

**OPEN  
POWER  
FOR A  
BRIGHTER  
FUTURE.**

WE EMPOWER  
SUSTAINABLE  
PROGRESS.



**Our performance 2022**  
Conservation of natural capital

**enel**





# Our performance

## **Ambition of zero emissions and clean electrification**

lies at the heart of the strategy we are implementing in a sustainable and innovative way, to favor a **just transition**.

## **People are the mainstays of sustainable progress,**

not only ours, but also customers, suppliers, communities, institutions, the financial community, the media, companies and trade associations.

## **Innovation, circular economy, digitalization and sustainable finance**

are the growth accelerators, and embrace and enhance all strategic themes across the board.

## **Protection of nature and respect for human rights**

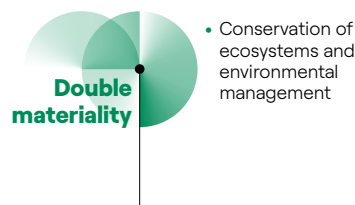
form our daily commitment to the current and future generations.

# Conservation of natural capital

## Material topics (I level)

## Plan

## SDG



Below the 2022 results related to the targets of the previous 2022–2024 Sustainability Plan, the resulting progress and the targets of the 2023–2025 Sustainability Plan, which may be redefined, added to, or surpassed with respect to the previous Plan.

SDG	Activities	2022 results	Progress	2023–2025 targets	Tag
12	Reduction of specific SO <sub>2</sub> emissions <sup>(1)</sup>	-78% vs 2017	●●●	<ul style="list-style-type: none"> <li>-81% in 2025 compared to 2017</li> <li>-85% in 2030 compared to 2017</li> </ul>	E
12	Reduction of specific NO <sub>x</sub> emissions <sup>(1)</sup>	-47% vs 2017	●●●	<ul style="list-style-type: none"> <li>-47% in 2025 compared to 2017</li> <li>-70% in 2030 compared to 2017</li> </ul>	E
12	Reduction of specific dust emissions <sup>(1)</sup>	-54% vs 2017	●●●	<ul style="list-style-type: none"> <li>-54% in 2025 compared to 2017</li> <li>-60% in 2030 compared to 2017</li> </ul>	E
6 12	Reduction of specific freshwater withdrawal <sup>(1)</sup>	-49% vs 2017	N.A.	<ul style="list-style-type: none"> <li>-56% in 2025 compared to 2017</li> <li>-65% in 2030 compared to 2017</li> </ul>	E
6 12	Reduction of specific water requirement	-47% vs 2017 <i>Target outdated as a new target on specific freshwater withdrawal has been defined</i>	●●●		
12	Reduction of waste products <sup>(1)</sup>	-49% vs 2017	●●●	-55% in 2030 compared to 2017	E
12	Overcompliance on waste management and end-of-life	N.A.	N.A.	Promoting and disseminating good practices on waste management and end-of-life	E
12	"ZERO Plastic" project – Reduction of single-use plastics at Enel Group sites	Reducing single-use plastics (office scope), compared to the new structure imposed by the pandemic, in the main countries of operation <ul style="list-style-type: none"> <li>Enel sites in Italy<sup>(2)</sup>: -85%</li> <li>Enel sites in Spain: -85%</li> </ul>	●●●	Reduction of single-use plastics (office scope), compared to new structure imposed by the pandemic <ul style="list-style-type: none"> <li>Enel sites in Italy<sup>(2)</sup>: -85% in 2025</li> <li>Enel sites in Spain: -85% in 2025</li> </ul>	E

(1) The values of the 2022 results, targets and 2017 baseline have been recalculated net of assets disposed as at December 31, 2022.

(2) Compared to the volume of single-use plastics used in 2018. Reduction calculated based on office occupancy and pandemic contingencies. Does not include offices with fewer than 20 employees.


### Goals

### Progress

I Industrial E Environmental S Social  
G Governance T Technological

⊕ New  
↻ Redefined  
⊖ Outdated

●●● Not in line  
●●● In line  
●●● Achieved  
N.A. = not applicable

SDG	Activities	2022 results	Progress	2023–2025 targets	Tag
14 15	Biodiversity conservation	<ul style="list-style-type: none"> <li>Definition of a Group protocol to verify the target on No Net Loss for new projects and applications on pilot projects</li> <li>Definition of a catalog of Nature Based Solutions for urban biodiversity projects and applications</li> </ul>	● ● ●	<ul style="list-style-type: none"> <li>Beginning <b>No Net Loss</b> implementation on selected projects in high importance biodiversity areas starting from 2025</li> <li><b>No Net Loss</b> of biodiversity for new infrastructure by 2030</li> <li><b>No Net Deforestation</b> by 2030</li> <li><b>No Go</b> in UNESCO areas<sup>(3)</sup></li> </ul>	I E
		<p>Minimizing the impact of Enel assets on habitats and species included on the Red List of the International Union for Conservation of Nature (IUCN):</p> <ul style="list-style-type: none"> <li>improvement of company processes for risk assessment and biodiversity management on plants and assets (<b>100%</b> annual progress) <ul style="list-style-type: none"> <li>Group Biodiversity Guidelines implemented by Enel Grids and Enel X.</li> <li>high level risk and opportunity analysis at Group level</li> </ul> </li> <li>definition of Group indicators and implementation of the biodiversity performance monitoring process: <ul style="list-style-type: none"> <li><b>100%</b> revised KPIs</li> </ul> </li> <li>internal biodiversity protection awareness initiatives to reach 100% of the Enel population and increase the partnership framework and stakeholder engagement: <ul style="list-style-type: none"> <li>awareness campaign via webinars and videos to all Enel people; 60 global and local partnerships, including TNFD, Science Based Target Network, Business for Nature, membership of CSR Europe's Biodiversity &amp; Industry platform, WBCSD, TNF, World Economic Forum, Legambiente</li> </ul> </li> </ul>	● ● ●	<ul style="list-style-type: none"> <li><b>Nature-related risk/opportunity analysis:</b> incorporate the assessment of nature-related risks and opportunities into all business activities to align the strategy and risk management processes</li> <li><b>Nature's Footprint – Assessment metrics and restoration plan:</b> assessment of <b>100%</b> relevant assets and revision of nature's restoration Plan on infrastructure</li> <li><b>Biodiversity value awareness and new partnerships:</b> broaden and consolidate global and local scientific and industrial partnership to support the nature positive approach and its implementation</li> </ul>	E G
14 15	Environment Extra Checking on Site (ECoS)	<b>93</b> Environment ECoS carried out	● ● ●	<b>72</b> Environment ECoS in 2025	↻ E S
14 15	Environment Contractor Assessment (CA)	<b>300</b> Environment Contractor Assessments carried out  <i>Target outdated as the Contractor Assessment process is an established operational practice on the whole perimeter</i>	● ● ●		E S

(3) In any case, Enel commits to comply to service obligation with the best adequate and feasible solutions.

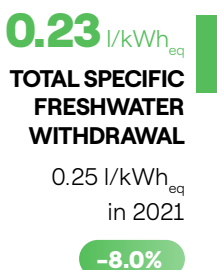
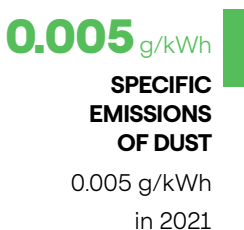
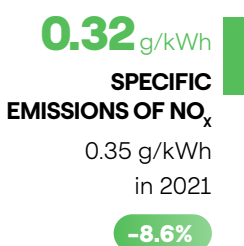


# Conservation of natural capital



THE GIAL





## Natural capital conservation

Protecting natural capital and combating climate change are strategic factors and integrated into the planning, operation and development of our activities. Being an energy company, our operations depend on natural resources, but at the same time they have an impact on them. For this reason, we integrate risk and opportunity assessments into our decision-making processes and our Group governance, and we define specific targets for reducing impacts on nature, restoring habitats and sharing the benefits of ecosystem services with the communities with which we interact.

Recent years have marked a significant increase in global awareness of the need to strengthen the commitment to not only limiting climate change, but also tackling the loss of biodiversity and defining a process for restoring it. This commitment was relaunched by the **UN Convention on Biological Diversity (CBD)**, held at **COP 15** in December in Montreal, Canada. The conference resulted in the release of the **Kunming-Montreal Global Biodiversity Framework**, which defines strategic objectives for reducing biodiversity loss, restoring ecosystems and protecting the rights of indigenous peoples and local communities. The plan includes concrete measures to halt and reverse the loss of nature, including protecting **30% of the**

**planet** and restoring **30% of degraded ecosystems by 2030**. Enel actively participated in the COP 15 business forums and supported the approval of the target to require large companies to assess and report on risks, dependencies and impacts on biodiversity.

At European level, the Commission published the Biodiversity Strategy in 2020,<sup>(1)</sup> which involves the introduction of a series of targets that are binding on Member States; subsequently in 2022, the consultation on the proposed **Nature Restoration Law** was launched. The proposal aims to introduce area-based restoration measures for at least 20% of the EU's land and sea area by 2030, and all ecosystems in need of restoration by 2050, requiring Member States to formulate specific national plans. The proposal also includes specific objectives for urban ecosystems, agricultural and forest ecosystems. Enel is actively supporting the Commission's activities, promoting the synergy between the restoration of degraded areas and the development of renewable energies, as well as stimulating the participation of stakeholders. We have also proactively integrated EU principles into our Environmental<sup>(2)</sup> and Biodiversity<sup>(3)</sup> Policies in order to continuously improve the management of our assets and services.

- (1) COMM (2020) 380 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.
- (2) Enel has had a Group environmental policy in place since 1996, updated in 2018 and again in 2022. The Enel Group's environmental policy covers the entire value chain, applying to: (i) all the production phases of every product and service, including distribution and logistics phases, as well as the management of related waste; (ii) each site and building; (iii) all relationships with external stakeholders; (iv) all mergers and acquisitions; (v) every key business partner (including partners related to non-managed operations, joint ventures, outsourcing or third-party producers); (vi) every supplier, including service and contractor suppliers; (vii) all due diligence and Merger&Acquisition processes.
- (3) In 2015, Enel published the Group's biodiversity policy, which was updated in 2023 following the release of the Kunming-Montreal Global Biodiversity Framework.

During 2022, the European Commission proceeded to adopt the action plan towards zero pollution for air, water and soil ("**Towards a Zero Pollution Ambition for air, water and soil – building a Healthier Planet for Healthy People**"<sup>(4)</sup>). The main lines of action include:

- **Air quality** – In 2022, the Commission launched the proposal to **revise the directives on ambient air quality**, with the aim of improving alignment between EU air quality standards and the new guidelines of the WHO (World Health Organization), with particular attention to urban areas, where the majority of the population lives. Enel actively participates in the review process by promoting the adoption of zero-emission technologies that generate benefits both globally, in terms of GHG reduction, and locally, in terms of reducing atmospheric pollution.
- **Industrial emissions** – As regards industrial pollution of air, water and soil, a proposal to revise the **Industrial Emissions Directive** was published in 2022. Enel supports the review process, in particular for large combustion plants, by committing over the years to the progressive adaptation of power plants powered by fossil fuels thanks to the introduction of technologies with low emissions of polluting substances. Furthermore, Enel actively supports the development of new technologies, such as electrification based on renewable energy, to support other sectors and uses of energy, such as the transport sector or heating and cooling in buildings.

- **Soil strategy** – In November 2021, the Commission launched an **EU soil strategy for 2030**, which sets out measures to restore degraded soils by 2050, setting medium- and long-term objectives for 2030 and 2050 respectively. The strategy is directly linked to that of biodiversity and climate adaptation, also establishing targets relating to the restoration of degraded land, the remediation of contaminated sites and the reduction of soil use. In this context, Enel is supporting the proposed strategy, by promoting a circular approach to land management, in particular through the reuse and redevelopment of brownfield sites, as well as the repowering and lifetime extension of wind farms, in order to limit the use of soil. Also, through the **Futur-e project**, Enel is actively pursuing the reuse of areas within its industrial scope. Enel's Futur-e project is one of the first examples on a global scale of the redevelopment of abandoned industrial sites of different sizes and in different contexts, turning them into a development opportunity for the local area and for the Country system. Futur-e aims to adopt a circular economy approach by converting abandoned industrial sites into eco-sustainable places dedicated to science, art, culture, tourism, or new industrial activities (see the chapter "Our commitment to a just transition: leaving no one behind").

Enel supports this process through participation with Eurelectric on the Zero Pollution Stakeholder Platform.

## Commitment to nature conservation by partnering with associations and organizations for sustainable development

The growing and renewed attention to nature and its ecosystems has led to the emergence of new coalitions and multilateral initiatives to stimulate the definition of restoration targets and the development of more ambitious policies to preserve biodiversity. Within this context, Enel is actively committed to this process, collaborating with the most relevant global stakeholders and participating in multilateral initiatives and dialogues. In particular, the main activities undertaken in 2022 included:

- partnership with **Business for Nature**, launched in 2020 with the signing of the call-to-action "Nature is Everyone's Business", with whose business delegation Enel took part in the pre-COP 15 negotiations in Geneva, in March 2022. Furthermore, in October 2022, Enel was among the first companies to sign the **Business Statement for Mandatory Assessment and Disclosure**, and

to support the "**Make it Mandatory**" campaign, which makes it mandatory for large companies and financial institutions to assess and report risks, dependencies and impacts on biodiversity by 2030; participation in the multistakeholder dialogue promoted by the World Business Council For Sustainable Development (**WBCSD**) in 2022 for the definition of the "Roadmap to Nature Positive", specifically for the part relating to the energy sector, which will provide companies with a framework of action on nature, supporting them with the definition of targets, as well as with measurement and reporting activities aligned with the implementation of the Global Biodiversity Framework;

- the partnership with the **Taskforce on Nature-related Financial Disclosure (TNFD)** through participation in the Forum, launched in 2021, which is working to establish,

(4) COM (2021) 400 final: Communication Pathway to a Healthy Planet for All – EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'.



by 2023, a global framework for companies and financial institutions to assess and report on nature- and biodiversity-related risks and opportunities. Connected to this, in October 2022 Enel joined the **TNFD Pilot Program** led by the WBCSD, which brings together 23 companies globally to test the new framework. These companies are divided into three groups: energy, land

use and built environment;

- ongoing support given to the **Science Based Targets Network (SBTN)**, a project that, on the trail of the Science Based Targets initiative (SBTi) in the area of climate, will define specific new improvement targets and objectives for nature and biodiversity conservation.

## Environmental governance and management model

| 2-9 | 2-12 | 2-13 | 2-24 | 3-3 |

Enel's organizational and corporate governance model ensures that sustainability issues are appropriately taken into consideration in all relevant company decision-making processes, by defining specific tasks and responsibilities for the main corporate governance bodies.

The Board of Directors plays a central role in corporate governance as the body vested with powers related to the strategic, organizational and control policies of the Company and Group. In this context, it takes into account the need to pursue sustainable success, particularly: (i) when defining Company and Group strategies; (ii) when drawing up the remuneration policy for the Chief Executive Officer/General Manager and Key Management Personnel, defining specific sustainability objectives the achievement of which is linked to a significant component of the variable pay; and (iii) with regard to the Company's Internal Control and Risk Management System ("SCIGR"), aimed at the effective and efficient identification, measurement, management and monitoring of the main corporate risks, including those of an ESG nature.

