INNOVATION

SUSTAINABILITY PLAN PILLAR

GROWTH ACCELERATORS

- Innovation

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

Enel is committed to a resilient and sustainable energy system by developing and deploying new technologies, solutions and models that meet the criteria of sustainability, economic competitiveness, environmental protection, safety and protection of the local areas.

Below the 2023 results related to the previous 2023-2025 Sustainability Plan, the resulting progress and targets of the 2024-2026 Sustainability Plan, which may be redefined, added, or outdated with respect to the previous Plan.

ACTIVITIES	2023 RESULTS	2024-2026 TARGETS	MAIN SDGs
INNOVATION AND SUSTAINABILITY			
Proof of Concept to test innovative solutions	**113** Proof of Concept launched	Launch of **200** Proof of Concept to test innovative solutions in the 2024-2026 period	9 17
Innovative solutions being scaled up in the business	**46** solutions adopted in the business	**80** innovative solutions being scaled up in the business to boost the implementation of the Strategic Plan in the 2024-2026 period	9 17

Goals

New | Redefined | Outdated

Progress

Not in line | In line | Achieved

N.A. = not applicable, target not included in the 2023-2025 Sustainability Plan

INNOVATION

DMA EU (former EU8)

46

INNOVATIVE SOLUTIONS BEING SCALED UP IN THE BUSINESS

60 in 2022 **-23.3%**

113

PROOF OF CONCEPT

194 in 2022 **-41.7%**

10

INNOVATION HUBS

10 in 2022 **0%**

35

PARTNERSHIPS FOR INNOVATION

43 in 2022 **-18.6%**

58

COLLABORATIONS LAUNCHED WITH STARTUPS

119 in 2022 **- 57.9%**

Innovation is a key element of Enel's strategy and plays a major role in creating shared value with different stakeholders, opening new horizons together with employees and partners for the benefit of customers, the community and the environment. A key factor in a resilient and sustainable future energy system is the development and deployment of new technologies, solutions and models that meet the criteria of sustainability, economic competitiveness, environmental protection, safety and security.
Priorities and the portfolio of innovation projects have been reshaped to support the new Group strategy; a new, simpler organizational structure has also been set up to ensure operational effectiveness and to focus on the priorities of the business areas: **increased efficiency, flexibility and resilience of operating assets**, **improved safety of people**, new energy storage technologies, **reduced impacts on the environment and biodiversity of assets** both in operation and under construction, **electrification of customers**, and **innovative supply models** to unlock new opportunities for the Group.
This is a process that leverages cutting-edge innovation, passion and ideas, not only internally through upskilling and reskilling strategies, but also outside of the Company.

Enel's Open Innovability® to change the future of energy

Enel's **open innovation model** leverages several tools to find solutions to business needs. The Company's crowdsourcing activity consists of publishing online – through the **openinnovability.com** platform – specific challenges addressed to audiences both external and internal to Enel, with the aim of attracting the best talents, ideas and technologies, to provide new solutions that will evolve within the Group. This way, all areas of the Company come into contact with startups, industrial partners, small and medium-sized enterprises (SMEs), research centers, universities, and entrepreneurs. Launched in 2017, the **openinnovability.com** platform brought together more **than 220 challenges, including over 40 in the past 2 years, and over 15,000 evaluated opportunities**. In the past year, public challenges for which the most solutions were proposed include: innovative ways to improve albedo in solar generation plants, sustainable approaches for reusing concrete, a new design for primary and secondary substations. Those who put forward solutions can win monetary awards or start collaborations with the Group.
Enel has a global network of **Innovation Hubs and Labs** to expand the Group's vision, promoting innovation and sustainability. The **Hubs** are located in some of the Group's key innovation ecosystems, such as the United States and Europe. They manage a network of relationships with all stakeholders involved in innovation activities, serving as

