analysed without assessing in detail the effects on assets<sup>28</sup>. In this case, projections indicate that by the middle of the century Italy will see at least three additional days, compared to the 1986-2005 reference period, with temperatures above 35°C; for Rome, in particular, within the same period, projections suggest outcomes above the national average: it is likely that the city will see about eight more days of heat waves considering the RCP 8.5 scenario, marking a significant increase.

Acea analysed two **climate scenarios on transition risks**:

- a “*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*<sup>29</sup>;
- a “*below 2°C*” scenario, based on the IEA’s *Sustainable Development Scenario* (SDS) and the resources developed by European institutions and the Italian government, such as the National Energy and Climate Plan.

Considering the potential implications for Acea of the risk categories indicated by TCFD (legal, market, technological, reputational, political-regulatory), the process to prioritise the transition risks to be investigated, considering the two climate scenarios indicated above, considered the exposure of the business sectors in which Acea operates and the likelihood that certain risks may occur at a European or national level in the current context, as well as in the medium and long term.

26 [climateknowledgeportal.worldbank.org/country/italy/climate-data-projections](https://climateknowledgeportal.worldbank.org/country/italy/climate-data-projections).

27 [www.wri.org/applications/aqueduct/water-risk-atlas](https://www.wri.org/applications/aqueduct/water-risk-atlas).

28 It should be noted, however, that the phenomena “heat waves” and “flooding”, as risk factors, are considered by Areti in the regular definition of the resilience plan for interventions on electricity distribution infrastructures.

29 [https://ec.europa.eu/energy/data-analysis/energy-modelling/eu-reference-scenario-2020\\_en](https://ec.europa.eu/energy/data-analysis/energy-modelling/eu-reference-scenario-2020_en).

The different types of transitional risks were analysed qualitatively before a more detailed assessment, also considering the economic aspect, of the transition risk found to have the greatest potential impact on Acea (see *Scenario analyses on transition risks and key risks and opportunities for Acea*). The risk with the greatest potential impact is the “political-regulatory” risk linked to *carbon pricing*; in fact, the risk relates to all of the local, national and supranational policies and regulations in force or that may be implemented in the future to facilitate the transition to a low-carbon economy, and this formed the basis for the in-depth assessment of the scenario analysis over different time horizons, as illustrated below; however, given the timeframe of the survey, it was not possible to consider the effects and uncertainties linked to the current crisis in Europe.

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

## CLIMATE SCENARIO ANALYSES ON PHYSICAL RISKS AND THE MAIN PHYSICAL RISKS FOR ACEA

As noted above, the analyses focused on a number of physical climate risks (drought and water stress; heavy precipitation and flooding; lightning) in relation to specific businesses, assessing their **possible changes in the medium to long term**, in terms of their impact on relevant assets, and **quantifying their economic impacts**. Finally, a **risk impact matrix** was developed for each risk examined, associating the probability of occurrence with the potential economic-financial impact. The climate indicators used are summarised in Table 4 and the specific analyses for each risk considered are illustrated below.

**Table 4 – Climate indicators used in physical risk assessment**

Risk	Indicator	Company
Increased water scarcity and more frequent, longer and intense droughts	Water stress  SPEI: Standardized Precipitation Evapotranspiration Index	Acea Ato 2
More frequent and heavy precipitation events	RX5day: measures changes in the maximum cumulative precipitation value over 5 days with a return period of 25 years	Areti
Increased frequency and magnitude of flooding	Changes in flood events with a return period of 50 and 100 years	Areti
Increased number of thunderstorms and increased risk of lightning strikes	No. of days of thunderstorms/year	Acea Ambiente Acea Produzione

### DROUGHT AND WATER STRESS

The *Aqueduct Water Risk Atlas* tool<sup>30</sup> was used to assess the water risks of about 1,300 assets of the companies involved in the project, mainly **Acea Ato 2** (more than 1,100 assets, including 243 drinking water system plants). 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.

30 [www.wri.org/applications/aqueduct/water-risk-atlas](http://www.wri.org/applications/aqueduct/water-risk-atlas).

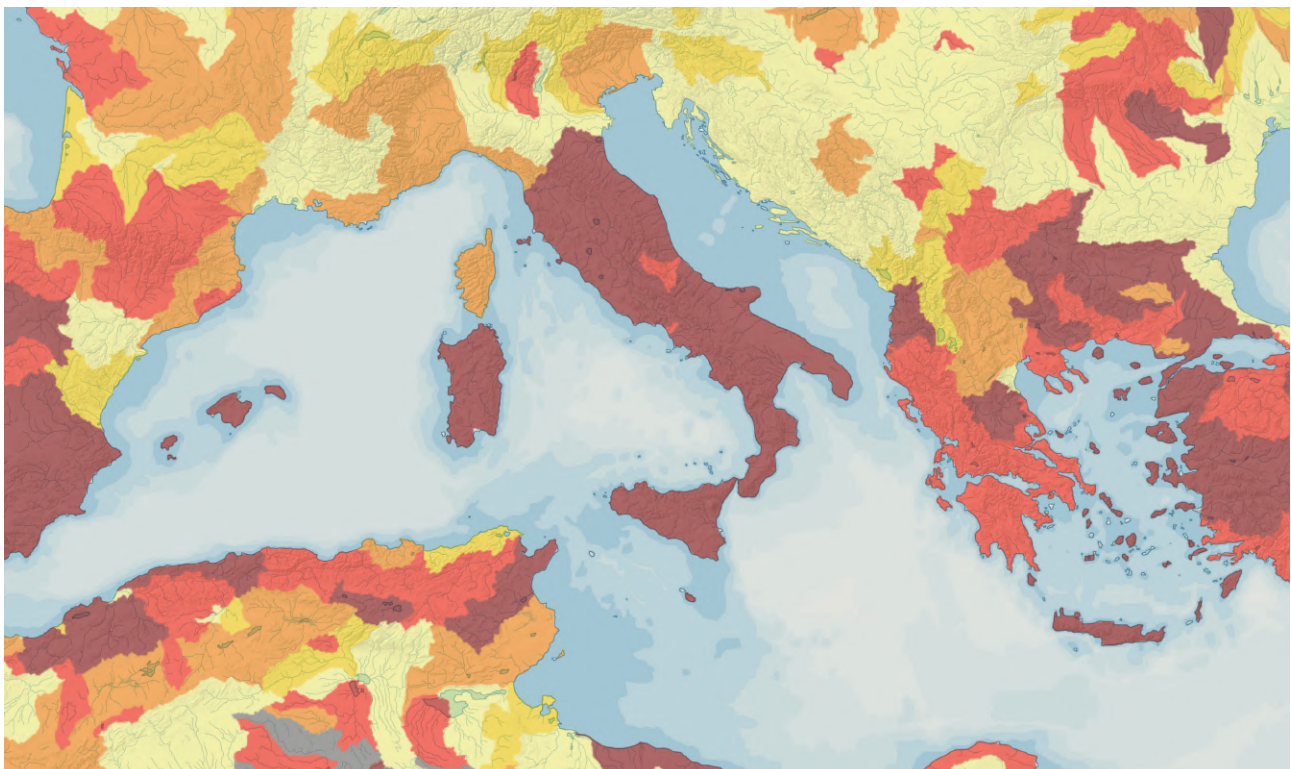


With regard to drought, the Standardized Precipitation Evapotranspiration Index (SPEI) was considered, with projections for the medium term and beyond 2040. *Aqueduct* was used to assess water stress by analysing projections for various scenarios - the *business-as-usual* (BAU), an “optimistic” scenario and a “pessimistic” scenario -, for two future periods (2030 and 2040), evaluating four indicators: **water stress**, **seasonal variability**<sup>31</sup>, **surface water supply**<sup>32</sup> and **water demand**.

The results of the analysis show 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.

The risk of water stress, already very high, is increasing with a ratio of between 1.0 and 1.6 (future value/historical value) for all scenarios and periods examined.

**Figure 6 – The current physical water stress risk in Italy**



**Water Stress**



■ Arid and low water use

Source: *Aqueduct - Water Risk Atlas*, 2021

Considering both climate scenarios by 2040, the most severe drought events can be expected to occur more frequently in central and southern Italy. While in the current climate, according to the available literature, extreme drought events occur once every ten years, in the future such events could occur every six years. Changes in the frequency of drought and water stress could cause more frequent interruptions in water supply.