The Board of Directors has also established internal board committees with the power to investigate, propose and

advise, in order to ensure an adequate internal division of its functions, as well as a related parties committee. During 2022, the Corporate Governance and Sustainability Committee dealt with nature-related issues, reflected in the strategies and related implementation methods in 2 of the 6 meetings held, in particular during the review of: (i) the Sustainability Report for the 2021 financial year, coinciding with the Consolidated Non-Financial Statement pursuant to Legislative Decree No. 254/2016 for the same year; (ii) the materiality analysis and the guidelines of the Sustainability Plan 2023-2025, including environmental objectives; (iii) updates on the main activities carried out in 2022 by the Enel Group in the field of sustainability, on the status of implementation of the Sustainability Plan 2022-2024 and regarding Enel's inclusion in the main sustainability indices. For more information on the activities carried out by the corporate bodies, please refer to the Enel Report on Corporate Governance and Ownership Structure, available at [www.enel.com](http://www.enel.com), governance section, as well as the chapter on "Climate governance" in this document.

The Board of Directors approves the Sustainability Report which also contains the Group's environmental policy.



# Environmental policy

## G4-DMA EN

Strategic factors in the planning, implementation and development of Enel's operations include protecting the environment and natural resources, tackling climate change, and contributing towards sustainable economic development. These are also key factors in consolidating the Company's position as leader in the energy market. Enel has had a Group environmental policy in place since 1996, based on **four fundamental principles**:

1. protecting the environment by preventing impacts and exploiting opportunities;
2. improving and promoting the environmental sustainability of products and services;
3. creating shared value for the Company and stakeholders;
4. meeting legal compliance obligations and voluntary commitments, advancing ambitious environmental management practices

and pursuing **ten strategic goals**:

1

**To apply internationally recognized Environmental Management Systems to the whole organization, underpinned by the principle of ongoing improvement and adoption of environmental indices to measure the environmental performance of the whole organization.**

- a. Ensuring annual compliance with ISO certifications 14001 extension to the entire scope of the Group's activities
- b. Streamlining and harmonizing certifications in the various organizational areas, seeking out partnerships and sharing best practices in environmental management

2

**To reduce environmental impacts by using the best available technologies and best practices in the construction, implementation and decommissioning stages of plants, with a view to life cycle analysis and circular economy.**

- a. Assessing the environmental impact caused by the construction of plants or by major restructuring operations
- b. Examining and applying Best Available Technologies (BAT)
- c. Protecting and monitoring surface and groundwater quality in the areas surrounding the plants
- d. Ensuring the internal development and application of international best practices

3

**To build infrastructure and buildings that protect the local area and biodiversity.**

- a. Assessing the risks and opportunities of biodiversity
- b. Developing and implementing infrastructures based on the Mitigation Hierarchy, the No Net Loss and the Zero Net Deforestation principles
- c. Developing and updating a Biodiversity Action Plan with projects that take into account the specific aspects of local environments (conservation of the habitats of protected species, reintroduction of particular species and replanting of indigenous flora in cooperation with research centers and nature observatories)
- d. Implementing biomonitoring activities (terrestrial, marine, river)
- e. Protecting areas of high biodiversity value and, among these, forests and protected areas
- f. Mitigating the visual and landscape impacts of power and distribution facilities and protecting archaeological assets during construction activities
- g. Undertaking research into innovative solutions to promote the development of urban biodiversity in the provision of infrastructures and services

4

**To play a leadership role in renewables, in the decarbonization of power generation, in the electrification of end-use and in the efficient use of energy, water and raw materials.**

- a. Progressively expanding the renewable generation facilities and pursuing the goal of decarbonization
- b. Improving the efficiency of power plants
- c. Reducing network losses tied to electricity distribution
- d. Efficiently managing water resources for industrial uses, with a particular focus on water stress areas
- e. Promoting services and products for electrification and end-use energy efficiency

5

**To ensure optimal waste and drain water management and promote circular economy initiatives.**

- a. Reducing waste production
- b. Reducing the pollutant load of wastewater
- c. Increasing the recovery and recycling rate of waste and drain water produced
- d. Exploiting by-products for use as raw materials in external production processes
- e. Applying the principles of the circular economy and seizing opportunities for reuse in second life equipment and products
- f. Carefully selecting disposal service providers and using IT systems for waste traceability

6

**To develop innovative technologies for the environment.**

- a. Implementing systems to boost plant efficiency and lower emissions
- b. Promoting and developing smart grids and digital asset management solutions to improve their environmental performance
- c. Developing innovative solutions to support renewable production (photovoltaic, geothermal, wind, green hydrogen), integrated with energy storage systems
- d. Promoting and developing electric mobility
- e. Developing innovative solutions for energy efficiency and smart cities
- f. Devising innovative services for the modulation of energy consumption that enable greater flexibility and stability of the electricity grid and more efficient use of resources
- g. Digitalizing processes and cloud computing

7

**To communicate with citizens, institutions and other stakeholders about the Company's environmental performance.**

- a. Publishing the Sustainability Report and providing open data access to the Group's key environmental parameters
- b. Communicating with financial analysts and taking part in various sustainability indices
- c. Consulting and engaging local stakeholders
- d. Disseminating environmental initiatives online

8

**To provide employee training and raise awareness on environmental issues.**

- a. Providing training on environmental issues
- b. Engaging employees in campaigns to support the environment

9

**To promote sustainable environmental practices with suppliers, contractors and customers.**

- a. Applying supplier assessment criteria based on environmental performance
- b. Holding meetings for information and training on relevant environmental aspects at the start of the works
- c. Assessing suppliers based on their environmental performance in activities carried out on Enel's behalf

10

**To meet and exceed legal compliance obligations.**

- a. Ensuring that operations are carried out in accordance with the legal requirements of the various countries and with the voluntary commitments made
- b. Correcting any non-compliance with obligations and voluntary commitments
- c. Assessing further voluntary environmental actions and practices, including where not legally required

Chief Executive Officer  
**Francesco Starace**



Enel ensures constant supervision and monitoring of environmentally relevant activities through a granular and harmonized organization at the level of central coordinating structures and at Country level. Specifically:

- at **Group (Holding)** level there is a central HSEQ (Health, Safety, Environment and Quality) Function with responsibility for guidance, coordination and definition of environmental policy and all other specific guidance policies. Within the HSEQ Function, the SHE.Factory has been created, which is a unit dedicated to specialized training on Safety, Health and Environment issues;
- at **Business Line** level, the HSEQ Functions present in the global structure of each Business Line with a role of coordination in the management of the respective environmental issues, ensuring the necessary specialist support in keeping with the Holding's guidelines;
- at **Country** level, there are staff units with a local coordination function and managers and contact persons identified in the individual operating units who manage the specific aspects of the various industrial sites.

Roles and responsibilities on Health, Safety, Environment and Quality issues are defined and reported in the corporate organization charts; operating procedures and in compliance with Country legislation reflect the Company's commitment to these issues. This organization also ensures that the Integrated Health, Safety and Environment Management System complies with the requirements of the international standards ISO 14001:2015 and ISO 45001:2018.

Application of **ISO 14001 certified Environmental Management Systems (EMS)** is one of the strategic tools defined by the Group's environmental policy; at the end of 2022, almost all (over **99%**) of operations were certified, while for new plants and new installations, the preparatory activities for certification are progressively planned. Given the complexity and variety of activities carried out in the Group, an ISO 14001:2015 certified modular approach has been adopted, with the definition of a management system at Holding level, which provides guidance and coordination to the Business Lines on environmental issues. Each Business Line has launched its own EMS focused on its own specific activities. Furthermore, the main thermal and geothermal production sites in Europe now also have EMAS (Eco-Management and Audit Scheme) registration. In support of activities for monitoring environmental performance and the definition of improved plans for the operating units of the Business Lines, the Group environmental reporting system Enel Data on Environment (EDEN) is used. During 2022, further improvements were made to version 2.0 of the EDEN tool, in order to make the data validation system and the calculation and reporting of environmental KPIs even more robust. Enel also has the global digital dashboards She.metrics and She.start for monitoring environmental accidents and improvement actions, which are defined during assessments or Extra Checking on Site (see the paragraph "Operational analysis and monitoring tools").

## Training and internal communication

Training is one of the strategic objectives of the Group's policy and forms an integral part of the EMS. Approximately **41 thousand hours of training** were provided in 2022, including 13 thousand hours directly through SHE.Factory. In 2022, implementation of the environmental training program continued, targeted at increasing the skills of the Group's technical staff and people with operational responsibilities (Environmental Competence Building Program), particularly in the field of water management and climate change. Training sessions were also held to update staff on Group policies and on the environmental data management platforms (EDEN), with a view to aligning the

adoption criteria in all Countries. Various communication initiatives were promoted through internal web channels in order to disseminate and strengthen Enel's commitment to preserving biodiversity and nature, by disseminating best practices and active restoration projects in the various Countries where the Group is present, and specific campaigns were launched to raise the awareness of internal personnel (see the "Near Miss" box). Enel has also established partnerships with local environmental associations to raise awareness among young people in the areas where it operates.



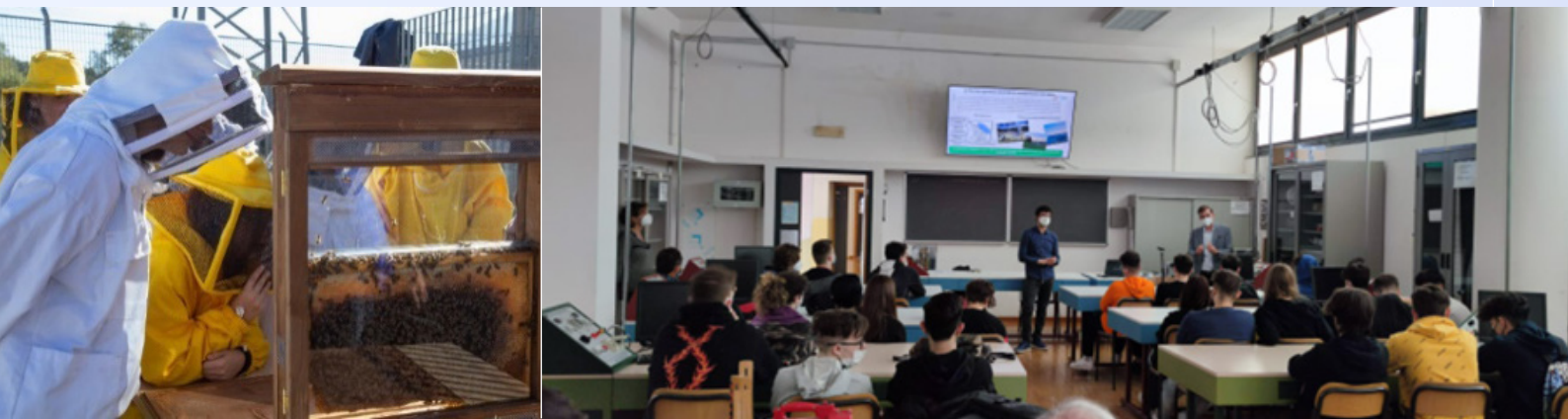
## Training in schools

In 2022, on World Biodiversity Day, Enel launched two innovative training projects in conjunction with Legambiente and Beeing and targeted at primary and secondary school students, to raise awareness of the Company's high level of commitment to defending biodiversity and supporting the energy transition.

**Biodiversity4Young** reached more than 250 students in 7 regions throughout Italy in 2022, thanks to the presence of experts from Legambiente and local Enel colleagues, who illustrated our initiatives with the

passion of those who are part of the local community in the host territory.

**Bee4education** took place in the Training and Education Center in L'Aquila, in partnership with the startup **Beeing**; this project consists of providing a very inspiring experience on energy and biodiversity with the possibility of getting up close to bees, thanks also to an innovative hive with a transparent side that enables the bees to be observed while they work. The training program, which was carried out from May to October 2022 and was targeted at primary and lower secondary schools in the province of L'Aquila, involved 300 students and 34 teachers at 4 local schools.



## HSE Near Miss Campaign

In 2022, an innovative internal communication campaign on HSE Near Misses was launched in all Countries, with the aim of informing Enel X Global Retail people about the meaning of near misses and the importance of reporting them and raising awareness among contractors. Some cartoon examples were shared, which depicted near misses that have actually occurred within the Business Line.



# Identification of impact factors and dependencies on nature and biodiversity

The identification of potential **impact** factors on nature and biodiversity is fundamental for Enel in order to define the most effective strategies to avoid, minimize, remedy or compensate for the associated effects, in line with the provisions of the Mitigation Hierarchy included in the Group's environmental policy. Similarly, the identification of **dependencies** on natural capital and biodiversity enables us to identify the most appropriate strategies to reduce the risks to the Company that may derive from these dependencies.

The activity referred primarily to direct activities that are

not yet inclusive of the entire value chain, and involved all of the Group's main technologies, from electricity generation from renewable sources and combined-cycle gas turbine power plants, to electricity distribution systems. The following were not considered in the analysis: coal-fired thermoelectric generation, which is already the subject of a medium-term phase-out program, in line with the decarbonization strategy adopted by the Group, and infrastructure linked to energy services, such as charging stations for electric cars, as they operate in generally urbanized habitats.

## Impact factors

The main **impact factors** (or pressures) that may be exerted on nature are summarized in the following categories, inspired by those identified by the **Science Based Targets Network (SBTN)**, and which have been adopted as the starting point for analyzing actions implemented to mitigate the associated risks:

1. use and modification of ecosystems (terrestrial, fresh water, marine);
2. use of resources (mainly water withdrawal);
3. climate change (GHG emissions);

4. pollution (emissions, discharge, waste);
5. disturbances (noise, vibration, artificial lighting) and introduction of invasive species.

The table shows the results of the preliminary materiality analysis of impact factors conducted at Group level for the various technologies. In this case, the evaluation approach indicated by the SBTN and the TNFD proposal was used, and the ENCORE tool was used.<sup>(5)</sup> The scores were internally reviewed based on the specific construction and operating solutions adopted by the Group.

Impact factors by technology	Hydroelectric	Solar PV	Wind	CCGT	Networks
1.1 Use of terrestrial ecosystems	VM	M	M	M	M
1.2 Use of fresh water ecosystems	VM			NM	
2. Water withdrawal	M	NM		VM	
3. Climate-changing gas emissions (GHG)	NM			M	M
4.1 Air pollutants (non-GHG)	NM			NM	
4.2 Water pollutants	M			NM	
4.3 Soil pollutants		NM	M	NM	M
4.4 Solid waste	M			NM	M
5. Disturbance factors and invasive species	NM	M	M	NM	M

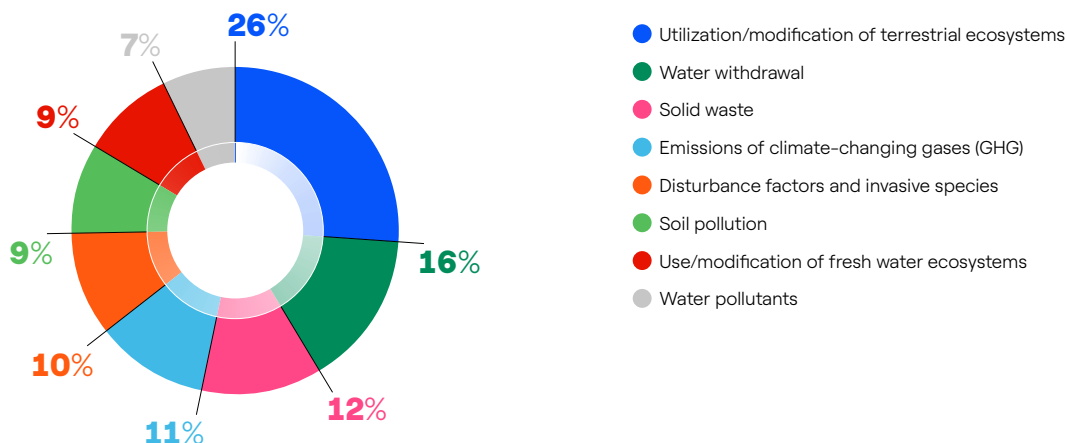
VM Very Material   
 M Material   
 NM Non Material   
  not applicable

(5) ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure), tool developed by the Natural Capital Finance Alliance (<https://encore.naturalcapital.finance/en/about>).