the main source of scouting for startups and SMEs, and fostering financially, environmentally and socially sustainable solutions. The **Labs** (located mainly in Italy and Israel) make it possible for startups to work alongside the technicians and experts of Enel's Business Lines to develop and test solutions in the most fertile environment possible.
Open innovation also means creating **partnerships** with key players. Enel is currently engaged in 35 innovation collaborations covering the most strategic areas for the Group; these focus on cutting-edge topics such as promoting space applications in the energy sector (ESA and Thales Alenia Space) and co-developing innovative digital solutions (Cisco and Microsoft). **Co-development with suppliers** and industrial partners is one of the most interesting approaches in the Group's strategy, making it possible to develop innovative initiatives and services by quickly and effectively targeting industrial implementation and leveraging existing skills and structures. It is a win-win approach where Enel works with large industrial partners by harnessing its resources to achieve a shared goal.
Dedicated **cross-functional work groups (Innovation Communities**) have been set up, which take an innovative approach to tackling key topics for business and new technologies and to create value. Active communities cover the following topics: blockchain, drones, energy storage, metaverse, artificial intelligence (AI), robotics, sensors, 3D printing, hydrogen, generative design, wearables, materials and quantum computing. Other working groups are dedicated to additive manufacturing, data monetization and machine learning. The Communities continuously monitor potential technological improvements and share new useful business models, added value services and use cases for types of technologies that could be adopted in various Group areas.
Enel constantly promotes and spreads the culture, knowledge and practices of open innovation in the countries where it operates, fostering a "learning by doing" approach which allows people to think and act differently and disseminate methods and tools that generate new ideas and support their development. There are many tools and initiatives for innovation that are useful for the dissemination of the open innovation culture. In addition to the recurring newsletters, surveys and webinars, periodic meetings are held with all Business Lines on many levels, not just managerial, but also with the non-hierarchical communities. The necessary resources are made available for promoting a culture of knowledge and enhancing its value at all levels, increasing awareness among people also thanks to training courses, events and meetings.

A new practice for sustainable innovation management

A critical success factor is the ability to manage innovation as a system (a strategic topic for organizations and businesses) and to organize all stages of the process.
In 2022, Enel voluntarily adopted the **ISO 56002 standard**, which governs all aspects of innovation management, from the inception of an idea through to its implementation on a global scale.

In December 2023, **UNI/PdR Practice 155 "Sustainable innovation management – Guidelines for the management of sustainable innovation processes in companies through open innovation"** was published, which was developed by Enel experts in collaboration with the Italian standards body UNI. This (pre-regulatory) document aims to provide practical support for all organizations that wish to address the organizational and production changes necessary to implement an effective sustainable innovation management process internally.

Based on the principles and framework provided by the ISO 56000 series of standards (in particular UNI EN ISO 56000:2021, UNI EN ISO 56002:2021, UNI EN ISO 56003:2021, UNI EN ISO 56005:2021 and UNI ISO 56006:2022), the document offers guidance with establishing a sustainable innovation plan, identifying specific needs and areas of opportunity, as well as with researching, validating, and developing industry-scale solutions. A specific chapter of the document is devoted to research solutions tools and methods, including crowdsourcing, startups, innovation events, cross-functional working groups, corporate entrepreneurship programs, and more.

How ideas are transformed into business solutions, creating shared value

Below are some examples of innovation projects focused on the Group's strategic priorities.

INCREASED EFFICIENCY, FLEXIBILITY AND RESILIENCE OF OPERATING ASSETS

NEW AND INCREASINGLY SUSTAINABLE ENERGY STORAGE TECHNOLOGIES

In 2023 a pre-commercial-scale testing campaign of a **zinc technology-based storage system** was launched at the Enel Innovation Hub&Lab in Catania (Italy), to accelerate the potential scale-up on the Enel Green Power business and diversify the portfolio of energy storage solutions.
In Tuscany (Italy), experiments continued on the innovative **thermal storage system** with a capacity of about 24 MWh, which uses common fragmented rocks that can store heat at about 500 °C with a storage duration of 5 hours. The system employs no critical materials, uses no potentially polluting substances, is inherently safe with no moving parts or flammable substances and is, therefore, a sustainable solution for the decarbonization of industrial thermal consumption.
A partnership was signed in 2023 to start testing (in one Italian and four American plants) an **advanced monitoring and diagnostic syste**m for lithium battery systems, which can simplify the collection and analysis of complex data, improve safety and reduce operational risks to increase performance and ensure high availability of storage systems, serving renewable energy resources.