To construct the impact matrix in relation to the physical climatic risk considered, five levels were set: the x-axis shows the **economic impact classes**, defined on the basis of emergency levels, which take into

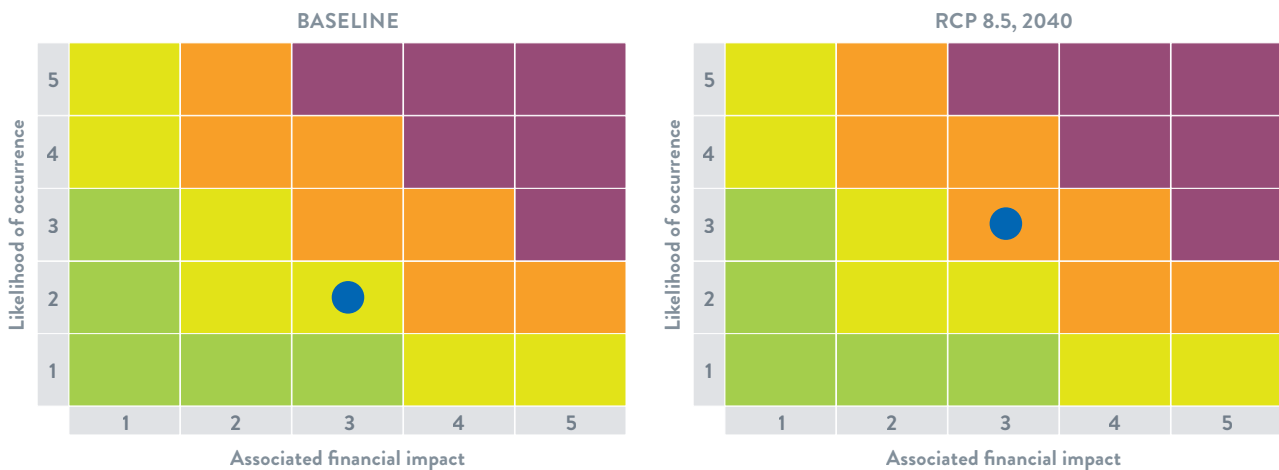
31 Seasonal variability measures the average annual variability of available water supply, including surface and groundwater supplies. Higher values indicate larger variations in available supply over the year.

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

account the number of residents affected by the water crisis and the duration of the drought event, while the y-axis shows the **probability of occurrence of the extreme climatic event**.

The following matrices are useful for assessing the financial impact: they show the changes in the probability of occurrence of the average drought event and the associated impact under baseline (current) conditions and under the RCP 8.5 scenario to 2040.

**Figure 7 – Impact matrices for “moderate drought event”: baseline and at 2040 - Acea Ato 2**



The drought event that occurred in Italy, and Rome in particular, in 2020 was classified with a level 2 probability of occurrence (low, i.e. ≤10%) and a level 3 economic impact on the scale drawn up by Acea Ato 2.

The effects of climate change, for both scenarios, suggest an increase in the annual probability of occurrence of this type of event. For RCP scenario 8.5, shown in the matrix, the probability of occurrence would increase from level 2 to 3 by 2040, increasing the risk exposure. The results are also similar in the RCP 4.5 scenario.

As regards the actions taken to **mitigate the risk**, based on the experience gained following the impacts caused by the prolonged drought event that occurred in 2017, Acea Ato 2 has deployed various structural and management strategies aimed at reducing exposure to this type of risk. The 2020 event is evidence of this: while occurring at a comparable intensity to 2017, this drought resulted in lower economic costs and had a “moderate” impact. The measures undertaken by Acea Ato 2 aimed at risk mitigation include the optimisation of water resource monitoring, the launch of a major campaign to reduce water losses through the digitalisation and district division of networks, active pressure management and the reconditioning of pipelines, and the strengthening of the resilience of the drinking water system<sup>33</sup>. To implement this action plan, Acea Ato 2 incurred an investment cost of approximately €218 million in the 2019-2021 three-year period.

In addition, the Company 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 50-year time horizon - in order to develop long-term forecasts of water availability from supply sources and water resource protection strategies.

33 For these and further initiatives, please refer to the Acea Ato 2 Sustainability Report.

## HEAVY PRECIPITATION AND FLOODING

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<sup>34</sup> 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 2021-2023 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.

In order to cope with **heat waves and prolonged periods of drought**, various types of intervention are contained in the resilience plan, 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. To **mitigate the risk factor of flooding** resulting from heavy rainfall, the same plan provides for prompt interventions, e.g., concerning substations vulnerable to flooding, for which two types of intervention are identified: the relocation of underground secondary substations or the reconstruction of substations with specific new design criteria to counteract flooding.

As part of the first application of the international climate scenarios, in line with the TCFD recommendations, the assessment of **expected changes in heavy precipitation** events was explored in depth, using a number of predictive climate indicators (see Table 4), aimed at understanding the likelihood that the intensity of heavy precipitation events, with a return period of 25 years, might change (technically, by assessing the maximum amount of precipitation accumulated over five consecutive days).

The results of the analysis indicate an increase in heavy precipitation events for both the RCP 4.5 and RCP 8.5 scenarios and for the time horizons analysed (by 2039 and 2040-2071). For example, in Rome, a rainfall event with a return period of 25 years, lasting 24 hours, could result in a **relatively small** increase of 2 mm for the RCP 4.5 scenario and 4 mm for the RCP 8.5 scenario **by 2039**, and up to 10 mm more rainfall than the historical baseline for both scenarios after 2040. In order to assess the possible change in the risk of **river flooding** with potential impacts on infrastructure **based on the RCP scenarios**, we relied on data from extensive scientific literature, processed using specific tools.

As noted above, the results of the analysis for the RCP 4.5 and RCP 8.5 international scenarios showed a tendency for an increase in the intensity of heavy precipitation in central Italy, but with a **reduction in the cumulative amount** of rainfall. These findings have already been partially confirmed by the **progressive infrequency and eventual attenuation of extreme flood events** in the Rome region in the period from 1871 to 2005; moreover, it has been shown that the **mitigation actions implemented** in the area examined, such as the banks of the River Tiber and the construction of the Corbara Dam, **have reduced the effects** (severity and frequency) **of floods**. Several other interventions planned by the authorities, such as the construction of small dams along one of the main tributaries of the Tiber, the River Paglia, or the some 40 interventions foreseen by the national plan for hydro-geological risk mitigation in the area of the province of Rome, will help to further limit the effects of climate change. In addition, Areti has an Emergency Plan to guarantee the continuity of the network in extreme weather conditions and is one of the entities appointed under the Civil Protection Plan of Roma Capitale to coordinate to manage the hydrological risk, which, among others things, also covers river flooding in the municipal area<sup>35</sup>.

The results of the analyses suggested **low future flood risk** with a return time of approximately one hundred years (based on historical data) **and low associated financial risk**.

34 Areti's resilience plan: [www.aret.it/content/dam/acea-aret/documenti/area-istituzionale/attivita/aret/allegato1\\_piano\\_svilupo.pdf](http://www.aret.it/content/dam/acea-aret/documenti/area-istituzionale/attivita/aret/allegato1_piano_svilupo.pdf).