Considering only the material impact factors with respect to the various technologies, each weighted according to

its share of generation at Group level,<sup>(6)</sup> the distribution of priorities shown in the figure is obtained.

Impact factors prioritized by materiality for the different technologies, weighted according to their share of power generation



The overall analysis therefore shows that, considering the average weighting of the various technologies, the main impacts on the external environment are associated with

**the use/modification of terrestrial ecosystems** and with **water withdrawal**.

## Dependencies

**Dependencies** found to be material based on the criteria indicated by SBTN for the various technologies adopted by Enel are attributable, in relation to the main direct activities, to ecosystem services necessary for the operation of plants and infrastructures, as summarized below:

1. regulation of the climate and climatic events on which the operation of all assets depends;
2. protection from floods and extreme environmental events, which are one of the primary causes of failure and unavailability of renewables plants (photovoltaic and wind) and distribution facilities;
3. use of water in production cycles, mainly in thermoelectric power generation;
4. soil stabilization and erosion control, important for hydroelectric reservoirs, renewables plants (photovoltaic and wind), and network infrastructure;

5. conservation of the water cycle, which enables the operation of hydroelectric power plants.

With regard to the upstream supply chain, the main dependency refers only to the "Use of raw materials (mineral and non-mineral) for the construction and operation of plants".

The results of the preliminary materiality analysis of ecosystem dependencies conducted at Group level for the various technologies are shown in the following table. Also in this case, the evaluation criteria indicated by the SBTN and by the TNFD proposal and the guidelines provided by the ENCORE tool were used. The scores were reviewed internally based on the construction and operating solutions adopted by Enel.

(6) Networks were given a conventional weighting of 25%, being the average of the values associated with the various generation technologies, also by virtue of its transversal function with respect to them.

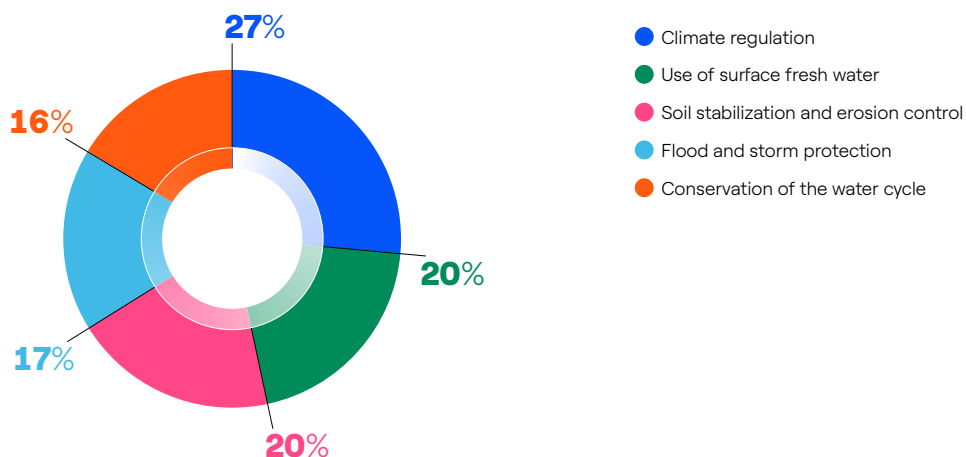
Dependencies by technology	Hydroelectric	Solar PV	Wind	CCGT	Networks
1. Climate regulation	VM	VM	VM	NM	VM
2. Flood and storm protection	M	M	M	NM	VM
3. Use of surface fresh water	VM	NM		VM	
4. Soil stabilization and erosion control	VM	M	M	NM	M
5. Conservation of the water cycle	VM			M	
6. Water resource quality	NM			NM	
7. Filtration of pollutants	NM			NM	
8. Bioremediation	NM				
9. Use of groundwater	NM			NM	

VM Very Material   
 M Material   
 NM Non Material   
  Not applicable

Considering only the material dependencies with respect to the various technologies, each weighted according to

its share of generation at Group level,<sup>(7)</sup> the distribution of priorities shown in figure is obtained.

Dependencies on ecosystem services prioritized by materiality for the different technologies, weighted according to their share of power generation



The overall analysis therefore shows that, considering the average weighting of the various technologies, the main dependencies for the Company are associated with **climate regulation** and **the use of surface fresh water**. Regarding these results, Enel's decarbonization strategy,

which is focused on the phase-out of fossil fuels and the growth of renewables, particularly wind and solar technologies, reduces impact on the climate by helping to reduce pressure on the ecosystem services on which we depend, such as water resources.

(7) The Networks were given a conventional weighting of 25%, being the average of the values associated with the various generation technologies, also by virtue of its transversal function with respect to them.



# Analysis of environmental risks and opportunities

The analysis of environmental risks and opportunities associated with Enel's business activities was conducted with a multifunctional integrated approach in line with the guidelines set out in the guidelines of the TNFD proposal and of the SBTN. The analysis, conducted in 2022 based on the results of the materiality analysis for impacts and dependencies described above, led to the identification for each technology of the main operational and economic-financial risks expected for the Company, as well as social and environmental risks, and the identification of the biggest opportunities in relation to each relevant impact factor and dependency. This preliminary screening analysis led to the definition of an evaluation template for each technology, which was used to identify the main critical events of a physical type (both acute in the short-medium term and chronic in the long term) and of a transitional type (resulting from possible changes in the regulatory, technological, reputational or market framework), and the main associated risks and opportunities expected. The main **operational and material economic-financial risks** for Enel are shown below:

- reduction or interruption of generation capacity;

- recovery and repair needs;
- authorization delays;
- adaptation and technological innovation needs;
- additional insurance fees;
- loss of competitiveness.

Simultaneously, this screening phase selected the following **main opportunities**:

- improvement of environmental and sustainability performance, such as efficiency in the use of resources and initiatives for the protection, restoration and regeneration of natural habitats;
- business opportunities, linked for example to the offer of nature-positive energy products and services, the launch of new partnerships in sustainable innovation sectors, access to green financing, and strategic choices of commitment and sector leadership, aimed at the economic, reputational and financial growth of the Company.

The screening analysis on Group impacts/risks conducted in 2022 reaffirmed the action priorities identified last year and described in the following table.

Impact Factors (or Pressures)	Importance • Magnitude • Probability	Level of control • Goals • Mitigation plans	Priorities
<b>Use of terrestrial ecosystems</b>			
• Land use • Habitat transformation and fragmentation	High	Moderate	High
<b>Use of natural resources</b>			
• Water withdrawal	High	High	Moderate
<b>Climate change</b>			
• Climate-changing gas emissions	Very high	Very high	Moderate
<b>Pollution</b>			
• Pollutant emissions (non-GHG) • Water and soil pollution • Waste production	High	High	Moderate
<b>Disturbance factors and other</b>			
• Noise and other • Invasive species	Low	Moderate	Low

The **identified intervention priorities** relate to the control of risk associated with **land occupation and the transformation of ecosystems**, and particularly to the use of land and the **transformation of terrestrial habitats**, in relation to which new commitments were made at Group level as early as last year (see the paragraph "Enel's commitment to biodiversity"). The analysis also highlighted an already very high level of commitment and control for risks associated with the use of natural resources (water withdrawal) and with potential pollution factors of environmental matrix

(emissions, discharges and waste production), as well as with climate change. In fact, for years Enel has already been defining stringent improvement targets, the results of which are described in the following paragraphs, which make it possible to mitigate the main risks associated with these impact factors in the future.

Following the screening activity described above, a more detailed aggregate analysis (by technology) was launched and is currently under way, which takes into account the estimated magnitude of potential risks or possible oppor-

tunities, the relative probability of occurrence and the mitigation actions already adopted by the Company. At the conclusion of this phase, the risk/opportunity analysis will therefore also be extended to the project and site level, to take into account the specific local context and the interaction of each technological asset with the local characteristics of nature and biodiversity. In this further phase, particular importance and priority will be given to plants in operation and to new assets in the planning and authorization phase which are located in areas of high value or naturalistic vulnerability, such as protected areas, critical habitats and water risk areas.

## Dependency management

Meanwhile, as regards the management of **dependencies**, the main criticality of which is linked to the effects of climate change (climate regulation), an analysis was conducted for each technology and for each geographical area in which the Group is present. The operational and economic-financial risks resulting from the occurrence of acute and chronic meteorological phenomena were also analyzed in order to define specific adaptation and resilience plans. Acute and chronic physical phenomena are intensified and accelerated by ongoing climate change and their effects on the integrity, operational continuity and correct functioning of our plants depend, to an essential extent, on the ecosystem services of mitigation and control performed by the surrounding natural environment, which may be potentially compromised by human impacts (such as the sealing of occupied soil or the extraction of raw materials). Among these ecosystem services, regulation of the water cycle and the ability of vegetation to protect, prevent and mitigate the onset and intensity of flooding or soil subsidence phenomena are particularly relevant, as is the action of extreme winds. For more details, see the paragraph "Enel's impact on climate change - Climate scenarios, strategy and risks" in the chapter "Zero emissions ambition".

## Operational analysis and monitoring tools

From an operational point of view, in order to identify and minimize environmental risks related to our activities, Enel has equipped itself at Group level with a series of important tools for guidance, investigation and intervention with respect to both the environment and the socio-economic context. These tools are referred to below and can operate in a capillary and synergistic way within the organization to protect the environment and associated ecosystems.

**Group Policy for the classification and analysis of environmental accidents.** Environmental accidents are classified according to their type and relevance. This classification is based on their possible impact on the environmental matrices and on any potentially sensitive areas (ecosystems and protected areas), in addition to their negative impact on the organization itself (operational, legal, reputational and financial). In accordance with their classification and magnitude of such accidents, the policy defines communication procedures, the creation of analysis groups with the participation of the Global Functions, cause analysis, and monitoring of subsequent corrective actions and improvements.

**Policy for assessing risks and opportunities related to environmental impacts.** The policy applies to all operational sites (including those being decommissioned) and to Group staff functions in which an EMS compliant with ISO 14001:2015 requirements is adopted. Its application involves the adoption of a single model for the classification and assessment of risks and opportunities linked to impact factors (or pressures) exerted on the environment, through the use of an IT tool called ERA (Environmental Risk Analysis). The analysis process involves evaluating both the interactions of significant operational aspects with various environmental matrices, and mitigation controls adopted for compliance with regulatory compliance, as well as the most stringent voluntary continuous improvement targets; furthermore, taking into account the results of the analysis of any accidental environmental events and periodic environmental visits to the various sites (Extra Checking on Site - ECoS), it allows a high level of integration of continuous control processes between the various levels of the organization and the related prioritization of improvement actions. Finally, the analysis enables the assessment of environmental aspects linked to governance and strategic activities carried out by the central Functions of the organization.

**Extra Checking on Site (ECoS) Policy.** The ECoS is a tool for planning and conducting site visits by cross-divisional teams of experts in support of plants and operational facilities and with a view to identifying improvement plans and sharing best practices. In 2022, the different Business Lines across all the Countries in which the Group operates conducted over 80 ECoS with a focus on the environment. See also the chapter "Occupational health and safety".

**Environmental qualifications and inspections for suppliers of products and services.** In consideration of the importance and role that suppliers have in determining the overall environmental performances of the Company, Enel has adopted a supplier environmental assessment procedure that is structured and homogeneous for the entire Group, activated in the development phase, above all for high environmental risk activities, and following important environmental events. Environmental assessments aim to verify the EMS of suppliers

as a whole and propose improvement actions to be shared with the supplier. They are also accompanied by environmental inspections conducted at the suppliers' operating sites, which include assessments on specific aspects of biodiversity. In order to standardize inspection standards and obtain a structured and widespread control system, Enel has adopted Group Guidelines on Environmental Inspections, which define the planning criteria as well as methods of execution in the field (see the chapter "Sustainable supply chain").

**Consequence Management Procedure.** At Group level, Enel has adopted an organizational procedure that defines a global line of action to improve the environmental perfor-

mance of its suppliers; specifically, roles and responsibilities are defined in order to implement Consequence Management, as well as actions against its contractors, in the event of their involvement in significant environmental events and/or due to low performance on specific environmental issues, encountered during the performance of the contract.

Finally, it should be noted that in analyzing the local context, which forms the basis for the community relations model, an assessment of the main social and environmental risks and opportunities is carried out in order to minimize them and promote socio-economic development. See the chapter on "Engaging communities".

## Preserving biodiversity

| 3-3 | 304-1 | 304-2 | 304-3 | 304-4 |

### Enel's commitment to biodiversity

Protection of biodiversity is one of the strategic objectives of Enel's environmental policy and is regulated by a specific policy adopted by Enel in 2015 and renewed in 2023 following COP 15. The policy defines the guidelines for all the Group's biodiversity protection initiatives and the principles according to which they operate, aligned with the Kunming-Montreal Global Biodiversity Framework.

Enel has renewed its commitment to biodiversity, published in the 2022 Sustainability Report, by committing itself to concrete actions and time targets.



## Biodiversity Policy

Enel's roadmap on biodiversity conservation is in line with the Kunming-Montreal global biodiversity framework, embracing the mission of taking action to halt and reverse biodiversity loss by 2030.

In particular, our Company is committed to:

- applying the **mitigation hierarchy principle** in all project phases, avoiding and reducing impacts on high biodiversity areas and ecosystem functions and services, reducing deforestation and habitat transformation; where avoidance is not possible, we strive to minimize adverse impacts, implement rehabilitation and restoration measures and finally, compensating for residual impacts;
- implementing, in the case of biodiversity significant residual impacts for new development projects, compensatory works according to the commitment of "No Net Loss" of biodiversity and "No Net Deforestation", and where applicable to have a Net Positive balance;
- assessing and transparently disclosing impacts, dependencies, risks and opportunities on biodiversity along operations, supply and value chains, setting goals and targets on priority issues;

- promoting biodiversity and nature-based solutions integration into business solutions for customers and urban ecosystem, boosting related environmental and social positive impacts;
- collaborating with public administrations, research centers, environmental and social associations and international stakeholders, as partners in the conservation, restoration and sustainable use of resources, fostering new innovative and systemic approaches and synergies while respecting the rights of indigenous peoples and local communities;
- monitoring and reporting progress towards the achievement of local and global goals and targets in alignment to main international standards and in a transparent and responsible approach, for accounting performances on biodiversity and natural capital management;
- promoting environmental awareness towards workers and stakeholders, to valorize biodiversity conservation and responsible use of natural resources.