GREEN HYDROGEN FOR DECARBONIZATION OF HARD-TO-ABATE SECTORS

Enel has continued with its **NextHy** initiative, which aims to stimulate the growth of the entire green hydrogen ecosystem. The **Hydrogen Industrial Lab** in Sicily (Italy) will be the main hub, serving as an industrial technology validation platform straddling the municipalities of Carlentini and Sortino, with the aim of collaborating with startups and global players to test new technologies that can accelerate the reduction of green hydrogen costs and enable the decarbonization of "hard-to-abate" sectors. NextHy Industrial Lab is one of the Italian projects which receives IPCEI Hy2Tech funding, which has a total endowment of 4.5 billion euros made available by the European Union for the development of hydrogen-focused initiatives of strategic interest.
The NextHy project also includes the NextHy Booster Program – an acceleration program promoted by Enel that aims to support the most promising startups in technology scale-up and business model development. The program engages with top scientific partners, such as the Polytechnic University of Turin, with which the first experimental validation activities were launched in 2023 with the startups Power to Hydrogen and 1s1.

DIGITIZATION FOR THE ENERGY TRANSITION

Maintaining responsible behaviors is key to ensuring safety at every stage and place of work, which is why in 2023 Enel Grids led the development of a virtual assistant in Italy, called **Electra**, which will be available from 2024 and will make field operations safer and more efficient. Electra can be consulted hands-free (making it possible to keep protective gloves on during tasks) and will act as a single point of access to work apps, simplifying and speeding up the acquisition of data needed to perform tasks. Using artificial intelligence, it monitors environmental noises and asks the operator to confirm their state of health, and then handles any requests for help. The goal of the initiative was to create a kind of "digital barrier", enabling people and vehicles to move

safely around work areas and construction sites. To ensure greater safety during operations, the **APP5RO** app was also developed, which leverages the latest computer vision and deep learning algorithms to alert operatives in real time in the event of an electrical hazard (see the chapter on "Health and safety of people").

Thanks to artificial intelligence, since 2023 an innovative tool **for optimized management of spare parts inventories** has been available for all Enel Green Power plants, which uses mathematical algorithms and machine learning **to automatically identify the optimal stock level of each item**, resulting in significant cost and time savings

AUTOMATION FOR EFFICIENCY AND SAFETY

An autonomous and sustainable robotic system has been implemented at the **Totana and Las Corchas photovoltaic power plants** in Spain to clean photovoltaic panels without the use of water. The solution was developed in collaboration with Sicilian startup **Reiwa** and provides a significant reduction in cost and related CO_2 emissions, consuming no water or diesel fuel, while at the same time increasing the safety and skills of staff. The Company is training more qualified personnel (*e.g.*, for on-site maintenance of robotic devices), with the creation of more highly-specialized jobs.
In the hydroelectric field, those at Enel Green Power have internally developed the **Oculus robot**, which can enhance both safety and efficiency in hydroelectric plants: in addition to speeding up inspection or investigation processes, it reduces (or removes) the need for staff to perform specialized inspections, both in places that are difficult to access and in confined areas of hydroelectric plants such as piezometric wells, tunnels and pipelines. The system was optimized by design on the specific needs of the end user, and development was concluded with the production of the first ten industrialized robots for the hydroelectric perimeter in Italy.
Through innovation, Enel Grids also aims to roll out increasingly cutting-edge and efficient solutions to **improve the safety** of colleagues and partners. As such, in 2023 Enel Grids has developed a robotic solution to support overhead maintenance activities on the Medium Voltage overhead grid, which allows complex work to be performed safely and eliminates the risks of falling from height and electrocution. The innovative robotic system, controlled by a ground-based operator, can handle a range of operations with a high degree of dexterity and support heavy loads. With a modular design, it can be installed on vehicles of different sizes to ensure access even in the most inaccessible areas. A pilot project will arrive in Italy in 2024.