35 [www.comune.roma.it/web-resources/cms/documents/Fasc2\\_Rischiodraulico\\_2021.pdf](http://www.comune.roma.it/web-resources/cms/documents/Fasc2_Rischiodraulico_2021.pdf)

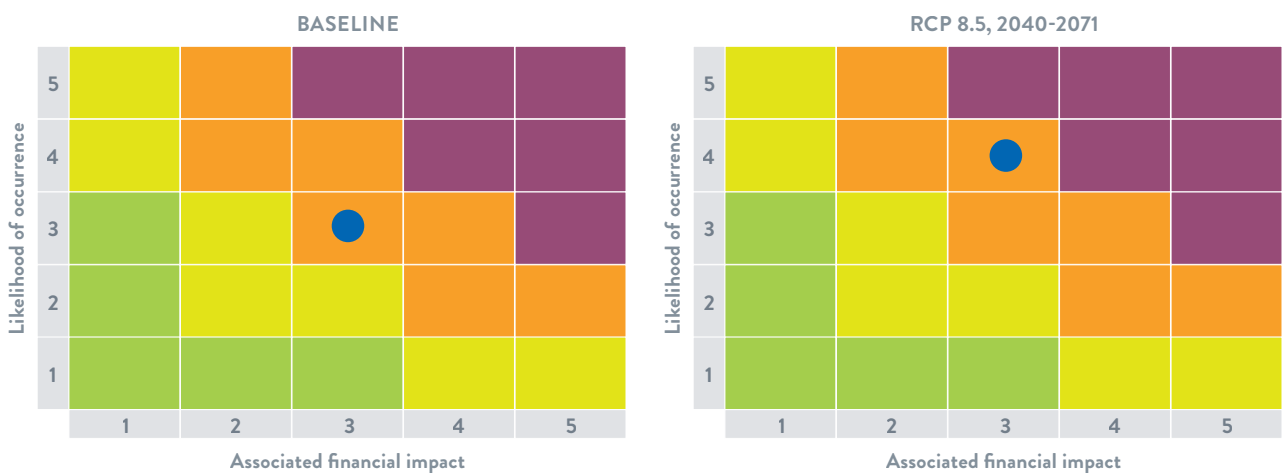
**LIGHTNING**

In order to assess the possible intensification of lightning risk due to climate change and the possible impacts, including financial, on Acea Ambiente and Acea Produzione's assets, which were considered to be most exposed, an analysis was conducted considering the number of days with a risk of thunder over Italy for two time horizons (2040-2071 and 2071-2100) considering RCP 4.5 and RCP 8.5 scenarios. The scientific literature consulted points to an increase in the occurrence of thunderstorms and lightning throughout Europe, including central and southern Italy. 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 analysis of both climate scenarios shows the increase in the number of days with the possible occurrence of this type of event: in particular, with the **RCP 4.5 scenario** the increase in the number of events with a moderate impact is insignificant in the medium term and more pronounced in the long term, while with the **RCP 8.5 scenario** the expected changes are more evident and significant, with the forecast of 10-20 additional days per year compared to the current situation up to 2040 and for the long term (2071-2100). **Risk mitigation** measures include investments to increase the continuity and reliability of power lines, plant monitoring and maintenance, and various forms of insurance (e.g. against damage or 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 following matrices show the changes in the **probability of occurrence** of moderate lightning events (classified as level 3) and **the associated impact** 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 matrix<sup>36</sup>, 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 8 – Impact matrices for “moderate lightning event”: baseline and at 2040-2071 - Acea Ambiente and Acea Produzione**



<sup>36</sup> The impact may increase, however, with the expected increase in the number of photovoltaic plants, and further assessments will be necessary in the future.

## SCENARIO ANALYSES ON TRANSITION RISKS AND KEY RISKS AND OPPORTUNITIES FOR ACEA

Possible policy, technology and market developments aimed at counteracting climate change may have different impacts on Acea's business. In order to understand these impacts, an analysis of the main transition risks and opportunities was carried out, and the risk considered to have the greatest potential impact was also analysed from an economic perspective.

Two climate scenarios - "business-as-usual" (BAU) and "below 2°C" - were constructed (see also "The organisation's processes for identifying and assessing climate-related risks and their integration into overall risk management"), combining hypotheses from different sources. The first takes into account the level of climate ambition of existing policies, which is not sufficient to limit the temperature in line with the goals of the Paris Agreement; the second assumes a higher level of climate ambition and major policy, technological and market developments to support the transition to a low-carbon economy in line with the goals of the Paris Agreement.

Four types of sources were consulted to extract the key assumptions needed to construct the scenarios:

1. the assumptions derived from the latest energy scenarios developed by the International Energy Agency (IEA): the *Stated Policies Scenario* (STEPS) and the *Sustainable Development Scenario* (SDS);
2. recent scenarios used at European level to assess what policy changes are needed to support the Green Deal and the upcoming adjustments to the 2030 targets, such as the EU 2020 Reference Scenario<sup>37</sup>;
3. the projections for future developments on which the National Integrated Energy and Climate Plan (NIPEC) is based<sup>38</sup>;
4. scenarios and policies specific to the water business.

For the time horizons under assessment, a medium-term period (2025-2030) has been identified, for which the EU has announced important policies and plans, including adjustments to the 2030 targets, with immediate implications for Acea, along with a long-term period (2030-2050), aimed at understanding the developments needed to achieve the EU's CO<sub>2</sub> neutrality target for 2050.

The main transition risk/opportunity categories related to climate change, their evolution and, in some cases, the implications for Acea are summarised below.

With regard to **legal risk**, for example, the growing scientific evidence on the cause-and-effect relationship between human activities<sup>39</sup> 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"<sup>40</sup>. 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. The COVID-19 pandemic had and continues to have energy implications (prolonged periods of business shutdowns; increased household consumption, etc.). In both 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 NIPEC, investments in photovoltaic systems amount to € 27.5 billion, in addition to existing planned investments<sup>41</sup>. These trends may imply new opportunities for Acea, both in the renewable energy sector and in the evolution of electricity distribution infrastructures.

37 [https://ec.europa.eu/energy/data-analysis/energy-modelling/eu-reference-scenario-2020\\_en](https://ec.europa.eu/energy/data-analysis/energy-modelling/eu-reference-scenario-2020_en).

38 [www.mise.gov.it/index.php/it/per-i-media/2040668-pniec2030](http://www.mise.gov.it/index.php/it/per-i-media/2040668-pniec2030).

39 See IPCC Special Report: Global Warming of 1.5°C, available online: [www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15\\_SPM\\_version\\_report\\_LR.pdf](http://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf).

40 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 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, <https://academic.oup.com/ojls/article/38/4/841/5140101>.

41 PNIEC (Integrated National Energy and Climate Plan), 2019: [https://ec.europa.eu/energy/sites/default/files/documents/it\\_final\\_necp\\_main\\_en.pdf](https://ec.europa.eu/energy/sites/default/files/documents/it_final_necp_main_en.pdf), p.321.



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.

As an electricity producer and distributor, Acea could benefit from the role that key technologies, such as *grid-scale* batteries, will play in the future to enhance resilience. According to projections, the cost of these batteries could fall between 42% and 58% by 2040 compared to the cost in 2019, in a below 2°C global warming scenario<sup>42</sup>. 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.

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 PNIEC, the growth potential of district heating and high-efficiency co-generation 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 political-regulatory) 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 **political-regulatory 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* (WFD<sup>43</sup>) addresses the issue in a comprehensive and integrated manner<sup>44</sup>.

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.

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 operators<sup>45</sup>. 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.

42 World Energy Outlook 2020, IEA, p. 82.

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

44 The WFD came into force in 2000 with objective to achieve good status for all surface water and groundwater bodies in the EU by 2027. The most important 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).

45 See Corrado Lo Storto, Efficiency, Conflicting Goals and Trade-Offs: A Non-parametric 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](http://www.mdpi.com/2071-1050/10/4/919/htm).

According to the European Commission's 2019 report on River Basin Management Plans in Italy<sup>46</sup>, there is a trend towards the adoption of water efficiency measures and upward water pricing policies. 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 **political-regulatory** 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 actions may evolve depending on the climate scenarios considered; for example, Table 5 lists possible policies with a **below 2°C global warming scenario** that could have implications for Acea in terms of risks (potential increases in operating costs and investments) and opportunities (access to new market developments).

**Table 5 – Policies in a below 2°C global warming scenario**

#### POLICIES ALIGNED WITH A <2°C GLOBAL WARMING SCENARIO

Full implementation of the Nationally Determined Contributions, for the alignment to the European Green Deal and the Climate and Energy Framework 2030 of the European Union, which brings to 55% the Goal of reducing greenhouse gas emissions compared to 1990 levels.

Long-term strategy for climate neutrality by 2050.

A hydrogen strategy for a climate-neutral Europe.

Objective of the EU Directive on the energy performance of buildings to achieve a highly energy efficient and decarbonised real estate by 2050.

In particular, as mentioned, exposure to **carbon pricing** schemes was considered in this analysis as a particularly relevant risk for Acea, as an increase in CO<sub>2</sub> emissions, combined with a further reduction in free emission allowances, would increase the operating costs of two thermoelectric power generation plants (Tor di Valle and Montemartini) subject to the European Emission Trading System (EU ETS)<sup>47</sup>. Furthermore, in order to support the achievement of the 2030 and 2050 emission reduction targets set by the EU, a new carbon pricing scheme at national level may be introduced in the future.