## Our commitment to nature

Enel undertakes to achieve **No Net Loss of biodiversity** for new infrastructures from 2030, commencing its adoption on selected projects in areas of high biodiversity importance beginning 2025. To achieve this goal, Enel will work in accordance with the principles of the Mitigation Hierarchy to avoid, minimize and recover impacts on natural habitats or species that are threatened, endemic or restricted in range.

In addition, Enel is committed to conserving forests and, if deforestation cannot be avoided, will reforest areas of equivalent value in line with the principle of “**No Net Deforestation**”.

Enel will not build new infrastructures in areas designated as UNESCO World Heritage Natural Sites.

Enel integrates the assessment of risks and opportunities linked to nature into corporate activities in order to align risk management strategy and processes; it also undertakes to evaluate 100%<sup>(8)</sup> of the significant assets in operation by 2025 in order to update, where necessary, the associated action plan.



<sup>(8)</sup> For Enel Grids, the assessment focuses on significant assets in protected areas.



With technical and specialist support from The Biodiversity Consultancy, Enel has developed a methodology for site-specific adoption of the “No Net Loss” (NNL) principle on biodiversity, developed in a functional manner and integrated into business processes and in line with International Finance Corporation Performance Standard 6 on conserving biodiversity and living natural resources, in order to define any mitigation actions necessary for individual projects.

## No Net Loss: from analysis to implementation

The methodology involves applying an impact mitigation hierarchy starting from a preliminary analysis of natural habitats, including forests, and priority species, by means of a desk analysis that involves the use of application tools such as GIS Portal (Geographic Information System)—for the correlation of georeferenced information relating to assets with global maps on habitats (IUCN Habitat Type Classification) and on species (IUCN Red List of Threatened Species)—and IBAT (Integrated Biodiversity Assessment Tool), which is specifically for biodiversity. In addition to the desk analysis, site surveys are carried out starting from the localization of the new infrastructure, and continuing up to the execution and monitoring phases. In order to mitigate and compensate for any residual impacts on natural habitats—including forests—and species, specific action plans (BAP – Biodiversity Action Plan) are defined and broken down into monitoring, conservation and compensation projects, responding to NNL’s commitment to biodiversity. Enel tested the methodology by developing a number of pilot cases, starting with environmental impact assessments and the related mitigation actions already identified; it emerged that in some cases, the actions identified already guarantee achievement of the NNL, whereas for others, additional offsetting actions are required. By way of example, the results on some of the sites analyzed are shown below.

**Carbo Project** – The project is a study for the construction of a photovoltaic system over a site spanning 96 hectares in Spain (Andalusia), which is situated in natural habitats



characterized by the presence of oaks and shrubs, and in habitats modified by the presence of crops. The species analysis did not highlight any species at risk of extinction (IUCN Red List of Threatened Species). During the impact assessment phase, many actions were defined for the conservation of local biodiversity, such as planting oak trees and green corridors along the perimeter of the plant, as well as protection and conservation interventions for some characteristic species (for example, installation of water stations, construction of protective covers using piles of stones, restoration of old buildings close to the plant used by various species as potential nesting sites) in order to promote the reproductive capacity of the species. The defined compensation plan satisfies the NNL criterion and no additional offsetting actions are required.

**Barzalosa Project** – Additional case to apply the methodology, concerning the design, in the Municipality of Girardot (Cundinamarca), Colombia, of a new primary substation (0.89 ha surface area) and related high voltage line (0.8 km) and medium-voltage line (47.5 km). From the impact assessment, important actions were defined to protect biodiversity, minimize impacts, and carry out reforestation, despite the area being situated within a partially urbanized habitat. Right from the screening phase, Enel identified the type of habitat with the aid of application tools and the use of detailed global satellite maps; desk analysis were also conducted on the animal species in the area, also supported by the results of monitoring campaigns carried out *in situ*. Although the application of the NNL methodology estimated a negligible net loss of biodiversity, Enel nonetheless committed to the restoration, conservation and enhancement of habitat by planting of over 200 native trees.

## Measures taken to reduce impacts

Enel has consolidated experience in managing and protecting biodiversity near its production sites, starting from the site design and construction phases; particularly in the past few years, activity has focused on renewable plants and distribution networks, in line with the Group's decarbonization strategy. The Group Guidelines, issued in 2019, define the principles and procedures for managing impacts on biodiversity during the entire life cycle of plants, from the development phase to operation and decommissioning, through the application of the **Mitigation Hierarchy** in the various phases of the life cycle.

For the Group's plants and installations that have been present in the local area for a long time, environmental protection and monitoring action plans are also adopted. In line with international standards and the principles of the biodiversity policy, the risk to biodiversity is assessed in an integrated manner right from the **feasibility** phase, starting with the location of the site of interest, and involves an assessment of the type of habitat, prioritizing habitats that do not present environmental criticalities, and considering geographical proximity to protected areas, habitats that are critical or important for biodiversity, as well as the potential presence of endangered species in the area of interest. To support the definition of local action plans for the mitigation of any risk identified, Enel adopts a consolidated process of stakeholder engagement, which involves continuous dialogue in synergy with all stakeholders—local communities, competent authorities and research institutes—with a view to supporting increasingly sustainable business for the economy, nature and people.

In the **construction** of new plants, specific action plans are also adopted to protect biodiversity by checking the effectiveness of the actions undertaken and the occurrence of any potential impacts, including at a later stage after the works have started. In the case of large plants, impact mitigation plans are envisaged, developed together with local stakeholders, including reforestation (see box "Restoration of the El Quimbo tropical forest").

Once the infrastructure is **commissioned**, protection of biodiversity becomes an integral part of environmental management, through periodical management for the checking of impacts highlighted in the authorization phase, as well as the continuous assessment of potential impacts that could occur later. This is also the moment where the plant consolidates its relationship with the local area and

where initiatives are developed, such as voluntary projects to safeguard local species and improve habitat conditions, based on knowledge of the environment surrounding the site. The results of monitoring at the local level are communicated and analyzed at global level by means of internal tools, allowing the identification of general issues that need to be addressed with improvement plans or projects at Group level. The main impacts on biodiversity during operations linked to technologies are:

- **wind plants:** impacts related to collision with birds and bats. Among the global initiatives aimed at reducing interference with birds and bats, the Wind Wildlife Challenge project (2022) was launched, which involves identifying increasingly innovative solutions such as the use of sensors and tools, based on radar, chamber and multi-sensor technologies, that can detect and even actuate the automatic shutdown of the turbine concerned; tests are under way on plants in Italy, Spain, Chile, the United States and Canada. This testing campaign follows the one already launched in 2021 in the South African plant of Gibson Bay with ultrasonic deterrent systems specifically for bats;
- **hydroelectric plants:** interference with fish and soil erosion; respectively, fish restocking actions are envisaged to restore the ecosystem and species, such as the restoration or improvement of spawning or fry habitats, the planting of native species directly or near the banks of the reservoir in order to control the stability of the terrain, and also to improve habitat conditions;
- **solar plants:** related to the occupation and possible transformation of habitats. The main initiatives include agrivoltaics, where the spaces between rows of photovoltaic modules are used to plant aromatic and medicinal herbs, food plants and melliferous flowers to also encourage the establishment of pollinator species, which improve the biodiversity of the site's ecosystems and ecosystem services;
- **distribution networks:** risk of birds colliding with overhead lines being electrocuted; for this reason, starting from the design phase to the operation and maintenance of existing sites, according to the biodiversity aspects associated with the site, Enel adopts mitigation measures, including the installation of line marking devices at regular intervals along overhead power lines, as well as the isolation of live parts. Added to this are actions related to the mitigation of interference risks during the construction phase, including the relocation of terrestrial fauna to protected areas.

## Reforestation São Luiz Gonzaga (Rio Grande do Sul)

Maintenance activities on existing networks require deforestation interventions to guarantee the correct and safe functioning of power lines and substations. In order to mitigate the impact of maintenance carried out on operational networks, Enel defines and adopts recovery plans for impacted habitats, through systematic planting of native species.

## Restoration of the El Quimbo tropical forest (Colombia)

Near the El Quimbo hydroelectric plant in Colombia, an important reforestation project focusing on tropical dry forest was started in 2014 and is still ongoing, which will affect a total area of over 11,000 hectares in the various stages of the project. In the initial phase, launched on an area of 140 hectares with the support of Fundación Natura, the best strategies to be implemented in the restoration process were defined and the optimal native species for restoration and propagation were identified; the pilot phase also led to the discovery of a new species

The main initiatives notably include an activity launched in 2017 in the Municipality of São Luiz Gonzaga (Brazil), which was completed and tested as recently as the end of 2022, linked to the license for maintaining the distribution network in the area. It is a reforestation activity using plants for phytodepuration as well as melliferous species, which are used to attract pollinating insects, created at a former landfill. Local communities have also been involved in monitoring herbaceous and shrubby flora grown in the area. Furthermore, some bird species have also been considered, for which a census was carried out based on the sighting and discovery of nesting sites.

of bromeliad *Pitcairnia huiensis*. In 2022, the area covered by the restoration projects totaled approximately 7.3 thousand hectares, including approximately 6.6 thousand hectares of assisted natural regeneration and approximately 0.7 thousand hectares of active restoration. In addition, the "Attalea" Tropical Dry Forest Research Center was created, which works in collaboration with Colombian universities on numerous ecological restoration initiatives, collaborations and projects in support of biodiversity research. Demonstrating the importance of the area from an ecological perspective, around one thousand hectares of the area being restored have already been declared a Civil Society Nature Reserve, while the possibility of extending the protected area to include a further 3 thousand hectares is being evaluated.

## Opportunities for development and shared wellbeing

For us, interacting with the local area and communities is an opportunity to promote socio-economic development, generating value and wellbeing through our services and products, in all the contexts in which we operate. In particular, as far as cities are concerned, the ongoing growing trend of urbanization can generate significant conflicts between natural and urban environments. To meet

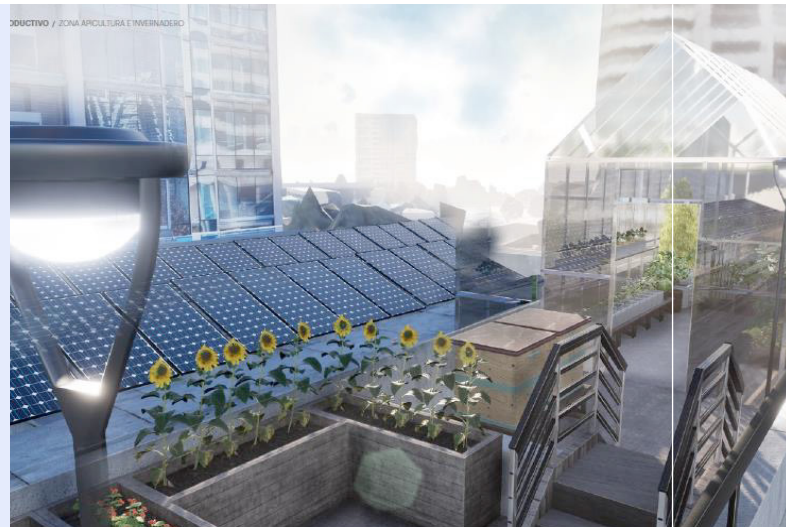
this need, Enel recognizes the importance of adopting **nature-based solutions (NBS)** as a powerful tool for sustainable city planning and innovative design for customers who address these issues. Enel X Global Retail proposes NBS solutions that can be integrated into the offer portfolio, and which have been associated with internationally recognized scientific indicators that are used to measure the positive impacts on urban biodiversity. In practice, the NBS solutions can be integrated with technological solutions and are aimed at providing ecosystem services, from climate change adaptation and mitigation to improving the quality of life in urban centers.



## Nature in the city

One of the various global initiatives for integrating NBS with Enel X solutions is an intervention carried out in Santiago, Chile, involving the rooftop refurbishment of the **Mandarin Hotel**; along with the installation of a new photovoltaic system, a biodiversity intervention was carried out involving the construction of a greenhouse, the planting of local fruit trees and the installation of a number of beehives to protect pollinating species and develop urban beekeeping.

A further environmental redevelopment intervention was carried out in the city of **Bogotá (Colombia)**, near the **e-bus terminal**, by Enel X Global Retail. The intervention involved planting urban vegetable gardens and vertical greenery, which was integrated with a number of murals. The initiative also directly engaged the local community in choosing artistic content and enhancing the urban garden.



The strategy linked to urban biodiversity is associated with further opportunities linked to power generation, such as the creation of **agrivoltaic plants**, which integrate business needs with nature. In recent years, many pilot solar plants

have been built, where planting of native and pollinating species has been carried out, to support the entire ecological balance, as well as promoting sustainable crops, in synergy with local communities.

## The biodiversity action plan

In 2022, **200 projects** were carried out to protect species and natural habitats at operating plants, of which 82 were developed in partnership with government agencies and non-governmental organizations and universities, for a total investment of around **11.9 million euros**. The projects were carried out in all countries and regions and mainly concern operational renewable generation plants and distribution networks. The projects included **habitat recovery activities covering 9,452 ha** (9,092 ha in 2021), most of which are related to ecological restoration and reforestation, mainly in Colombia, Brazil, Chile and Spain. Examples of the measures to mitigate impacts on biodiversity carried out to apply the related policy are available on the sustainability section of the [www.enel.com](https://www.enel.com) website, at

the following link: <https://www.enel.com/investors/sustainability/strategy-sustainable-progress/biodiversity>.

In addition, in 2022 a further **63 projects** relating to plant construction sites were carried out, mainly in Brazil, Chile, Spain and North America, targeted at the conservation and monitoring of native species impacted, for an overall capital expenditure of **6.4 million euros**.

**200** projects  
for the protection of  
species and natural habitats

**9,452** ha  
of habitats restored  
(related to projects carried  
out in 2022)



## Interaction of assets with biodiversity and protected areas

Enel measures its environmental performance on aspects of biodiversity in a transparent and responsible way, both in the construction of new plants and during the operation of its power generation sites. For this reason, in 2021 we defined and calculated a set of specific indicators, which

are updated annually, to measure the impacts generated and monitor the effectiveness of action plans.

**Land occupation:** the area of land occupied by assets. This is a general indicator, as it does not provide an indication of the quality of the habitat that has been occupied by the assets.

### Land occupation<sup>(9)</sup> – Power generation assets

Technology	Hectares (ha) in 2021 <sup>(10)</sup>	Hectares (ha) in 2022
Solar	16,632	27,773
Wind	12,660	13,326
Hydroelectric	202,425	202,425
Geothermal	442	442
Thermal	6,318	6,318

In 2022, the land occupation of power generation assets increased by **11,807 ha**, equal to +5%<sup>(10)</sup> of the total (238,477 ha in 2021), including 4.7% solar and 0.3% wind, in line with the development of new plants envisaged by the business strategy.

### Land occupation – Asset Grids<sup>(11)</sup>

This year, data on the occupation of distribution infrastructures is also reported for the first time, calculated by evaluating the buffer zone for high-voltage (HV) and medium-voltage (MV) lines as land occupation, distinguished by voltage level and type of conductor (bare or in cable) and the surface area of transformer substations.