HYDROELECTRIC FLEXIBILITY – INNOVATIVE MODELING OF THE FADALTO POWER PLANT – BYPASS PROJECT

The idea stems from the well-established collaboration between the Functions Global Energy and Commodity Management & Chief Pricing Officer and Enel Green Power & Thermal Generation to re-evaluate and improve the efficiency of Italian hydroelectric storage systems. The project will be completed in 2024 and involves the Fadalto plant, located in the Veneto region of Italy, consisting of two production and pumping units. It involves the installation of two hydraulic bypass lines on both units. The plant is a pivotal element for the management of environmental operating constraints of one of Italy's largest hydroelectric rods; it also leads to an interconnection line with foreign countries (Soverzene-Lienz) which is particularly important for the stability and safety of the Italian and European power grid. The operation and relative use of the plant in the electricity markets have always been highly constrained, since the plant must constantly ensure hydraulic flows compatible with downstream irrigation uses, but also tightly control the level of the Santa Croce lake upstream (Veneto, Italy). With the new modeling, the production unit, in its "second life", will be constantly available to deliver all flexibility services, as well as more efficient and safer management of constraints with benefits also for the various stakeholders in the watershed and for the surrounding environment in general.

REDUCED IMPACTS OF ASSETS ON THE ENVIRONMENT AND BIODIVERSITY

BIODIVERSITY

With the **agrivoltaic** demonstration program developed simultaneously in several countries (Spain, Greece, the United States and Australia), Enel Green Power has shown the effectiveness of integrating solar energy production, agri-livestock activities, biodiversity conservation and improved ecosystem services, using innovative methodologies and technical solutions. Moreover, a new initiative called Agrivoltaic Open Labs has been launched in Italy, with the opening of five "open laboratories" to test different innovative photovoltaic technologies, monitoring sensors and coexistence methodologies with high-income crop activities and biodiversity conservation measures. These Open Labs make it possible to work together with the local area, promoting an open and collaborative approach with local farms, beekeepers, universities, research centers and startups with specific expertise in these areas, as well as engaging schools and other local entities in training and awareness-raising activities. Four Agrivoltaic Open Labs were launched between September and December 2023 and are now operational. The first opened in Colfiorito, Umbria, at the La Valletta farm where vertical photovoltaic technology was integrated with arable crops such as PDO lentils. The second opened in Salaparuta, Sicily, at the Vaccaro Winery, where vertical photovoltaic technology enabled integration with a vineyard already in production. The third was launched in Bastardo, Umbria, at Enel Green Power's first standard configuration agrivoltaic site, with the collaboration of the University of Tuscia, the Università Cattolica del Sacro Cuore, the University of Perugia and the start-up 3Bee. This project is also supported within the framework of the National Biodiversity Center (NBFC) – the first national research center dedicated to biodiversity and coordinated by the National Research Council (CNR), with funding from the National Recovery and Resilience Plan (PNRR). Lastly, the fourth was launched together with Enea in Portici, Campania, and is the first algovoltaic® plant integrating microalgae culture with the photovoltaic plant. These initiatives will also make it possible to put in place and validate innovative business models and new approaches to engaging key local stakeholders. On agrivoltaics, see also the chapters "Roadmap towards natural capital conservation" and "Engaging communities".

CIRCULAR APPROACHES

With the **Wind New Life** project, Enel Green Power is supporting – together with other wind operators and specialized companies – the construction of a plant in Italy by 2026 for the collection and treatment of decommissioned wind turbine blades, which will be able to dispose of up to 3,000 tons per year of composite material. The goal is to turn fiberglass from end-of-life blades into secondary raw material to be reused for the production of high-value components, such as building materials, sanitary and furniture products, pipe insulation, and roadside cabinets. As part of the project, a business model and basic economic conditions were agreed upon in 2023.
Circular approaches have been adopted in the field of solar photovoltaics. Together with other companies and research institutes, Enel Green Power is participating in the European project **Photorama** to help develop innovative technologies to recycle end-of-life photovoltaic products and production waste. It aims to go beyond current recovery levels to reach close to 95% of secondary raw materials, enabling the most valuable materials to be recovered. Regarding Enel's circular approach see also the chapter on "Circular economy".