In order to assess the expected changes, the *business-as-usual* (BAU) and *below 2°C* scenarios were considered, particularly for the short (2025), medium (2030) and long term (2040), taking several variables into account. The matrix illustrates the result to 2030.

In a **below 2°C global warming scenario**, the price of carbon emissions<sup>48</sup> was assumed to be \$120 by 2030 and \$170 by 2040, while in the **BAU scenario**, it was assumed to be \$61 per tonne by 2030 and \$75 per tonne by 2040.

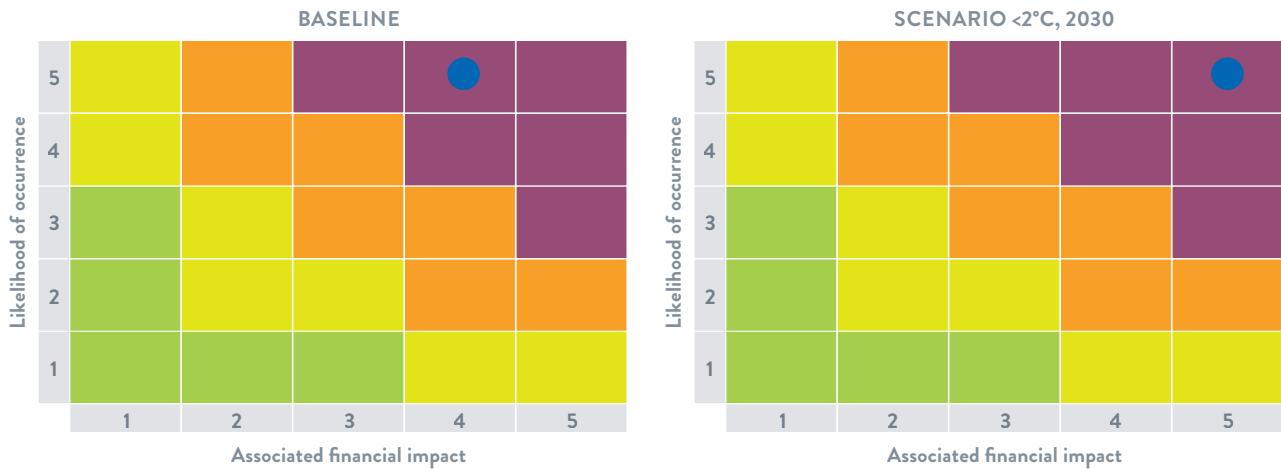
<sup>46</sup> <https://ec.europa.eu/environment/water/water-framework/pdf/Translations%20RBMPs/Italy.pdf>.

<sup>47</sup> Please note that at the time the analysis was carried out, the Terni waste-to-energy plant, managed by Acea Ambiente, was also subject to the Emissions Trading System. However, as a result of Resolution 66/2022 of the National Committee for the Management of Directive 2003/87/EC and for the Support for Project Management of the Kyoto Protocol (Ministry of Ecological Transition), which was adopted in March 2022, the plant was excluded from the ETS scheme from 31.12.2020. Consequently, the waste-to-energy plant was no longer taken into account in the above analysis. However, in the medium term, the circumstances of exclusion could change. Furthermore, Acea Ambiente has already undertaken risk mitigation actions, through the diversification of activities and a shift towards less carbon-intensive activities, for example through the operation of biogas plants. Two new biogas plants - in Aprilia and Monterotondo - entered into operation in 2019.

<sup>48</sup> For the carbon pricing analysis, reference was made to data from the WEO 2021 report of the International Energy Agency.

Based on this analysis, the cost that Acea Produzione, the company operating the two plants, would have to pay in 2040, considering the below 2°C scenario, could be six times higher than in 2021<sup>49</sup>. However, these values should be interpreted with caution: new technologies are expected to be available by 2040 that will contribute to a significant reduction in emissions and, therefore, in the expected costs.

**Figure 9 – Impact matrices - carbon price: baseline and at 2030 - Acea Produzione**



By 2030 the probability of the risk occurring, as well as the level of impact, were estimated to be very high<sup>50</sup> under the below 2°C scenario, with the same outcome at 2040.

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.

49 The cost incurred by Acea Produzione for the purchase of CO<sub>2</sub> allowances in 2020, given a cost of \$25 per tonne of CO<sub>2</sub> emitted in the year, was about €1 million.

50 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.



ACEA IS COMMITTED TO  
REDUCING THE EMISSIONS  
PRODUCED BY ITS ACTIVITIES  
AND BY THE COMMUNITIES IN  
WHICH IT OPERATES THROUGH  
THE PROVISION OF GREENER  
SERVICES



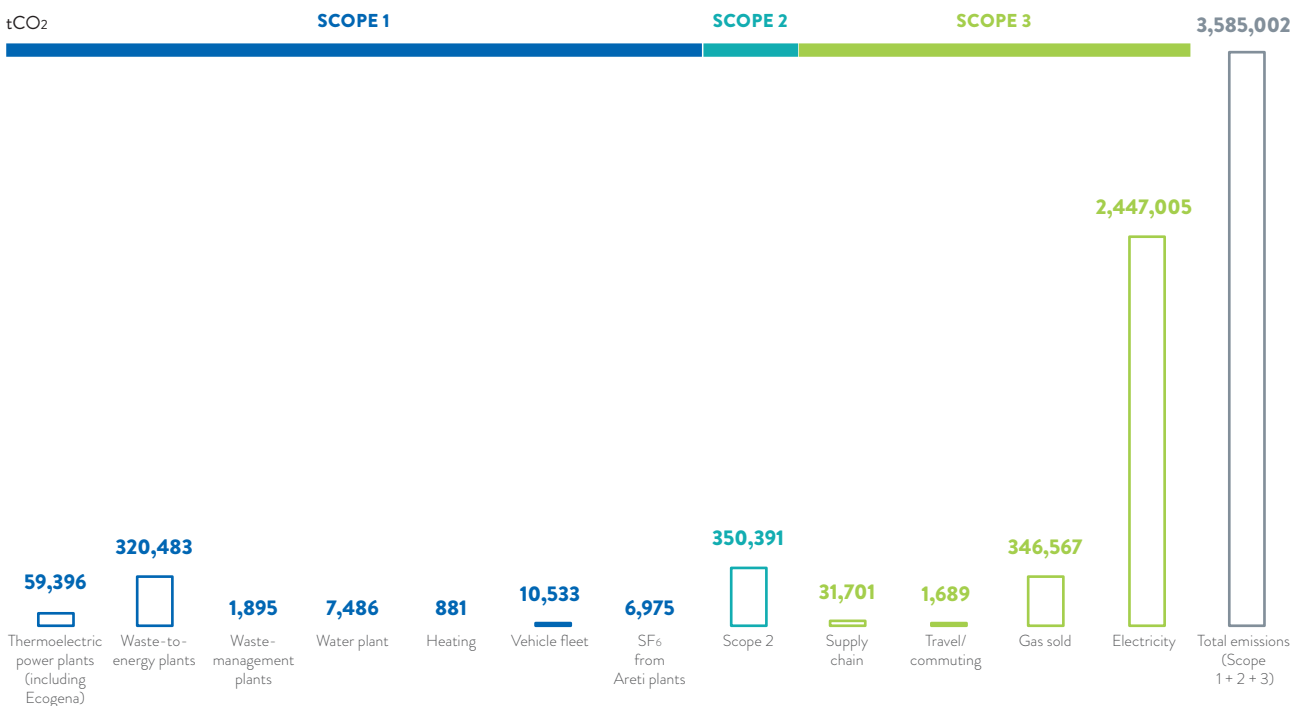
# PERFORMANCE, METRICS AND TARGETS

## THE EMISSIONS OF THE ACEA GROUP

Acea quantifies its greenhouse gas emissions (Scope 1, Scope 2 and Scope 3)<sup>51</sup>, monitoring and assessing the carbon footprint of individual operational macro-processes and identifying mitigation actions and other initiatives to reduce its carbon emissions.