Technology	Hectares (ha) <sup>(12)</sup>	km
Primary and secondary substations	2,539	-
High Voltage Lines	54,296	33,716
Medium Voltage Lines	431,307	653,205
Total	<b>488,142</b>	<b>686,921</b>

**Transformation of natural habitats:** measures the area of land occupied in hectares (ha), classified according to the IUCN<sup>(13)</sup> habitat categories on which the assets have been built. It therefore represents a specific indicator of the impact on habitats that have been transformed to build plants. Power generation plants that entered operation in 2022 occupy land amounting to **11,807 ha**, an increase of 10% on the growth recorded in 2021 (10,700 ha), due to an increase in the development of renewable energies; of this new land occupation, **5,770 ha** (49%) relate to natural habitats (23% less than the previous year, 7,530 ha), and, of these, **537 ha** (5%) are related to forest-type habitats. As far as distribution is concerned, almost all HV and MV lines were built in the 1970s, mainly in urbanized habitats.

Around 70% of the infrastructures built to date are situated in cultivated areas, grazing land and urban areas; only the remaining 30% of the infrastructures have impacted natural-type habitats, of which only 9% are forest-type habitats.

**Presence of assets in protected areas:** mapping was carried out for all power generation assets and from this year also for Grids HV and MV lines, in the main Countries,<sup>(14)</sup> to assess the presence of assets in UNESCO World Heritage Natural areas and IUCN I-IV classified protected areas.

(9) Land occupation was calculated for power generation facilities using a GIS application in which each plant was modeled and georeferenced. The following criteria were used to model land occupation and area of influence: solar, thermoelectric and geothermal were modeled with the plant perimeter; for hydroelectric, the perimeter of the reservoirs was modeled; for wind plants, from the position of the generators the area of land occupation is modeled in a precautionary manner to take into account ancillary works such as yards, roads and areas used when the construction site is operative (in so far as they are subsequently restored).

(10) Compared with last year, KPI mapping and calculation tools were refined, which led to a slight change in the figure compared to 2021.

(11) Italy, Spain, Chile MT, Peru, Colombia and Brazil (São Paulo, Rio de Janeiro, Ceará) are considered.

(12) Land occupation intended as a buffer zone for HV and MV lines and the area occupied by primary and secondary substations was calculated using the PUC (Single Cartographic Portal).

(13) <https://www.iucnredlist.org/resources/habitat-classificationscheme>.

(14) Italy, Spain, Chile MT, Peru, Colombia and Brazil (Sao Paulo and Rio de Janeiro).

### Presence of power generation plants in protected areas as at 2022 – by technology<sup>(15)</sup>

Technology	number of infrastructures in protected areas/total number	Countries	Presence in protected areas (ha)	Presence in protected areas as % of the total occupied by technology
Solar	4/161	Greece	32	0.1%
Wind	8/266	Italy/Spain	116	0.9%
Hydroelectric reservoirs	135/1,096 <sup>(16)</sup>	Italy/Spain/Chile	5,595	2.8%
Geothermal plants	0/39	-	-	-
Thermoelectric plants	2/9 <sup>(17)</sup>	Italy	28	0.4%

### Presence of power plants in protected areas – by Country

Renewable and thermoelectric power plants		
Countries	Hectares (ha)	% in protected area of the total area occupied in the Country
Italy	3,738	19%
Spain	1,986	8%
Greece	32	6%
Chile	15	0.03%
<b>Total</b>	<b>5,771</b>	<b>2.3%</b>

The number of generating plants situated within protected areas (IUCN I-IV) **remains unchanged since 2013**, as no new plants have been built in these areas. The presence of power generation assets in protected areas mainly refers to hydroelectric plants which were largely built before the 1970s (in many cases before the creation of protected areas) and which are managed according to basin management plans shared with the authorities and which promote the conservation of local species. Notable examples are the multi-year ENDESA-bats project, developed voluntarily in the autonomous Spanish provinces of Catalonia, Galicia, Andalusia and Aragon through the study and monitoring of the bat populations that inhabit the tunnels of

hydroelectric plants and infrastructures. This project aims to improve the knowledge and conservation of cave bats, their ecological needs and their relationship with the operation of hydroelectric plants, through study and monitoring campaigns, using new cutting-edge methods and technologies such as automatic monitoring by means of time-lapse photography (photo-trapping) and ultrasound recordings. Through the collation of data, Enel carries out various actions to adapt its plumbing systems so that they promote bat colonies, including the air conditioning of tunnel entrances, the targeted positioning of shelter boxes and a reduction in brightness at a number of points that are critical to the bats.

### Presence of distribution infrastructure in protected areas as at 2022 – by technology

Technology	Hectares in protected areas (ha)	% in protected areas of the total occupied by the asset <sup>(18)</sup>
Primary and secondary substations	28	1.1%
High and medium voltage lines	13,769	2.8%
<b>Total</b>	<b>13,797</b>	<b>2.8%</b>

The countries in the Enel Grids perimeter with the highest proportion of assets present in protected areas are Spain, Italy and Brazil. Most of the Enel Grids infrastructure was built before the 1970s, in many cases before the creation of protected areas. In cases where the infrastructure falls within a protected area, Enel creates the best solutions




to mitigate impact on the surrounding environment, also considering the need to comply with its service obligation. Below are some examples of mitigation projects currently under way for infrastructure that falls within protected areas (IUCN I-IV).

(15) The data reported on GIS has been revised and optimized, leading to adjustments in the value of hectares (ha) and the number of plants compared with last year.

(16) The figure represents individual reservoirs, not hydroelectric power generation plants.

(17) The figure includes plants being decommissioned.

(18) Out of the total of HV and MV lines.

Technology	Country	Plant	Land occupation (ha) in protected areas	Critical species impacted	Habitat	Biodiversity projects
Refurbishment of existing HV line	Colombia	New Hope – Indumil	3	Bromeliaceae ( <i>Tillandsia spp.</i> ), Orchidaceae ( <i>Epidendrum secundum</i> )	Forest	Rescue, translocation and safeguarding of 56 specimens of epiphytic plants (orchids and bromeliads)  Actions for rescue and translocation of epiphytic flora
Refurbishment of existing HV line	Colombia	Zipaquirá – Ubaté	22	Native and non-native plants belonging to different forest species ( <i>Juglans</i> , <i>Quercus</i> , <i>Fuchsia</i> , <i>Trichanthera spp.</i> )	Forest	Planting to offset trees removal and vegetation clearance  Reforestation intervention
HV line maintenance	Brazil/Rio	Casimiro de Abreu/Rio Tabicum	1.5	<i>Schinus</i> , <i>Albizia</i> , <i>Cordia</i>	Forest	Planting to offset trees removal (about 600 specimens)  Reforestation intervention (clearing, digging holes, planting)





## Biodiversity project to protect the huemul (Chile)

The huemul (*Hippocamelus bisulcus*) is a species of deer found in the area of influence of the Ñuble National Reserve, a forest reserve located near the hydroelectric plants located in the Laguna del Laja. It is a native species that is endemic to Chile and an emblem of the country, and is at risk of extinction according to the Red List of Threatened Species compiled by the International Union for Conservation of Nature (IUCN). The huemul population located in Los Nevados de Chillán in central Chile is vulnerable due to its small size and highly fragmented distribution. Since 2018, Enel has participated in a multidisciplinary project led by the Chilean Ministry of the Environment to develop and implement the "Biodiversity project to protect the huemul", which involves defining a plan for the restoration, conservation and management of the huemul population, with a view to reducing threats to the species and increasing protection measures through habitat restoration and conservation. In February 2022, the plan was approved by the Chilean Ministry of the Environment, recognizing Enel's contribution to conserving this species and preventing the risk of its extinction.



## Eagle owl conservation project in Catalonia

In the first half of 2021, a project was launched in Catalonia (Spain) to monitor and conserve the eagle owl, which is the largest nocturnal bird of prey in Europe and whose conservation is under threat. Indeed, in Spain it is included in the "List of Wild Species in Regime of Special Protection" and in Catalonia it is listed as a protected species.

The project involves the adoption of specific measures to avoid the birds being killed by medium- and low-voltage lines, an initiative that is part of the voluntary projects of the Endesa Biodiversity Conservation Plan, developed with the Birding Natura company. For several weeks, a live webcam was used to display real-time activity in a nest in the plain of Lleida, in the region of Les Garrigues. In addition, radio tracking transmitters were placed on 6 eagle-owl chicks, tracking a total of 6 chicks and 6 adult






birds. This measure provides information about their flight patterns during a period of one year, in order to identify and analyze the decisive factors in their development.





**Biodiversity Significance:**<sup>(19)</sup> this qualitative indicator makes it possible to classify power generation plants according to the importance of biodiversity present in their vicinity (high/medium/low). The methodology therefore makes it possible to identify priority sites for the protec-

tion of biodiversity in order to ensure proper management to mitigate potential impacts. Also in this case it should be noted that most sites of high significance are related to hydroelectric plants, generally infrastructures built in mountain areas and present in the locality for many years.

					
Sites of high biodiversity significance/ total plants by technology	19 / 161	66 / 266	541 / 1,096 <sup>(1)</sup>	39 / 91 <sup>(2)</sup>	0 / 39

(1) The figure represents individual reservoirs, not hydroelectric power generation plants.

(2) The figure includes plants being decommissioned.

In 2022, **4 new power generation plants** were built in areas of high biodiversity value, 2 fewer than in 2021, including 3 in critical habitats and 1 in areas containing species at

risk of extinction, for which action plans were developed to restore habitats and protect species.

Technology	Country	Plant	Land occupation (ha)	Significance	Critical species potentially impacted	Habitat	Biodiversity projects
Solar	Spain	Sol de Casaquemada	77	Critical habitat	<i>Nyctalus lasiopterus</i> <i>Rhinolophus mehelyi</i> <i>Otis tarda</i> <i>Tetrax</i>	Grassland	Installation of nests, perches, insect boxes and bird feeders
Solar	Spain	Torrecilla	118	Critical habitat	<i>Triturus boscai</i> <i>Aquila adalberti</i>	Wetlands and Grassland	Habitat improvement for amphibious reptiles and other faunal groups: restoration of ponds to promote biodiversity Habitat improvement for wild rabbits in the Francisco Pizarro node Improvement of habitats and shelters for birds of prey
Solar	Spain	Can Lloreta	6	Critical habitat	<i>Olea europaea</i>	Grassland	Restoration of degraded area
Wind	Spain	Tico	9	Endangered species	No endangered species mapped in the project area	Wetlands and Grassland	Monitoring of birds and bats: - baseline definition and species conditions; - impact monitoring before and during construction

**Presence of endangered species near plants/assets:** knowledge of protected species potentially present in the vicinity of assets is important in order to evaluate the actions needed to reduce the risk of interference by Enel assets. This type of mapping is carried out for all infrastruc-

tures for which biodiversity projects are developed and includes both flora and fauna species. The summary of this mapping is presented in the infographic table of biodiversity projects.

(19) To identify areas of high biodiversity importance, the following general criteria are considered: 1) Protected areas (UNESCO World Heritage Natural Sites and IUCN I-IV); 2) Critical habitats as defined by IFC Performance Standard 6; 3) Presence of endangered species, according to the methodology developed and adapted by UNEP-WCMC, Conservation International and Fauna & Flora International ("Biodiversity indicators for site-based impacts", 2020).

- Critically Endangered (CR)
- Endangered (END)
- Vulnerable (VUL)
- Near Threatened (NT)
- Least Concern (LC)

Country	No. of projects	Project type							Group	No. of species on the IUCN Red List					
		Mandatory	Voluntary	of which voluntary	Monitoring	Conservation (species)	Restoration (habitats)	Research and other purposes		CR	EN	VU	NT	LC	Total
Argentina	3	2	1	33%	1	1	-	1		-	-	-	-	-	-
Brazil	46	38	8	17%	16	7	21	2	Birds; Mammals; Fish; Plants	1	9	36	58	285	389
Chile	27	12	15	56%	9	6	6	6	Birds; Plants	-	-	3	3	69	75
Colombia	15	6	9	60%	4	5	4	2	Birds; Plants; Mammals; Reptiles	-	2	3	5	58	68
Greece	2	1	1	50%	2	-	-	-	Birds	-	1	3	3	60	67
Guatemala	8	-	8	100%	5	-	3	-	Birds; Mammals; Plants; Amphibians and Reptiles	3	3	4	8	80	98
Iberia	48	8	40	83%	2	32	8	6	Birds; Bats; Mammals; Plants	-	6	14	13	46	79
Ireland	1	-	1	100%	-	1	-	-		-	-	-	-	-	-
Italy	30	8	22	73%	6	21	3	-	Birds; Bats; Mammals; Plants; Fish	3	3	18	4	37	65
Mexico	4	4	-	-	4	-	-	-	Birds; Bats; Plants	-	1	6	8	38	53
Panama	1	1	-	-	-	-	1	-		-	-	-	-	-	-
Peru	5	3	2	40%	3	2	-	-	Birds; Plants	-	-	-	1	2	3
Romania	9	3	6	67%	3	6	-	-	Birds	-	1	5	2	7	15
South Africa	1	1	-	-	1	-	-	-	Birds; Bats	-	3	1	1	18	23
<b>Total</b>	<b>200</b>	<b>87</b>	<b>113</b>	<b>57%</b>	<b>56</b>	<b>81</b>	<b>46</b>	<b>17</b>		<b>7</b>	<b>29</b>	<b>93</b>	<b>106</b>	<b>700</b>	<b>935</b>

**Assessment of ecosystem services:** among the approaches that have been developed for some years in the scientific community to describe fully the contribution provided by biodiversity and nature, one relates to the optimization of ecosystem services. In this area, Enel continues to de-

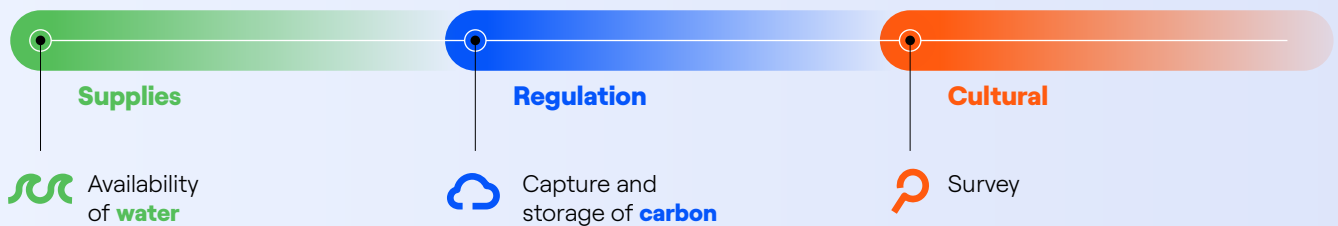
velop studies to verify how this approach facilitates better environmental management of its infrastructures in order to maximize the benefits for the environment and for local communities (see the dedicated box: "Optimization of ecosystem services in Chile").

## Evaluation study of ecosystem services in the Fundación Huinay

Enel carried out a study in Chile to identify and enhance the most relevant ecosystem services in natural areas taken as a benchmark, in order to propose management measures for their conservation. In addition to the 5 areas assessed last year (totaling an area of 10,300 ha) which are part of the appurtenances of a number of hydroelectric plants owned by Enel in Chile, in 2022 a

survey was conducted on a further 34,300 ha owned by the Fundación San Ignacio del Huinay, of which Enel is a founding member together with the Pontifical Catholic University of Valparaíso.