SUPPORTING CUSTOMER ELECTRIFICATION

SMART CITY

The **Open Data 4 Smart & Sustainable Cities** program designed by Enel X processes open data using *ad hoc* models to provide concrete support to government bodies in directing urban planning actions. Enel X continued its commitment in 2023, releasing the upgrade of the **Circular City Index** for all Italian municipalities, which estimates readiness in terms of policy and infrastructure enabling urban circularity, and the **15 Minute City Index**, which analyzes urban planning of service proximity, in line with the 15 Minute City model. Also in 2023, the new **CO_2 City Index** was released, which integrates new data sources with experimental models, and provides an estimate of anthropogenic CO_2 emissions for Italian municipalities and their micro-districts, highlighting the main emitting sectors, from private and public transport to industry and buildings.
All analyses are available in the **Enel X YoUrban** (Italy) portal – a single point of access allowing government bodies to take advantage of all Enel X solutions on the urban perimeter, from the digital management of faults in public lighting systems through to the innovative City Analytics solution for optimal urban planning. In 2023, a service was also made available for municipalities to design challenges or activities relating to environmental and social sustainability issues, and to engage and reward the most virtuous citizens through the YoUrban app (see the chapter on "Customer centricity").

CUSTOMER CENTRICITY

Enel has adopted new approaches, such as neuroscience, to interpret customers' physiological inputs, gain insights into how business communications are understood, and simplify customer relations. In 2023, this study helped **improve the layout of the paper bill** in Italy, reducing the format by one page and helping reduce the costs and environmental impact of paper use. In 2023, payment services in Colombia were further simplified. As part of the **Botón de pago** service, a QR Code supports the customer by displaying a personalized page with their data, where they can digitally make a "one-click" payment – a simpler process that makes the service more inclusive. To learn more about additional customer-focused initiatives, see the chapter on "Customer centricity".

NEW MODELS TO ENABLE NEW OPPORTUNITIES FOR THE GROUP

OPTIMIZING WEATHER FORECASTING AND NATURAL RESOURCE VARIABILITY

In 2023, a research collaboration between Intesa Sanpaolo and Enel Global Energy and Commodity Management and CPO helped **develop a market-based hedging algorithm** for illiquid products, based on Intesa Sanpaolo Group's prior experience and machine learning techniques, along with a tool that jointly optimizes risk exposure and transaction costs. In addition to enhancing the existing partnership between the two companies, this project has also been useful in benchmarking knowledge toward investment banks and testing ways to leverage intellectual property through patents.
The primary objectives of Enel Global Energy and Commodity Management and CPO include **optimizing the hydrological production management** of Enel's Italian power plants, minimizing risks caused by natural resource variability, and improving market strategies. To achieve this it is necessary to know not only the amount of expected rainfall, but also the volume of water in the snowpack (Snow Water Equivalent) – an important temporary reserve of winter precipitation. Thanks to the call for proposals launched with **ESA** (European Space Agency), 4 key solutions were tested in 2023 and a winner was selected, with whom the Group is collaborating on the development of algorithms to estimate the water content in the Alpine snowpack via satellite and through innovative technologies.

Massimo Bartolucci
Head of Sustainable Technology and Materials – Enel Grids

RESILIENT NETWORKS

"The development of new design systems for secondary substations, based on the principles of modularity, efficiency and sustainability, pursues Enel's commitment to make increasingly versatile and innovative tools to boost grid resilience and reliability"

Enel Grids Innovation has undertaken a number of initiatives for the **technological and sustainable renewal of electricity distribution networks**, which are critically impacted by the energy transition. These include the initiative of researching innovative materials and designs for two important components: **the street box and secondary substation**. For the first component, the solution was developed from the concept design arising from the challenge launched on the Enel Openinnovability® portal; it ensures adaptability to a wide range of environments, facilitates the functional aspects of use, facilitates installation and maintenance thanks to modularity, and integrates a mix of reinforced thermoplastic materials making it possible to use 100% recycled material. Lastly, the new model ensures greater durability of components and improved safety, thanks to an optimized natural ventilation system, special anti-intrusion door closure, and enhanced ergonomics. The design of the box has been filed by Enel, which is using the national supply chain to start production of the first 100 units, to be installed in many major Italian urban centers, such as Florence, Bari, and Matera starting in 2023. New installations will continue in 2024.
The new secondary substation solution – identified by an external jury with representatives from academic, industrial, and professional spheres who selected the