In 2021, the Acea Group recorded emissions totalling 3.6 million tCO<sub>2</sub>, broken down into about 408 ktCO<sub>2</sub> of Scope 1 emissions, 350 ktCO<sub>2</sub> of Scope 2 emissions<sup>52</sup> and 2.8 million tCO<sub>2</sub> of Scope 3 emissions (see figure 10).

**Figure 10 – Scope 1, Scope 2 and Scope 3 CO<sub>2</sub> emissions (2021)**



**Direct Scope 1 emissions** mainly derive from the Group's two waste-to-energy plants and thermoelectric power stations but also include other components deriving from certain processes of plants in the Environment Segment (composting, treatment and disposal of liquid waste), sludge drying at treatment plants, company vehicles, leaks of sulphur hexafluoride (SF<sub>6</sub>) that may arise at Areti plants, and combustion processes for heating premises and offices.

**Scope 2 emissions** relate to electricity consumption and losses on the electricity distribution network.

**Scope 3 emissions** derive from the sale of gas, the sale of electricity, the consumption of electricity by suppliers from whom we purchase goods, services and works, and employee commutes and work travel.

<sup>51</sup> See also *Sustainability Report - Acea Group 2021/NFS 2021* available online, in which data on emissions, mitigation actions, consumption etc. are made public every year. The emissions recorded are attributable to the companies considered in the reporting boundary of the NFS, which, for 2021, account for about 95% of the total emissions of all of the Group's companies consolidated on a line-by-line basis.

<sup>52</sup> Below are the emissions calculated using the location-based method.



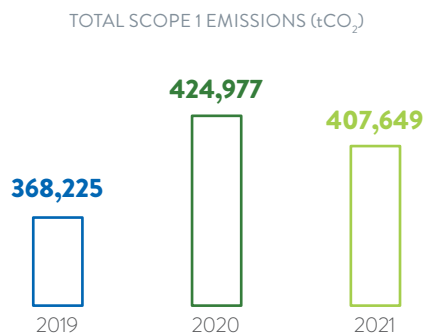
**Table 6 – CO<sub>2</sub> emissions, greenhouse gas intensity indices (2019-2021)**

<b>CO<sub>2</sub> EMISSIONS</b>				
<b>SCOPE 1 EMISSIONS</b>				
<b>FROM ENERGY PRODUCTION PLANTS</b>				
	<b>u. m.</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
CO <sub>2</sub> emissions from Acea Produzione thermoelectric power stations	t	48,506	45,773	51,567
CO <sub>2</sub> emissions from the Ecogena plants	t	10,925	9,607	7,829
CO <sub>2</sub> emissions from Acea Ambiente waste-to-energy plants	t	280,504	341,763	320,483
<b>FROM WASTE MANAGEMENT, ENERGY DISTRIBUTION, HEATING PLANTS AND VEHICLE FLEET</b>				
CO <sub>2</sub> emissions from waste-management plants	t	1,507	1,582	1,895
CO <sub>2</sub> emissions from water-plant processes of the IWS	t	6,893	6,979	7,486
CO <sub>2</sub> emissions from heating	t	940	872	881
CO <sub>2</sub> emissions from vehicle fleet	t	9,550	9,705	10,533
CO <sub>2</sub> emissions from Areti plants (from SF <sub>6</sub> )	t	9,400	8,695	6,975
CO <sub>2</sub> emissions from refrigerants (HFCs)	t	0	1	0
<b>TOTAL SCOPE 1 EMISSIONS</b>	<b>t</b>	<b>368,225</b>	<b>424,977</b>	<b>407,649</b>
<b>SCOPE 2 EMISSIONS</b>				
Location-based Scope 2 emissions (market based)	t	<b>394,798</b> <b>(273,937)</b>	<b>380,010</b> <b>(278,452)</b>	<b>350,391</b> <b>(262,649)</b>
<i>of which CO<sub>2</sub> emissions from network leaks</i>	t	118,824	100,489	95,414
<b>SUM OF SCOPE 1 + SCOPE 2 LOCATION BASED</b>	<b>t</b>	<b>763,023</b>	<b>804,987</b>	<b>758,040</b>
<b>SUM OF SCOPE 1 + SCOPE 2 MARKET BASED</b>	<b>t</b>	<b>642,162</b>	<b>703,429</b>	<b>670,298</b>
<b>SCOPE 3 EMISSIONS</b>				
CO <sub>2</sub> emissions deriving from the purchase of goods/services and works	t	22,303	11,642	31,701
CO <sub>2</sub> emissions from commuting	t	7,060	1,937	1,651
CO <sub>2</sub> emissions from business travel	t	288	46	38
CO <sub>2</sub> emissions from volumes of gas sold	t	214,043	276,284	346,567
CO <sub>2</sub> emissions from the sale of electricity, location based (market based)	t	2,168,154 (2,382,384)	2,200,491 (2,382,384)	2,447,005 (2,507,585)
<b>SUM OF SCOPE 1 + SCOPE 2 + SCOPE 3 LOCATION BASED</b>	<b>t</b>	<b>3,174,871</b>	<b>3,295,387</b>	<b>3,585,002</b>
<b>SUM OF SCOPE 1 + SCOPE 2 + SCOPE 3 MARKET BASED</b>	<b>t</b>	<b>3,268,240</b>	<b>3,375,722</b>	<b>3,557,840</b>
<b>INTENSITY INDICES FOR GREENHOUSE-GAS EMISSIONS</b>				
<b>Intensity indices of the GHG emissions</b>				
CO <sub>2</sub> emissions (Scope 1 + Scope 2)/Acea Group added value	t/k€	626.2	594.3	519.8
Scope 1 CO <sub>2</sub> emissions/gross production	g/kWh	357.8	423.0	368.8
Scope 2 CO <sub>2</sub> emissions deriving from losses on the electrical energy distribution network/issued GWh	t/MWh	0.0112	0.0104	0.0097
Scope 3 CO <sub>2</sub> emissions from the sale of electricity	t/MWh	0.396	0.364	0.323

## DIRECT (SCOPE 1) EMISSIONS AND PERFORMANCE INDICATORS

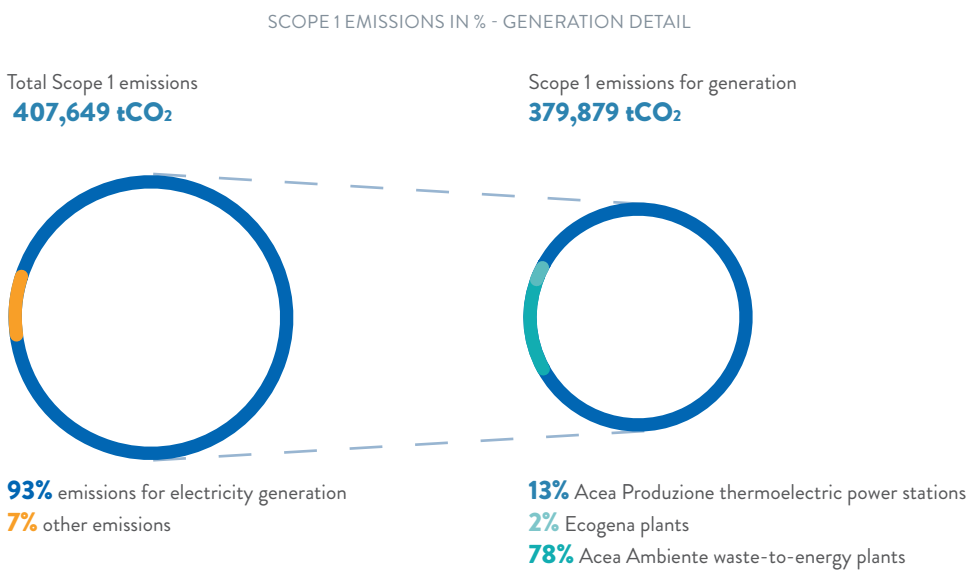
Over the last three years, total Scope 1 emissions increased in 2020 compared to 2019, and then decreased in 2021 compared to 2020. The increase was mainly due to the different composition of waste entering the two waste-to-energy plants (at San Vittore del Lazio and Terni), while the decrease in the biodegradable amount is partly attributable to the extensive closure of restaurants and canteens during the pandemic. By 2021, the slight increase in the biodegradable amount delivered to the two plants resulted in a 4% reduction in emissions, compared to 2020 data.