Ecosystem services have been classified according to the "Common International Classification of Ecosystem Services" (CICES) (<https://cices.eu/>), which selects and classifies services through participatory methods, applying internationally accepted standards. These are presented in three main areas, namely: cultural services, regulating and provisioning. The main ones are shown below:



The significant theoretical aspect of the environmental factor has become an economic model, put into practice on a conceptual level and tested in various environments, both

industrial and uncontaminated, yielding useful results for making socio-environmental decisions.

Ecosystem services

**845,110 €/year**

Economic value creation

### The numbers at a glance

**34,311 ha**

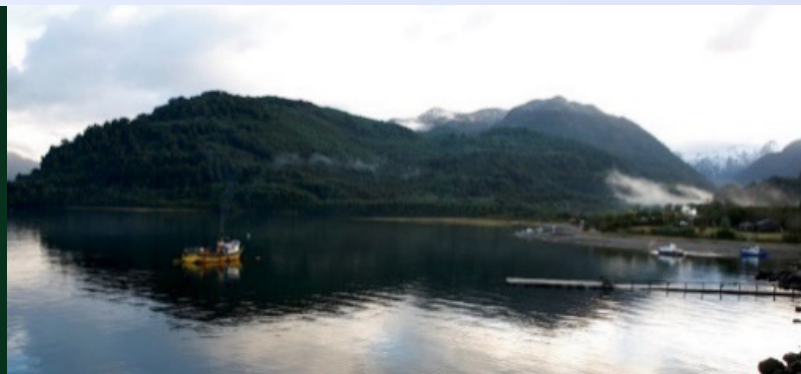
Analyzed surface

**109,705 tCO<sub>2</sub>/year**

CO<sub>2</sub> capture potential

**18**

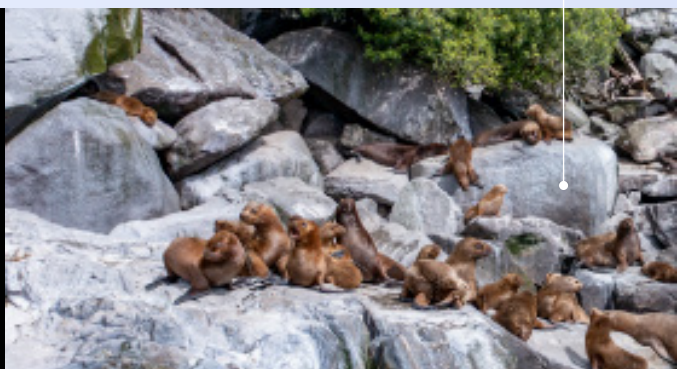
Ecosystem services analyzed and leveraged for a Management Plan



## Huinay – POETA Program – an example of a partnership for researching the impacts of climate on nature

In 2021, Fondazione Centro Studi Enel signed a partnership agreement with Fundación San Ignacio del Huinay with the aim of developing joint projects involving research, analysis and scientific studies. The partnership encompasses ecological issues, management and conservation of ecosystems and biodiversity, and focuses on the development of the POETA program

(Observation of the terrestrial and aquatic ecosystem of Chilean Patagonia) which was launched in 2018 **with the aim of giving a scientific response to the climate emergency in Chile and around the world**. Specifically, the program has a twofold objective: the first is to **conduct long-term monitoring of the essential variables of the climate and the terrestrial and aquatic ecosystems** of Chilean Patagonia, through a network of automatic stations, field sampling and remote detection; the second is to provide, with the help of the **GEOOs portal** (Observational Geoportal), a freely accessible, real-time data management and information transfer system useful for decision-making.



## Reducing pollution

3-3 | 305-7 |

The reduction of the environmental impacts associated with the operation of our plants is a strategic objective for us, pursued through the application of the best technologies available and best international practices. During 2022, Enel continued its commitment on the path towards decarbonization. However, it should be noted that, due to the ongoing energy contingency in some countries in our perimeter, there was an overall increase in coal-fired generation compared with 2021, particularly in Italy due to the disconnection of energy supplies from Russia. For details on greenhouse gas emissions, please refer to the chapter “Zero emissions target”.

The constant commitment to improving air quality in the areas where Enel operates is demonstrated by the care paid to reducing the main atmospheric pollutants associated with thermal generation: sulfur oxides ( $\text{SO}_2$ ), nitrogen

oxides ( $\text{NO}_x$ ), and dust. To this end, over the years numerous measures have been taken to improve the environmental performance of most of the thermoelectric plants in the company's fleet, beginning from best technologies and international practices and taking into consideration factors such as context and local priorities, the plant configuration and its potential service life.

For years, the Group has set itself important objectives to reduce specific emissions of pollutants emitted into the atmosphere by 2030. In line with the SBTi certification process with respect to the Group's GHG emissions, which involved revising the 2017 targets and baseline net of asset deconsolidations as at December 31, 2022,<sup>(20)</sup> the 2017 target values and the baseline for the main environmental indicators were also revised. In particular, for emissions of pollutants into the atmosphere, the **new targets** include:

(20) For reference, see the chapter “Zero emissions ambition”.





## Objective of reducing our main emissions (vs 2017 baseline year)

**Dusts**  
**-60%**  
0.005 g/kWh<sub>eq</sub>

**SO<sub>2</sub>**  
**-85%**  
0.05 g/kWh<sub>eq</sub>

**NO<sub>x</sub>**  
**-70%**  
0.16 g/kWh<sub>eq</sub>

Starting from this year, the target of reducing Hg emissions from coal-fired thermoelectric plants by 100% compared to the year of reference will also be introduced.<sup>(21)</sup>

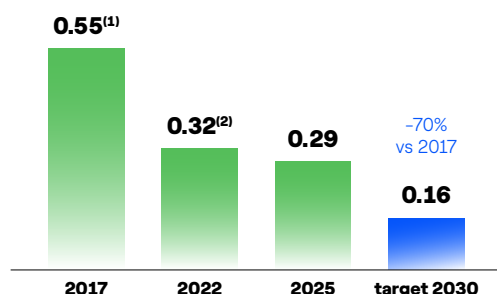
Pollutant reduction trends and targets are consistent with the Strategic Plan and with the Group's decarbonization objective.

Emission measurements are carried out in compliance with each Country's regulatory framework and, in the majority of large plants, a measurement system is used that can assess compliance with the limits in real time. Its reliability is guaranteed by accredited certifying entities and through assessments carried out by inspection authorities.

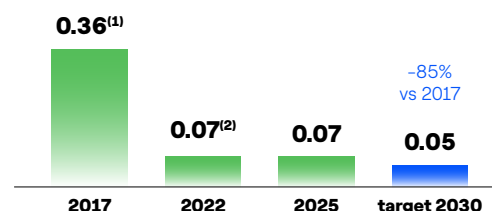
In 2022 there was a slight decrease in NO<sub>x</sub> emissions, in both absolute and specific terms, linked to the concomitant lower overall generation of gas and CCGT plants.

By contrast, SO<sub>2</sub> and dust emissions are in line with last year. In particular, specific emissions of SO<sub>2</sub> totaled 0.07 g/kWh<sub>eq</sub> (in line with 2021, which was 0.07 g/kWh<sub>eq</sub>), NO<sub>x</sub> emissions 0.32 g/kWh<sub>eq</sub> (-8.6% compared with 2021, which was 0.35 g/kWh<sub>eq</sub>) and dust 0.005 g/kWh<sub>eq</sub> (in line with 2021, which was 0.005 g/kWh<sub>eq</sub>). For mercury emissions, the value for the year 2022 was 75 kg of Hg, down 81% compared with 2017. For these emissions—which have also always been subject to constant monitoring and reduction in all plants of the coal-fired thermoelectric park through the adoption of the best available and technologically applicable abatement techniques—as previously stated, the target value of 0 kg of Hg (-100%) by 2030 was set, in line with the expected closure of all coal-fired plants by 2027, whereas the value set for 2025 is 14 kg of Hg (-96% vs 2017).

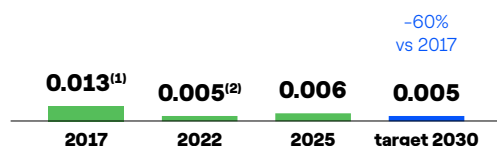
### NO<sub>x</sub> (g/kWh)



### SO<sub>2</sub> (g/kWh)



### Dusts (g/kWh)



(1) Values recalculated net of corporate deconsolidations as at December 31, 2022.

(2) The values for 2022 recalculated net of previous corporate deconsolidations are 0.29 g/kWh for NO<sub>x</sub>, 0.08 g/kWh for SO<sub>2</sub> and 0.006 g/kWh for dust.

(21) The target refers to the Countries for which this measure is prescribed and therefore includes Italy, Spain and Chile, whereas Colombia is excluded. The baseline value of 387 kg of Hg, referred to the year 2017, was calculated net of corporate deconsolidations as at December 31, 2022.

## Using water responsibly

3-3 | 303-1 | 303-2 | 303-3 |

The responsible use and conservation of water resources are fundamental guarantees for the protection of natural habitats and for the wellbeing of the people around us who use the ecosystem services provided by these resources, as well as being essential for the success of our own activities, which also depend to a significant extent on the responsible use and conservation of water resources. For this reason, the responsible use of water has been included among the strategic objectives of our environmental policy and is pursued using an integrated management approach.

The preliminary analysis of environmental risks and opportunities, conducted based on the TNFD criteria and reported in the chapter "Identification of impact factors and dependencies on nature and biodiversity", particularly highlighted the materiality, for some energy generation technologies, of impacts linked to the use of water resources, above all fresh water and particularly in areas with high water stress, where competition between natural and human needs is greatest.

Specifically, the main impacts are above all linked to water withdrawal mainly for industrial purposes. Water is large-

ly used in thermal and nuclear generation, for the cooling of thermal cycles and for operating atmospheric emission abatement systems. Overall water requirements for generation are covered, where available, through withdrawals from so-called "non-scarce" sources (mainly including sea water, which is used as-is in open cycle cooling processes and subjected to desalination to obtain industrial water) and, where necessary, from "scarce" sources, represented by surface water, groundwater and water for civilian use. To minimize these withdrawals, as well as maximize the restoration of internal wastewater, Enel uses, where available, treated wastewater supplied by water management consortia.

The main dependencies are instead attributable—in addition to the aforementioned needs of thermal plants—to hydroelectric plants, which, despite having negligible water consumption, depend for their operation on the water cycle which, through rainfall and the melting of snow, constantly replenishes surface watercourses (for further information, see the following paragraph "Responsible and integrated management of water catchment areas").



## Efficient use of water resources

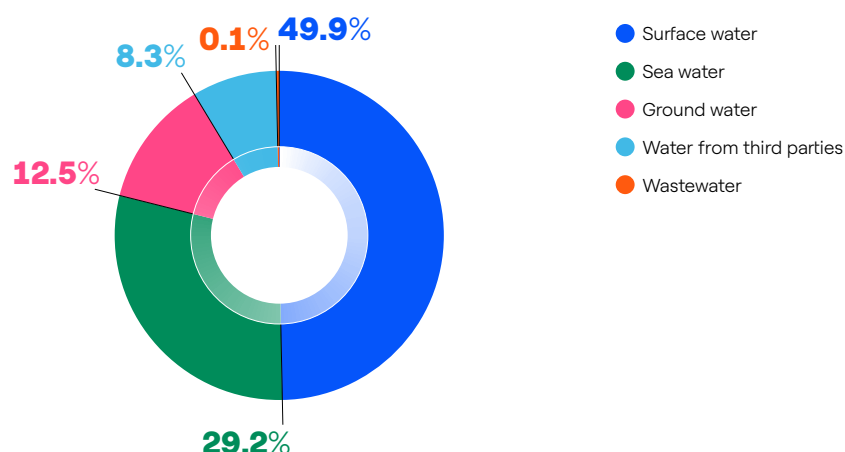
In 2022 total consumption of process and cooling water in a closed cycle<sup>(22)</sup> was approximately 76.0 x10<sup>3</sup> ML, a moderate increase compared to the 2021 figure<sup>(23)</sup> (73.1 x10<sup>3</sup> ML), due to the ongoing international energy contingency and the consequently greater need for electricity generation from coal-fired plants (which are expected to be closed by the end of 2027). As for the specific water requirement<sup>(24)</sup> in 2022 it was 0.27 l/kWh, slightly down on 2021<sup>(25)</sup> (0.29 l/kWh), despite the moderate increase in consumption volumes, thanks to the simultaneous growth of the renewable generation park.

Enel is constantly committed to progressively reducing the specific need for water for its plants and assets, through the efficient use of water in existing thermal plants, the evolution of the energy mix towards renewables, and the progressive reduction of generation from fossil fuels. Among the efficiency measures, particular attention is paid to maximizing the recovery of process wastewater leaving

treatment plants and to measures to increase the efficiency of cooling systems and evaporative towers, by upgrading the control and recovery systems of the drains. Other important optimization interventions concerned the use of crystallizers,<sup>(26)</sup> a technology that allows the complete reuse of waste water in the production cycle, eliminating its discharges (ZLD – Zero Liquid Discharge plants). Finally, great importance is given to the reuse of rainwater collected in plant areas, which cannot be returned as-is to natural receptors as it is potentially contaminated by contact with industrial surfaces. This water is stored in special storage tanks and reused in the generation processes, thus further helping to reduce the environmental footprint of our generation sites.

Measures to improve efficiency in the use of water also make it possible to minimize water effluent as well as total consumption, which are respectively 30.8 x10<sup>3</sup> ML and 45.2 x10<sup>3</sup> ML.

### Water withdrawal by source 2022 (76 x10<sup>3</sup> Mega liters)



(22) The waters used for open cycle cooling are reported separately among the environmental indicators. They are not taken into consideration here in assessing the efficient use of the water resource, as they are returned in full to the natural receptors, without substantial changes in quality, apart from a slight increase in temperature, subject to authorization and continuous control in order to guarantee the absence of measurable impacts on exposed ecosystems.

(23) The total value of process and closed-loop cooling water withdrawal for the year 2021 was recalculated following the refinement in 2022 of the way in which water withdrawn for cooling purposes at certain nuclear power plants in Spain was calculated.

(24) Water needs are constituted by all the water withdrawal quotas from surface (including recovered rainwater) and groundwater sources, by third parties, from the sea and from wastewater (quota for third party procurements) used for processes needs and for closed-cycle cooling, except the quota of seawater discharged back into sea after the desalination process (brine). This latter item (brine) contributes to the total quota of withdrawals.

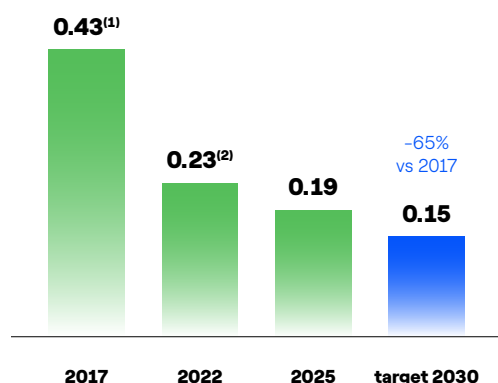
(25) Value also recalculated to take into account the reclassification of the cooling cycles of some nuclear power plants in Spain.

(26) Crystallizers or SEC plants, named after Softening, Evaporation and Crystallization processes.

## The new target for reducing specific fresh water withdrawal and the focus on water-stressed areas

Starting this year, Enel has renewed and relaunched its commitment to conserving water resources by adopting a new, even more challenging target aimed at reducing specific withdrawal of fresh water.

### Specific fresh water withdrawal (l/kWh)



(1) Value recalculated net of corporate deconsolidations as at December 31, 2022.

(2) The value for the year 2022 recalculated net of previous corporate deconsolidations is 0.22 l/kWh.

The target set by the Group for 2030 is a 65% reduction in specific withdrawal of fresh water compared with the base year 2017.<sup>(27)</sup> As already stated, both in this case and as regards the Group's GHG emission reduction targets, the baseline value for 2017 was recalculated to take into account the deconsolidations that took place in the reporting period (see the chapter "Zero emissions ambition"). The new target of reducing specific fresh water withdrawals, turning attention to the most valuable and vulnerable water resource, testifies to the even more explicit commitment to the protection of natural habitats and the needs of local communities. The objective takes into account future developments envisaged by the European legislation on sustainability reporting standards (proposed standard EU EFRAG ESRS-E3 "Water and marine resources"), and the results of the risk and priority analysis carried out at Group level in line with the main international standards being defined (TNFD and SBTN).

The commitment is pursued through the definition, at Group level, of common strategies and specific objectives,

which are implemented locally through the adoption of Environmental Management Systems on all assets for which the resource is material, as well as through water management plans for hydroelectric plants combined with continuous improvement programs shared with local stakeholders (dam authorities, local administrations, control bodies, citizens' committees and NGOs). The measures of impact mitigation and improvement, defined in the management plans, are linked to the guarantee of minimum vital flow and the protection of habitats (see the specific websites of the Environmental Authorities of the various Countries where the group is present).

During 2022, a total of 52.7 x10<sup>3</sup> ML of fresh water was withdrawn for process and closed-loop cooling uses, a slight decrease compared with 2021 (55.5 x10<sup>3</sup> ML), with the specific fresh water withdrawal value at group level standing at 0.23 l/kWh (down on last year's value of 0.25 l/kWh).

Enel also pays particular attention to the vulnerability of the resource, by mapping and constantly monitoring all generation sites located in areas classified as **water-stressed areas**. Mapping of generation, thermal, nuclear and renewable sites falling within water-stressed areas is done in line with the criteria of GRI 303 (2018) with reference to the conditions of "(baseline) Water Stress" indicated by the World Resources Institute Aqueduct Water Risk Atlas.<sup>(28)</sup> Among the sites mapped, those defined as "critical" are those positioned in water-stressed areas and which procure significant volumes<sup>(29)</sup> of fresh water. For these sites, which are specifically thermoelectric and nuclear plants that use water resources for process and closed-cycle cooling needs, water management methods and process performance are constantly monitored, in order to minimize consumption and favor withdrawals from sources of lower quality or which are non-scarce (wastewater, industrial or sea water).

The percentage of water withdrawn in water-stressed areas was approximately 19.3% of total withdrawals in 2022 (23% in 2021). In particular, fresh water withdrawals in water-stressed areas amounted to 12.4 x10<sup>3</sup> ML, generated by 7 significant plants, with an 18% reduction compared with the 2021 value (15.3 x10<sup>3</sup> ML), thanks to optimization actions and the reduced generation of some gas plants located in areas with high water stress.

(27) The values of which have also in this case been recalculated to take into account the corporate divestitures that have taken place in the intervening years, as was done for CO<sub>2</sub> emissions, waste and other atmospheric emissions.

(28) GRI 303 defines "water stressed" areas as those in which, based on the classification provided by the WRI Aqueduct Water Risk Atlas, the ratio, referred to as "baseline water stress", between total annual surface and groundwater withdrawals for different uses (civil, industrial, agricultural and livestock) and the renewable water supply available annually is high (40-80%) or extremely high (>80%). By way of greater environmental protection, those plants located in areas classified by the WRI as "arid" due to the unavailability of water are also considered as located in water stressed areas.

(29) Plants with withdrawals greater than 100 m<sup>3</sup>/year are included.



The specific withdrawal of fresh water in water-stressed areas was 0.12 l/kWh in 2022 (0.16 l/kWh in 2021), lower than the general Group value shown above, demonstrating the Company's priority commitment to adopting, in water-stressed areas, renewable technologies (solar and wind) that do not require significant quantities of fresh water or, in the case of thermoelectric plants, sea water desalination technologies.<sup>(30)</sup>

The strong expansion of the solar plant fleet, which is naturally intended for installation also in water-stressed areas, has nevertheless highlighted potential criticalities for some of these plants resulting from the need to clean the photovoltaic panels in order to remove dust deposited on their

surfaces: although such volumes are insignificant, Enel has adopted innovative solutions for these plants aimed at drastically reducing their water consumption (see the following box on the Roboost project).

In 2020, the Enel Green Power and Thermal Generation division launched the WaVE (Water Value Enhancement) project in order to reduce the use of water resources in all thermoelectric and renewable power generation sites, and to identify improvement actions, particularly in water-stressed areas. The project continued in 2022, refining the mapping of assets and focusing on the effects that climate change may have on the availability of water resources.

## Roboost Project – Robotic washing of solar panels

Our solar plants are often installed in arid regions, where they can benefit from high sun exposure. Although the water consumption needed for washing the panels is low compared to that required for thermal generation, it is nevertheless important to aim at further reducing it in consideration of the particular context of water scarcity in these regions. This year, the methods used to wash our photovoltaic panels were subject to a thorough review, which identified automation as one of the key factors for reducing the amount of water needed to keep the systems efficient.

In this area, Enel is developing its own "Roboost" program of new solutions that use autonomous robots to clean the photovoltaic panels in a fully automatic way without using water. The expected water saving is 5 l/MWh. Initial trials were carried out at the Totana plant in the Spanish region of Murcia. Here, robots supplied by an Italian startup have already been used successfully,



helping to reduce the water consumption needed to keep the panels efficient in what is one of Spain's most arid regions. The installation of other robotic systems is being planned, with the participation of other suppliers: one of the first countries involved will be Chile, where all our solar plants are located in desert regions with high water stress, and where saving water resources is therefore of paramount importance. Being completely electric, the autonomous robots also avoid generating any greenhouse gas emissions during the panel cleaning operations.

(30) The quantities of fresh water withdrawn and the energy generated in water-stressed areas are calculated taking into consideration both thermoelectric and renewable plants located in these areas. In the case of renewable plants managed in geographical clusters that include areas with different levels of water stress, the estimates of the previous quantities were made in proportion to their generation capacity.

## WaVE Project – Reduction of drinking water use in Peru

Enel pays great attention to the use of drinking water in its industrial processes. Where, due to particular local constraints or contingent situations, its use is absolutely necessary, maximum effort is expended to reduce or eliminate it in the near future.

During 2022, the Malacas gas plant in Peru replaced its old turbine burners with more modern “Dry low NO<sub>x</sub>” type burners. These enable nitrogen oxide emissions to be reduced even without the need for injection of demineralized water, which was being produced using water from the municipal aqueduct. The saving obtained from this intervention was approximately 60 thousand m<sup>3</sup>/year of drinking water, equivalent to the annual requirement of a small community. The social



benefits of reducing competition for the use of civil water infrastructure are therefore significant for the local community, given the scarcity of water resources.

## Optimization of liquid wastewater treatment

Downstream of internal recoveries and reuses, wastewater discharged from the plants is returned to the surface water body. Discharge always takes place downstream of a treatment process that removes any pollutants present to a level where they will not have a negative impact on the receiving water body, in compliance with the limits provided

for under national regulations and by operating permits. The potentially polluting substances present in our drains mainly consist of metallic species (Fe, Al, Si, Ca, Mg) in solution or, to a lesser extent, suspended solids. There are also no added nutrients (nitrates and phosphates), pesticides or other substances classified as dangerous.

## Responsible and integrated management of water catchment areas

The activities of hydroelectric power plants are an important element of water management. These power stations, which do not contribute to the Group's water consumption in that the water withdrawn is completely returned to its source, provide a series of additional services for the Company compared to the sole generation of renewable energies. A variety of power plants, jointly run by government and private stakeholders, manages the water resource for multi-purpose services ranging from flood control, drinking water and irrigation and firefighting services, to the management of river waste held by artificial dams, also in-

cluding numerous cultural, leisure and nature-based initiatives, made possible thanks to the presence of the power plants. The reservoirs of hydroelectric plants also carry out a vital role in the response to the effects of climate change, increasing the level of protection of the communities subject to increasingly frequent severe flooding and to prolonged periods of drought. Management of the outflows from hydroelectric plants is done through specific programs to ensure the volumes of water required to preserve the ecological state of rivers (minimum vital water flows).

# Managing waste

| 3-3 | 306-1 | 306-2 | 306-3 |

Optimal waste management is a strategic objective of Enel's environmental policy, which results in a constant commitment to reducing its generation, as well as to constantly devising new methods of reuse, recycling and restoration in the perspective of a circular economy of resources, in line with the principles indicated by the new

EU proposal EFRAG ESRS E5 "Resource use and circular economy". These principles are further strengthened and integrated into Enel's operations in the Group Guidelines for Waste Management (PL No. 473), which Enel has adopted in order to collect and share best management practices and rules developed within the Company.

## The target of reducing waste from operational and maintenance activities

For several years, Enel has been pursuing an important target of reducing waste produced by direct, operational and maintenance (O&M – Operation and Maintenance) activities carried out on its plants. The reduction target previously set, linked above all to the ongoing energy transition and to Enel's strategic decision to bring forward the closure of its coal-fired thermal plants, which accounted for the majority of waste produced (mainly ash and gypsum), has already been reached in the last few years (1.2 Mt in 2020 and 2021, which is the target value previously set for 2030).

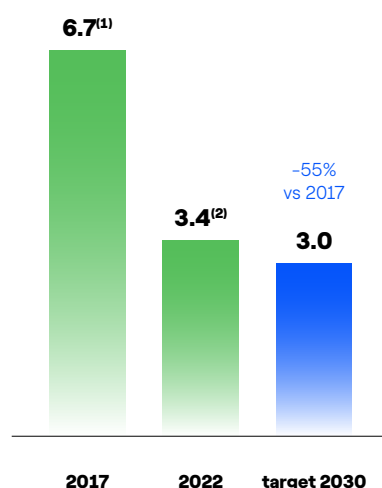
Starting this year, this target has been made more challenging by extending it to O&M waste produced by contractors who, operating on behalf of Enel, generate waste which they manage under their own responsibility as producers, in compliance with applicable laws, authorizations and mandatory qualification and management compliance criteria regularly verified by Enel as the contracting company.

This new adjustment of the target reflects the principles of extended responsibility of the waste producer, as recommended by the recently proposed EU standard EFRAG ESRS E5 "Resource use and circular economy". It also makes it possible to highlight, in the context of the ongoing energy transition, the growing role within the Company of the management of renewable plants and electricity and service distribution networks (for example, public lighting networks) with respect to the operational processes of thermoelectric plants.

The increase in the values reported this year is therefore attributable to the inclusion of O&M waste produced and managed by our contractors, mostly consisting of excavated earth and rocks and inert materials from civil and road construction and demolition, which in some main countries, including Italy, are classified and managed as waste and entirely destined for recovery.

The new target commits the Company to a 55% reduction in waste produced by direct and contracted O&M activities in 2030 compared with the base year 2017.

### Waste production from O&M activities (Mt)



(1) Values calculated net of corporate deconsolidations as at December 31, 2022.

(2) The value for the year 2022 recalculated net of previous corporate deconsolidations is also 3.4 Mt.

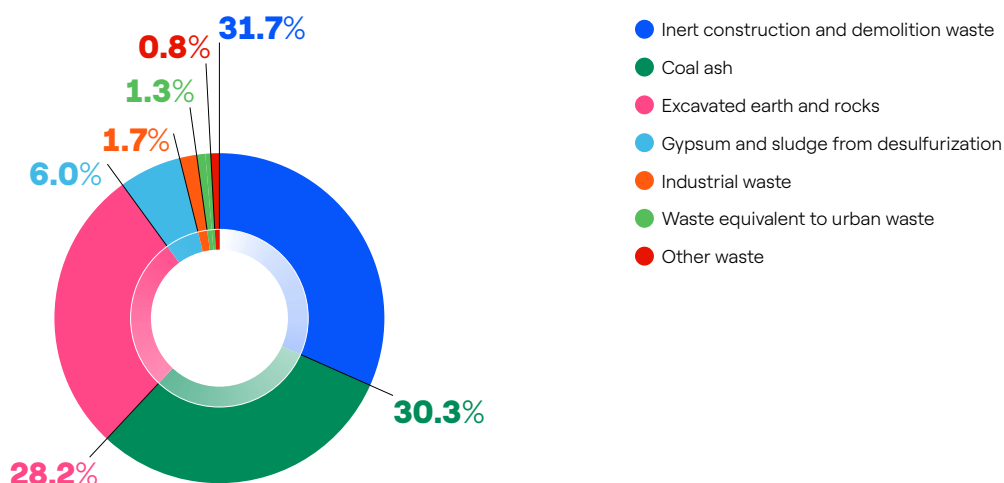
Waste produced in 2022 amounted to 3.4 Mt (corresponding to -50% compared with 2017), a moderate increase compared to that recorded in 2021 (3.1 Mt, also recalculated to include waste produced in O&M activities by contractors), mainly as a consequence of the increase in coal-fired thermoelectric generation in some countries, mainly including Italy, following the ongoing international energy contingency.

The vast majority of waste produced (98.3%) is accounted for by waste classified as non-hazardous and mainly consisting of inert waste from construction and demolition, coal ash and excavated earth and rocks. In particular, pro-

duction of ash from coal and gypsum from desulfurization, which is expected to be completely eliminated by 2030 following the planned decommissioning of coal-fired plants,

was respectively 1.02 Mt in 2022 (52% vs 2021) and 0.11 Mt (57% vs 2021).

## Waste produced by O&M activities (3.4 Mt)



The overall percentage of O&M waste sent for recovery totaled 84.4%. The commitment to a continuous increase in the percentile recovery of waste produced is essential for an effective transition towards a circular economy that minimizes the exploitation of natural resources, in accordance with the objectives of sustainable development and reducing the Company's environmental impact and dependence on ecosystem services. Excavated earth and rocks (94.6%) and construction and demolition waste (86.9%) were recovered almost in their entirety, deriving mainly from the maintenance of power grids as well as of generation plants. Process waste from thermoelectric

generation was also recovered to a significant extent, including coal ash and desulfurization gypsum, which were reused in building works to produce cement, concrete and bricks according to specific technical and environmental control requirements. In particular, the percentage sent for recovery was 80.4% for coal ash and 88.3% for desulfurization gypsum, improving on the results of the previous year (respectively 67% and 81% in 2021). Finally, industrial waste deriving from the maintenance of generation plants and electricity grids was mainly destined for recovery (88.1%), as was an even higher percentage (95.6%) of WEEE and metal waste, including iron, copper and aluminum.

## Waste produced by construction site activities

The objective of reducing waste produced by the operating and maintenance activities described above does not currently include waste deriving from the construction of new renewable plants and the demolition of thermoelectric plants at the end of their life, as these flows are specifically linked to the Group's strategy of decarbonization and energy transition. Above all, these activities are linked to the generation of inert materials, such as excavated earth and rocks, as well as valuable metal waste, in the case of the end-of-life decommissioning of plants. Enel is constantly committed to maximizing their recovery. In particular, for the recovery of waste deriving from the end-of-life decommissioning of plants, selective demolition techniques of the structures and dedicated management procedures

are adopted to maximize their economic value. For more details, see the chapter "Circular economy".