**Figure 11 – Scope 1 CO<sub>2</sub> emissions (2019-2021)**



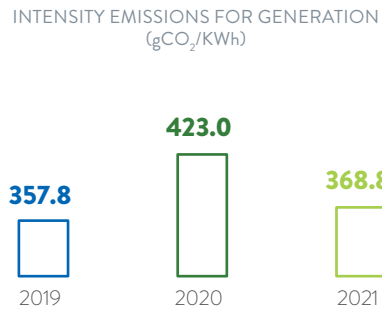
The total of 407,649 tCO<sub>2</sub> of Scope 1 emissions, measured in 2021, is more than 90% attributable to power generation, specifically electricity.

**Figure 12 – Focus on Scope 1 emissions and generation detail (2021)**



Looking at the trend of the Scope 1 emissions index **on the energy produced**<sup>53</sup> by Acea Produzione and Acea Ambiente's production plants, an increase between 2019 and 2020 and a reduction in 2021 can be seen, in line with total emissions, due to a decrease in CO<sub>2</sub> from waste-to-energy plants and an increase in energy production, mainly at the Terni plant.

**Figure 13 – Emission intensity index for generation (2019-2021)**



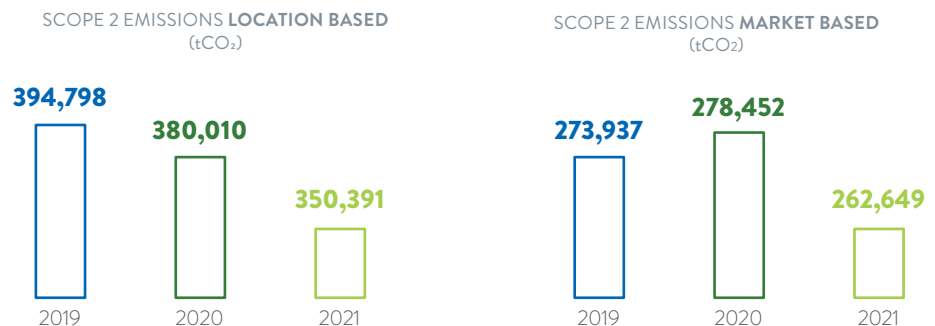
## INDIRECT (SCOPE 2) EMISSIONS AND PERFORMANCE INDICATORS

Indirect (scope 2) CO<sub>2</sub> emissions are determined according to two approaches:

- **location-based**, obtained by multiplying electricity consumption (including grid losses) by the average emission factor of the national electricity grid<sup>54</sup>;
- **market based**, which attributes a zero GHG emission factor for energy consumption from certified renewable sources (with Guarantee of Origin - G.O.) and a residual emission factor<sup>55</sup>, which, for the remaining portion of the electricity supplied, excludes the renewable part from the average value of the national electricity grid. This methodology highlights the efforts to reduce Scope 2 emission achieved through the purchase of certified renewable energy.

In 2021, Acea recorded an 8% decrease in Scope 2 location-based CO<sub>2</sub> emissions and 6% of Scope 2 market-based emissions, mainly due to a reduction in network losses on the distribution network.

**Figure 14 – Scope 2 CO<sub>2</sub> emissions - location and market based (2019-2021)**



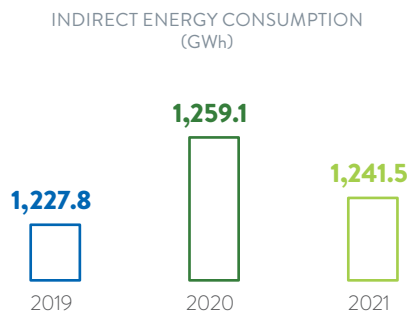
53 The calculation considers the total energy produced and emissions from power plants.

54 The factor is updated annually by Terna, the Italian Transmission System Operator (TSO) and published in the document "International Comparisons" available at [www.terna.it/](http://www.terna.it/).

55 The factor is updated annually by the AIB Association of Issuing Bodies and published in the document "European Residual Mixes" available at [www.aib-net.org/](http://www.aib-net.org/).

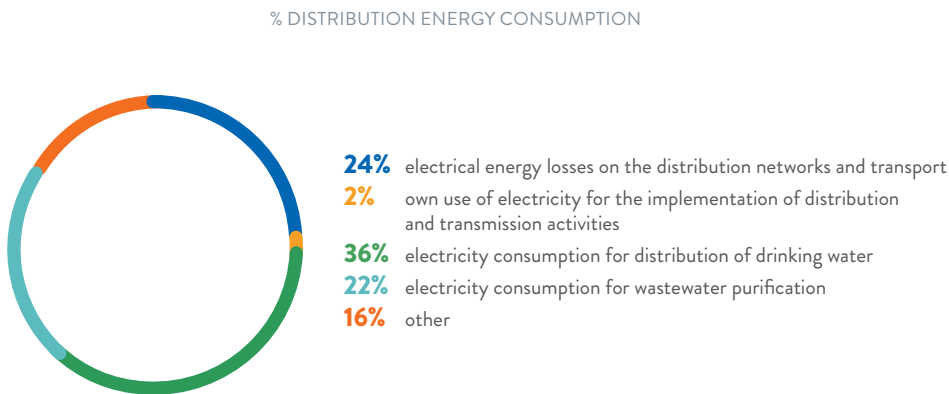
Although some areas may experience increases in consumption, which may also be influenced by contingent factors - such as, in the purification sector, new plants entering into operation or variations in rainfall that may lead to higher or lower energy consumption by lifting plants - in general, indirect energy consumption (electricity consumption) in the last three years has varied very little, in the order of 20-30 GWh.

**Figure 15 – Indirect electricity consumption (2019-2021)**



In particular, in 2021, 58% of indirect electricity consumption was attributable to the water sector (drinking water distribution and wastewater purification), 26% to Areti's activities (electricity losses on distribution and transport networks and own use) and 16% to other types of consumption (attributable to waste management plants, offices, public lighting, etc.).

**Figure 16 – Distribution of indirect electricity consumption (2021)**

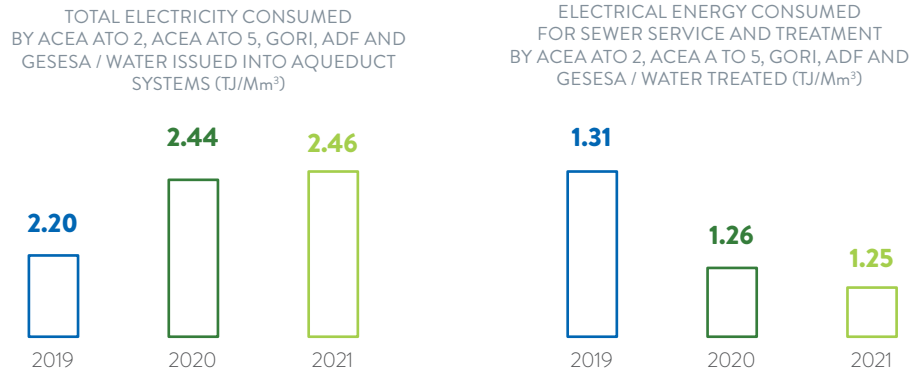


The electricity consumed by the main companies, for potable and non-potable water distribution, purification, waste management, work premises, etc., **comes from G.O. certified renewable sources** for a total of about 420 GWh, representing 57% of consumption for operational processes in 2021 (731.8 GWh).

Various types of **performance indicators** are monitored, mainly concerning electricity consumption related to the operation of the water and sewage treatment plants and the transmission of electricity. For example, for the water sector<sup>56</sup> over the last three years, the KPI for drinking water distribution (total electricity consumed/water entered into the aqueduct systems, calculated as consumption in TJ on Mm<sup>3</sup>) has risen slightly, while the KPI for the purification sector (electricity consumed for sewerage and purification/treated water, calculated as consumption in TJ on Mm<sup>3</sup>) has fallen slightly.

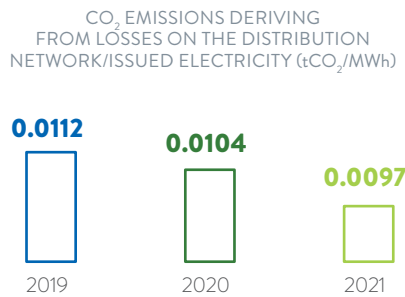
56 Companies in the NFS reporting boundary (Acea Ato 2, Acea Ato 5, GORI, Acquedotto del Fiora and Gesesa).