In 2022, waste produced on the construction sites of new renewable plants (wind and solar) and by the 3SUN Giga-factory totaled 0.09 Mt, which consisted almost exclusively of non-hazardous waste (99.9%). The same activities also produced 3.31 Mt of excavated earth and rocks, which was entirely reused *in situ*.

By contrast, waste from the end-of-life demolition of thermoelectric plants totaled 0.39 Mt. Waste from these activities consisted of 92.3% non-hazardous waste (mainly excavated earth and rocks, inert waste from construction and demolition and industrial waste, including mainly metals) with average recovery values of 76%, rising to 93% for



the metallic portion. Programs at country level and dedicated initiatives at plant level are aimed at optimizing the management of this waste, with a view to maximizing its recovery and value (see also the paragraph on the circularity of resources).

Finally, with reference to the specific redevelopment site of the Enel headquarters in Viale Regina Margherita (Rome,

Italy), launched in November 2019 for a duration of approximately 40 months and involving a total area of approximately 80 thousand m<sup>2</sup>, the amount of waste produced in 2022 totaled 26.4 kt, of which 98.2% (about 26.0 kt) consisted of demolition aggregates, glass and metals, which was entirely sent for recovery.

## Improvement initiatives

Among the most significant initiatives, within the Enel Green Power and Thermal Generation Division, the commitment made in 2020 continued with the launch of “Zero Waste”, a global project that aims to reduce the amount of waste produced and improve the percentages of waste recovered through the sharing of best initiatives and good practices implemented in the various Countries. The global initiatives carried out in 2022 continued, notably including the commitment to engage Enel’s contractors through awareness-raising and training initiatives and the adoption of contractual instruments to incentivize waste recovery.

Particular attention was also paid to wind and solar technologies, in order to identify possible strategies for the reuse of components that are subject to replacement and disposal at the end of their life, mainly starting from 2030. As regards wind technology, the “Wind New Life” project for the recovery of wind blades is continuing. Among the possible alternatives for their recovery, the project has also considered the processes of reusing and recovering energy from the turbine blade materials for concrete production. Meanwhile, the “Photorama” project is dedicated to the reuse of photovoltaic panels, focusing above all on the most valuable and difficult-to-source materials, which are potentially reusable for the generation of new panels.

As regards waste produced by grid management activities, in continuity with the programs launched in previous years, Enel is continuing in its commitment to restoring hazardous and non-hazardous special waste, especially as regards dielectric mineral oils used as insulators in electrical equipment, which is delivered to authorized companies for regeneration or, if this option is not feasible, destined for waste-to-energy processes. Also ongoing are the initiatives launched in the various countries for the sustainable replacement of first-generation smart meters and the recovery of their constituent materials.

For further initiatives, see the chapters “Circular economy” and “Sustainable supply chain” in this document.

As part of the provision of products and services for energy efficiency, in 2022 Enel X Global Retail continued its commitment to a sustainable approach that extends to the entire value chain, by further extending the requirement for its suppliers to provide transparent and comparable information on the environmental impact of the materials and products they supply. In particular, for own-brand products, Enel X Global Retail adopts the Extended Producer Responsibility (EPR) model, which also includes the post-consumer phase, by adhering to collective WEEE collection systems in all the markets in which it operates, as well as collection of batteries and packaging, and by launching end-of-life management initiatives for marketed products and optimizing their design with a view to maximizing their reuse and recycling. These initiatives notably include:

- the ALVA (ALternativas de VALorización) project in Spain, aimed at improving performance in the management of waste from electrical and electronic equipment (see the dedicated box);
- the agreement between Enel X Italia and CdC RAEE (Centre for the Coordination of Waste from Electrical and Electronic Equipment), whose partnership enables B2C distributors/installers contracted with Enel X Italia to use the WEEE collection service free of charge, as well as providing greater control/traceability of WEEE along the entire supply chain to the plants where they are ultimately destined;
- a similar project in Peru, but applied to B2G public lighting, with the objective of both extending the life cycle of light bulbs that are still functional and the restoration treatment of spent bulbs through the WEEE RECOLECC consortium in order to recycle the raw materials, thereby creating value and reducing greenhouse gas emissions.

## Spain – ALVA Project (ALternativas de VALorización)

With the aim of applying the principles of the circular economy and in compliance with environmental regulations on waste, Enel X Global Retail has developed a project for reusing and recycling electrical and electronic equipment (EEE) products or components taken back from customers.

The project applies to electronic devices marketed by Enel X which are subject to return, in the case of rentals, or replacement of EEE installed at the customer's premises (1-for-1 takeback). The objective of the project is to ensure virtuous management and traceability of products/waste in order to prioritize EEE reuse operations over disposal. The project engages installers, a qualified repair company and the ECOTIC consortium in managing waste electrical and electronic equipment (WEEE) in order to improve circularity, by providing full traceability of the installation/replacement process, and to increase the reuse and restoration percentages of WEEE in treatment plants, and consequently to reduce CO<sub>2</sub>.

2022 results



**61** installers  
who have signed the  
agreement with ECOTIC

**103** t WEEE collected  
(93–96% material  
recovery / 1–3%  
energy recovery)

**119** t CO<sub>2</sub>  
equivalent saved



# Protection of soil, subsoil and groundwater

## 3-3

Enel is committed to the continuous application of the most advanced technologies available and best practices in order to minimize the possible environmental impacts deriving from its activities, using international standards as a benchmark even where the required environmental protection is less stringent. Among the areas of prevention, the highest level of attention is paid to the protection, monitoring and remediation of soil, subsoil and groundwater in the areas where plants and generation and service facilities are present in all Countries.

The protection of the environment matrices guides every phase of each asset's life, from design choices to construction, operation and end-of-life management. Both active and passive protection and safety measures will be used in the project phase to prevent and, in any case, minimize the risk of uncontrolled or accidental contact of potentially polluting substances (such as fuels, reagents, liquid and waste flows) with soils and subterranean waters. During plant operations, every process undergoes compliance controls as well as ongoing upgrades as required by the Environmental Management Systems to prevent and minimize the risks of any potential environmental contamination. At the same time, control plans are executed to monitor the condition of the previous environmental matrices. In the event of an accident, for example the accidental spillage of polluting substances, the timely application of the Stop Work and Emergency Management Policies makes it possible to prevent or minimize the risk of environmental impacts, rigorously complying with the provisions and the legal obligations of the various countries. For the end-of-life management of power plants, once they have been made safe and prior to them being dismantled and the area reassigned for new development projects, Enel proceeds to verify further the environmental quality of the soil, subsoil and groundwater in the areas where the plant is located, according to the authorized provisions and legal requirements of the various countries. In the event of potential contamination phenomena, characterization of the environmental matrices in the areas potentially affected and, if necessary, implementation of

safety measures and subsequent remediation, are executed according to intervention plans shared with the competent authorities and by resorting to specialist, qualified companies that are able to promptly restore the level of quality suitable for the intended use of the area (industrial, commercial, residential etc.). Particular focus is on power plants falling within large industrial hubs. In order to mitigate further the risk connected to the detention and consequent potential uncontrolled release of substances that can have an impact on the environment, numerous projects have commenced for their progressive substitution, for example, verifications under way on the use of vegetable (hence biodegradable) oil, replacing the traditional dielectric oil of mineral origin.

Within the context of the energy transition launched by Enel, particular importance is given to projects for converting decommissioned plants, with the aim of hosting new renewable generation and energy storage plants, in order to reuse the industrial areas, some common parts of the plant, and the main infrastructures. In this way it is possible to reduce the environmental impacts deriving from demolition and new construction activities, as well as the consequent social and economic impacts on the surrounding communities and stakeholders. In order to optimize the management of plant decommissioning projects, in 2021 Enel adopted dedicated Guidelines ("Environmental issues management in power plants decommissioning"), with the purpose of guaranteeing a standardized approach to identifying, preventing and managing environmental aspects related to the decommissioning of power plants. These Guidelines provide global guidance on applying best management practices in relation to all environmental aspects, including soil and groundwater management.

With a view to continuous improvement and minimizing the possible environmental impacts deriving from decommissioning activities, at the end of 2022 a further set of Guidelines was also issued ("Sustainable Repurposing Model") in order to ensure the increasingly sustainable end-of-life management of plants (see the dedicated box below).



## Habitat restoration to protect native species

The area affected by the environmental restoration project was previously used to store combustion ash from the “Eugenio Montale” thermoelectric plant in La Spezia, Italy. Starting from 2020, following a project authorized by the competent bodies, a waterproof top cover (cap) was created for the two reservoirs on the site, aimed at making them permanently safe while also guaranteeing landscape restoration by planting and grassing the area. The capping activity, completed in July 2022, was carried out in conjunction with a habitat restoration project aimed at restoring and maintaining biodiversity in the area, which is considered “core”, due to the presence of *Rana dalmatina*

frogs (a protected species included in the IUCN National Red List).

The habitat restoration project envisaged the recreation of a semi-open humid environment (azonal *Phragmites australis* reed bed habitat) fed by a channel that conveys runoff surface water from the reservoir caps, in addition to planting native arboreal and herbaceous essences characteristic of submerged wetlands and humid and perhumid environments. This habitat, in addition to providing a safe place during the reproduction period for a species in need of protection such as *Rana dalmatina*, also plays an irreplaceable ecological role by providing a place of rest, shelter and food for numerous other animal species.

For further details, please refer to the chapter “Our commitment to a just transition: leaving no one behind”.



## Sustainable Repurposing Model

The sustainable repurposing model aims to promote the standardized adoption of sustainable practices during all end-of-life disposal activities of plants and assets. The aim is to create synergies with the future redevelopment of the sites, while maximizing the positive environmental and social impacts of the entire process.

To achieve and monitor these objectives, a set of guidelines, a catalog of sustainable practices and specific KPIs have been created. In order to launch and promote the model, some pilot projects on decommissioned plants have been launched in Chile, Spain and Italy. The contin-

uous monitoring, through KPIs, of environmental performance on important aspects such as the reduction of atmospheric emissions, the recovery and recycling of materials and waste, the efficient use of water and the improvement of soil and biodiversity will allow us to continue on our path towards an increasingly efficient energy transition. The proposed model includes, in particular, the identification and application of sustainable principles and practices related to the management of the environmental matrices of soil and groundwater, such as the restoration of reclaimed areas in compliance with the morphological, vegetative and landscape characteristics of the surrounding area, as well as the creation of habitats aimed at promoting biodiversity and ecosystem services.



# Energy efficiency

| 3-3 | 302-1 | 302-3 |

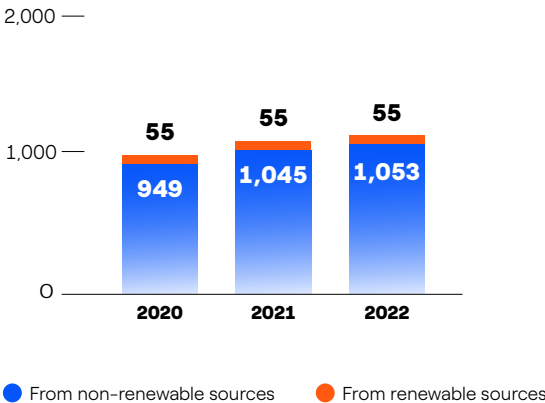
## Energy efficiency in production processes

For Enel, the efficient use of energy is a constant commitment that extends to the entire value chain and which is pursued through the implementation of operational excellence programs across the different Business Lines, both for operations and in buildings. In particular, targeted interventions are aimed at maximizing the efficiency of power generation plants as well as improving the operational efficiency of distribution networks.

Energy consumption is mainly represented by fossil fuels, to operate thermal power plants (with coal accounting for 19% and natural gas 45% in 2022), and by uranium, to operate nuclear power plants (27%). By contrast, a smaller amount of energy consumption is related to the operation of power generation plants relying on renewable sources (biomass and geothermal). Total direct consumption of energy for electricity generation in 2022 amounted to 1,108,069 TJ (26.5 Mtoe), which was basically in line (0.8%) with the energy consumption of fuel recorded in 2021 as a result of the increase in thermoelectric generation from coal (64,571 TJ, up by 46% on 2021), as well as from diesel and nuclear to a lesser extent, replacing generation from natural gas (-79,774 TJ, down 15% on 2021). The Group's energy intensity, which provides a measure of its operational efficiency, was 4.81 MJ/kWh<sub>eq</sub> in 2022, slightly down on the previous year (-0.36%). Activities to optimize the grid structure continued in 2022, allowing for a significant reduction in grid losses. These include pro-

gressively reducing single-phase power lines, constructing additional power lines to alleviate the overload on existing lines, using low-loss transformers, boosting the grid by using conductors with a greater cross-section, and rephasing primary transformer substations. Finally, the realization of new transformer stations that help reduce the length of low-voltage lines, which are characterized by higher levels of loss.

Consumption of primary energy from renewable and non-renewable sources (,000 TJ x10<sup>3</sup>)



## Energy efficiency and electrification products for customers

The electrification of final consumption has become a central element of Enel's strategy. Its intrinsic efficiency makes it the key partner in achieving sustainable goals globally. In line with this approach, several initiatives across our businesses were strengthened and consolidated in 2022 to support commitments towards clean electrification. In 2022, the interventions carried out by the Enel X Global Retail Business Line in relation to efficiency, technological innovation and reduction of CO<sub>2</sub> emissions in the sectors in which the division operates, were strengthened and consolidated. In the public lighting sector, work performed in 2022 by Enel X Global Retail in Italy, Spain, Chile, Colombia and Peru resulted in cumulative savings of approximately 177 GWh. In public transport, Enel X Global Retail participated in the commissioning of more than 500 new electric buses in Chile, Colombia, Spain, Italy and the United Kingdom in 2022.

For its B2C (Business to Consumer) customers in Italy, Spain, Chile and Romania, in 2022 Enel X Global Retail in-

stalled about 78 thousand energy-efficient products, including condensing boilers, air conditioners, air-to-water heat pumps and photovoltaic plants (some with storage systems), while in the B2B (Business to Business) sector, the photovoltaic plants managed by Enel X Global Retail for its customers in Brazil, Spain, Italy, North America and Korea in 2022 made possible a generation of distributed renewable energy equal to about 42 GWh, in addition to the energy savings obtained by the cogeneration and trigeneration plants managed by Enel X Global Retail in Italy and Spain. Overall in 2022, Enel X Global Retail's efficiency and electrification products and services enabled its customers to avoid the emission of approximately 130 thousand tons of CO<sub>2</sub>, equivalent to an environmental benefit of more than 7 million trees per year, values calculated by applying algorithms validated by an internationally recognized certification body according to the principles identified in the UNI EN ISO 14064-2:2019 standard.

For further details, see the chapter "Clean electrification".

## Environmental legal disputes

2-27

2-4

At December 31, 2022, the number of legal proceedings pending was 168 across the whole Group. The main environmental disputes related to Italy, Latin America and

Iberia. The amount of fines imposed or paid in 2022<sup>(31)</sup> was approximately 1.8 million euros. In addition, 22 non-monetary sanctions were issued.

(31) The relevance threshold for fines is 10,000 USD, therefore only sanctions that individually exceed this amount are reported.



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