**Figure 17 – Indirect electricity consumption: KPI water sector**



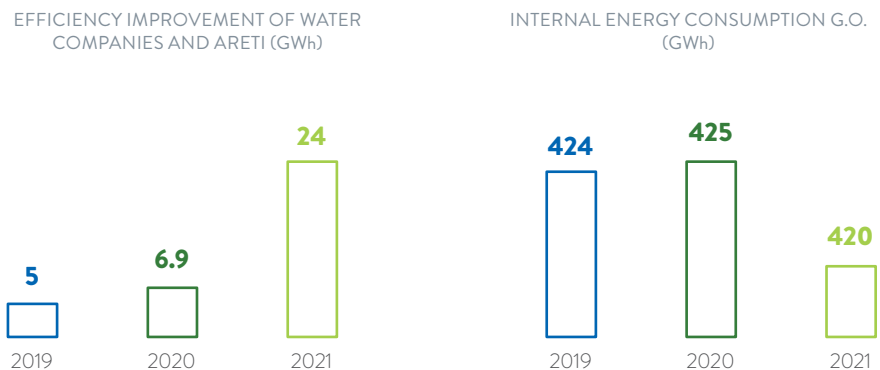
For the electricity distribution sector, the KPI considered (CO<sub>2</sub> emissions from losses on the distribution network/electricity input, calculated as tonnes of CO<sub>2</sub> per MWh) shows a downward trend over the last three years. In 2021, in particular, the performance indicator fell by 6% compared to the previous year, due to both the reduction of the CO<sub>2</sub> conversion factor (updated annually by Terna) and the grid efficiency measures implemented by Areti.

**Figure 18 – Indirect electricity consumption: KPI distribution of energy**



Every year, the electricity distribution company and the water companies implement energy efficiency measures. In 2021, in particular, efficiency gains will amount to a total of approximately 24 GWh of savings/year, or about 7,500 tCO<sub>2</sub> avoided. In addition, in 2021, as already mentioned, about 420 GWh of electricity consumption of Group companies will come from G.O. certified renewable energy for a total of 132,360 tCO<sub>2</sub> avoided.

**Figure 19 – Efficiency (Areti and water sector) and internal energy consumption of G.O. certified energy (2019-2021)**



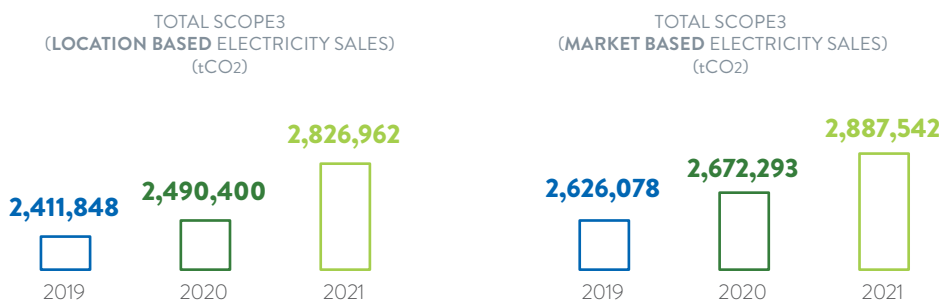


## INDIRECT (SCOPE 3) EMISSIONS AND PERFORMANCE INDICATORS

The Scope 3 emission categories monitored by Acea concern emissions from the purchase of goods, services and works, commuting, business travel, and the use of products sold (electricity and gas). Emissions related to the use of electricity sold by Acea (hereafter referred to as EE) represent **about 90%** of total Scope 3 emissions and are reported according to the dual location-based and market-based approach, as described for Scope 2 emissions.

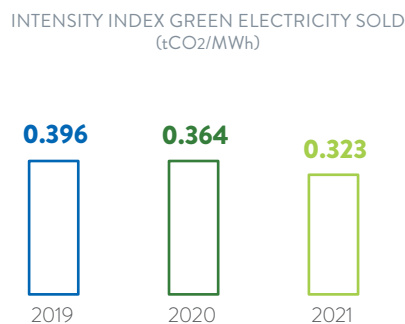
Over the last three years, the trend in Scope 3 emissions shows an increase attributable mainly to the increase in electricity sold. Using the location-based approach (average national grid emission factor updated by Terna) to calculate the proportion of Scope 3 emissions deriving from energy sales, total Scope 3 emissions increased by 14% in 2021 compared to 2020, while applying the market-based approach (zero GHG emission factor for energy consumption deriving from certified renewable sources) shows an overall increase of 8% for the same year, due to the increase in the proportion of G.O. certified renewable electricity sales out of the total energy sold. According to the best available estimates, green energy sold to free market customers in 2021 totalled approximately 2,300 GWh (1,198 GWh in 2020), corresponding to 38% of total energy sold to free market customers.

**Figure 20 – Scope 3 CO<sub>2</sub> emissions - location and market based (2019-2021)**



In particular, the performance indicators monitored for Scope 3 emission trends include an emission intensity index<sup>57</sup> which specifically concerns electricity sold; the KPI shows the company's progress in selling green energy and the consequent decrease in the ratio of tonnes of CO<sub>2</sub> emitted and MWh sold: in 2021, this shows a decrease of about 11% on 2020 and 18% on 2019.

**Figure 21 – Scope 3: KPI electricity sold**



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

## GHG EMISSION REDUCTION TARGETS


In addition to implementing actions to address climate change risks, in terms of adaptation and mitigation, Acea is committed to reducing the emissions produced by its activities and by the communities in which it operates through the provision of greener services.

For example, initiatives include:

- *Electric mobility and related services:* Acea aims to contribute to the development of sustainable mobility by providing the necessary infrastructure to expand the network. Acea Innovation, in particular, oversees the gradual installation of charging stations for electric cars that supply G.O. certified green energy. It has also developed a multifunctional platform that enables the provision of different types of services related to electric mobility: from monitoring the operation of charging infrastructure to payments, the provision of information, video surveillance services and other applications tailored to the needs of customers, whether private individuals or large companies, helping to make the use of electric vehicles increasingly accessible to those who wish to transition to more sustainable lifestyles.
- *Production of biomethane from sewage treatment plants:* Acea Ato 2 plans to upgrade the anaerobic digestion systems of two of Rome's largest sewage treatment plants (Roma Nord and Roma Est) which transform the biogas produced on site into biomethane. The purpose of the initiative is to "isolate" the methane contained in the biogas, monitoring its quality and optimising its usage. While biogas is currently mainly used to produce heat for digesters, the biomethane obtained from the refining process will be fed into the existing gas network specifically for use as a vehicle biofuel, "certifying" the quantities produced and fed into the pipeline and providing environmental benefits in terms of lower vehicle emissions.
- *Acea Smart Comp:* This is a mini-plant which, through a fully-automated process, transforms organic waste into certified high-quality compost in 90 days. The compost is naturally sanitised and free of pathogenic bacteria, and is ready to be used as a soil conditioner and fertiliser. The entire process is automated using advanced integrated IoT technology, monitoring the real-time processing status and environmental data (temperature, humidity, interstitial gases, emissions). The data collected and analysed is returned to the customer via a dedicated dashboard which displays trends in performance indicators such as the volume of CO<sub>2</sub> removed and the amount of compost produced.
- *Commercial products and added value services:* Acea Energia has introduced 100% eco and value-added products such as boilers, air conditioners and wallboxes to its range of light and gas products to reduce consumption, with a view to promoting sustainability. Acea Energia's sustainable offers include the *Luce 100% Green* and *0% CO<sub>2</sub>* tariffs, in line with the Acea Group's environmental protection and regional commitment targets. As well as "Guarantee of Origin" certified electricity, carbon offsetting is in place for gas sales, compensating the CO<sub>2</sub> emissions generated by gas consumption through the purchase of certified carbon credits (VER - Verified Emission Reduction), which help to fund and support mitigation projects (Verified Carbon Standard) in Peru and India with tangible benefits for local communities. In addition, Acea Innovation offers services such as the installation of photovoltaic solar panels with storage systems and thermal insulation for buildings that generate energy improvements and reduce the climate impact of homes and cities.

Furthermore, some of the main targets that specifically impact **GHG emissions** already defined in the current 2020-2024 sustainability plans<sup>58</sup> are described below.

<sup>58</sup> The Sustainability Plan 2020-2024 was approved by the Board of Directors in December 2020. For a general overview of the plan and details on the status of the various targets, please refer to the *Strategy and Sustainability* section of the *Sustainability Report Acea Group/NFS 2021*, available online.

SDG	AREA OF INTERVENTION	TARGET FOR 2024	DETAILS
  	Scope 1 emissions – intensity emissions for generation (gCO <sub>2</sub> /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 <b>Acea Produzione</b> up to 40 g CO <sub>2</sub> / kWh (-55% compared to 89 g CO <sub>2</sub> /kWh in 2019).	The intensity indicator refers to the Company that produces electricity and thermal energy from hydroelectric, thermoelectric, and photovoltaic plants and accounts for 13% of 2021 Scope emissions.
   	Scope 1 emissions - intensity emissions for generation (gCO <sub>2</sub> /kWh)	Developing biogas cogeneration (14,600 MWh of energy generated from biogas/year) in 3 compost plants of <b>Acea Ambiente</b> , with consequent increase in green energy produced.	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 <b>main Group Companies</b> , equal to around 400,000 MWh/year and over 140,000 tonnes of CO <sub>2</sub> /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 efficiency of <b>Acea Ato 2</b> electricity consumption through the completion of management and structural interventions in the integrated water service plants, with expected increased energy efficiency equal to 12 GWh.	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 <sub>2</sub> emissions (location based conversion factor, the target has been revised in 2021) 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.
 	Scope 3 emissions – market based	Increasing <b>Acea Energia</b> customers awareness of the sustainability of electricity consumption through specific initiatives aimed at promoting and increasing the purchase of “green” energy.	Acea Energia, the Group's main Commodity Sales Company, has set a goal to annually increase the sale of G.O.-certified electricity by reducing Scope 3 emissions from the use of products sold.

Acea's commitment will become even more robust and responsive, with **longer-term perspectives** and a renewed focus on the ecological transition in the **new Group strategic guidelines** that are in the process of being defined.

## 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 Acea Code of Ethics, etc.*) and also in the response provided annually to the 2021 CDP Questionnaire. Please find a table of the main references below.

REFERENCE TABLE		
Core elements	TCFD Recommended Disclosure	References
<b>GOVERNANCE</b>  The organization's governance around climate-related risks and opportunities	Describe:  a) the board's oversight of climate-related risks and opportunities	<i>Acea Group - Climate-related Disclosure 2021, chapter "Governance - the organisation's roles and responsibilities for handling aspects pertaining to climate change", paragraph "The role of the Board of Directors, the Chairperson and the Chief Executive Officer", pages 11-12.</i>  <i>Report on corporate governance and ownership structure, financial year 2021, pages 13-14 and 30-33.</i>  <i>Views of the Board of Directors of Acea to the Shareholders on the dimensions and composition of the New Board of Directors, 9 March 2020, page 3.</i>  CDP 2021 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 2021, chapter "Governance - the organisation's roles and responsibilities for handling aspects pertaining to climate change", paragraph "The role of management in assessing and managing climate-related risks and opportunities", page 14; chapter "Strategy and risk management", paragraph "The organisation's processes for identifying and assessing climate-related risks and their integration into overall risk management", pages 20-25.</i>  <i>Report on corporate governance and ownership structure, financial year 2021, pages 7, 13-14.</i>  CDP 2021 C1.2a
<b>STRATEGY</b>  The actual and potential impacts of climate-related risks and opportunities on the organization's businesses	Describe:  a) the climate-related risks and opportunities the organization has identified over the short, medium, and long term	<i>Acea Group - Climate-related Disclosure 2021, chapter "Strategy and Risk Management", paragraphs: "Climate-related risks and opportunities in the short, medium and long term", pages 18-20; "Climate scenario analyses on physical risks and the main physical risks for Acea", pages 25-29; "Scenario analyses on transition risks and key risks and opportunities for Acea", pages 30-33.</i>  <i>Sustainability Report Acea Group 2021, pages 73-74.</i>  CDP 2021 C2.3 and C2.4
	b) the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	<i>Acea Group - Climate-related Disclosure 2021, chapter "Strategy and Risk Management", Table 1 - Risks and opportunities related to climate change: CDP evidence, pages 19-20.</i>  <i>Report on the Remuneration policy and the remuneration paid, year 2022, pages 27-28.</i>  <i>Code of Ethics Acea, Art. 18 - Environment, circular economy, page 21.</i>  CDP 2021 C3.3 and C3.4
	c) the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	<i>Acea Group - Climate-related Disclosure 2021, chapter "Strategy and Risk Management", "Risks and opportunities related to climate change: CDP evidence", pages 19-20.</i>  CDP 2021 C3.1b and 3.2a

<p><b>RISK MANAGEMENT</b></p> <p>How the organization identifies, assesses, and manages climate-related risks</p>	<p>Describe:</p> <p>a) the organization’s processes for identifying and assessing climate-related risks</p>	<p><i>Acea Group - Climate-related Disclosure 2021, chapter “Strategy and Risk Management”, paragraphs: “The organisation’s processes for identifying and assessing climate-related risks and their integration into overall risk management”, pages 20-25; “Climate scenario analyses on physical risks and the main physical risks for Acea”, pages 25-29; “Scenario analyses on transition risks and key risks and opportunities for Acea”, pages 30-33.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 65-76.</i></p> <hr/> <p><i>Report on corporate governance and ownership structure, financial year 2021, pages 48-50.</i></p> <hr/> <p>CDP 2021 C2.1b and C2.2</p>
	<p>b) the organization’s processes for managing climate-related risks</p>	<p><i>Acea Group - Climate-related Disclosure 2021, chapter “Strategy and risk management”, paragraph “The organisation’s processes for identifying and assessing climate-related risks and their integration into overall risk management”, pages 20-25.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 65-76.</i></p> <hr/> <p><i>Report on corporate governance and ownership structure, financial year 2021, pages 47-55.</i></p> <hr/> <p>CDP 2021 C2.1b and C2.2</p>
	<p>c) how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management</p>	<p><i>Acea Group - Climate-related Disclosure 2021, chapter “Strategy and risk management”, paragraph “The organisation’s processes for identifying and assessing climate-related risks and their integration into overall risk management”, pages 20-25.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 65-76.</i></p> <hr/> <p><i>Report on corporate governance and ownership structure, financial year 2021, pages 47-55.</i></p> <hr/> <p>CDP 2021 C2.1b</p>
<p><b>METRICS AND TARGETS</b></p> <p>The metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material</p>	<p>Disclose:</p> <p>a) the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process</p>	<p><i>Acea Group - Climate-related Disclosure 2021, chapter “Performance, metrics and targets”, pages 35-43; chapter “Strategy and risk management”, paragraphs “Climate scenario analyses on physical risks and the main physical risks for Acea”, pages 25-29; “Scenario analyses on transition risks and key risks and opportunities for Acea”, pages 30-33.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 223-226, 265-298.</i></p> <hr/> <p>CDP 2021 C4, C6 and C7</p>
	<p>b) Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks</p>	<p><i>Acea Group - Climate-related Disclosures 2021, Chapter “Strategy and risk management”, pages 17-33; Chapter “Performance, metrics and targets”, paragraphs “The emissions of the Acea Group”, pages 35-36; “Direct (Scope 1) emissions and performance indicators”, pages 37-38; “Indirect (Scope 2) emissions and performance indicators”, pages 38-40; “Indirect (Scope 3) emissions and performance indicators”, page 41.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 223-226.</i></p> <hr/> <p>CDP 2021 C7</p>
	<p>Describe:</p> <p>c) the targets used by the organization to manage climate-related risks and opportunities and performance against targets</p>	<p><i>Acea Group - Climate-related Disclosure 2021, chapter “Performance, metrics and targets”, paragraph “GHG emission reduction targets”, pages 42-43.</i></p> <hr/> <p><i>Code of Ethics Acea, Art. 18 – Environment, circular economy, page 21.</i></p> <hr/> <p><i>Sustainability Report Acea Group 2021, pages 45-61.</i></p> <hr/> <p>CDP 2021 C4</p>







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