winning design from the external innovation ecosystem – is a new model that uses a smaller number of components, as well as recycled and low-environmental-impact materials, with a modular approach to provide great versatility and harmonious integration in urban or rural, modern or historic contexts. The new substation is also capable of accommodating advanced digitization technologies. The first substation with this design will be installed in Italy in 2024 (see also the chapter on "Circular economy").

Pablo Fontela Martinez
Enel Green Power
Innovation Project Owner

VANADIUM FLOW BATTERY INTEGRATED WITH PHOTOVOLTAICS

"The implementation of the Son Orlandis flow battery plant is an important step forward in differentiating the portfolio of energy storage solutions"

In **Son Orlandis**, Spain on the island of Majorca, work has been successfully completed on commissioning the **new vanadium electrolyte flow battery plant**, developed by Largo Clean Energy, coupled with a photovoltaic system. The Son Orlandis storage facility has a capacity of 1.1 MW and 5.5 MWh and is Enel's first example of a utility-scale storage facility other than lithium coupled with a renewable.
The flow batteries operate with a liquid electrolyte that is pumped from the reservoirs to the power cells to generate (or absorb, depending on the charge or discharge phase) electricity. Thanks to this project, the experience that Enel has gained in the development, construction, commissioning and future operation of the plant, can easily be extended to new types of flow batteries with different electrolytes that are increasingly cheaper and more sustainable, such as iron-based or organic ones.
The technological differentiation of the portfolio of storage solutions makes it possible to increase competitiveness according to the specific requirements of various use cases (*e.g.*, provision of ancillary services to the grid and energy shifting from the hours of highest generation to those when generation is lower), thereby improving socio-environmental sustainability and supply chain security.

Daniele Stein
Enel Green Power
Innovation Project Owner

A DIGITAL ASSISTANT FOR MONITORING WIND POWER PLANTS

"In line with Enel Green Power's mission, this project improves the well-being and quality of life of our colleagues, which we feel is essential. At the same time, it makes it possible to achieve important operational objectives, improving the effectiveness and efficiency of asset management and taking a significant step forward in sustainability: for our colleagues and for the best use of renewable facilities"

In Spain, as part of its **Artificial Intelligence in Control Room** project, Enel Green Power has used artificial intelligence combined with robotic process automation to provide a "**virtual assistant**", which supports the decision-making of staff working in the control rooms of Enel's **wind plants**. The digital assistant is able to deal with complex situations that are part of operators' daily routine, such as downtime, *i.e.*, production stoppages due to breakdowns, malfunctions, or other issues. The system makes its assessments based on enormous computing power, analyzing numerous variables with in-depth knowledge of the machinery in each individual plant and of all processes managed by the control room, and continuously learns thanks to machine learning processes. The solution is also being scaled-up in other countries. The project was developed and rolled out thanks to the work of an international, multidisciplinary team made up of colleagues from Spain, Italy and the United States, specializing in different areas: data scientists, business and human behavior experts. Room operators were also involved to define the purpose, develop solutions and refine the user experience, *i.e.*, interactions between artificial and human intelligence.
It is now being considered whether to expand the project to technologies other than wind power: automating repetitive, low value-added tasks helps to reduce stress (making the work more sustainable) and lowers the chances of making mistakes (optimizing plant operation).

Intellectual property

Enel's intellectual property portfolio (also referred to below as "IP") includes a set of information for a sustainable growth. The Open Innovability® ecosystem fosters innovation by creating and sharing both internal and external solutions, leading to a stream of inventions that can be procteted and valorized through intellectual property rights.

In 2023, Enel consolidated and further streamlined its processes for managing the generation and use of intellectual property rights in Intellectual Property Management and Trade Secrets Management organizational procedures. Both of these view human capital as an essential element in the creation of IP and aim to incentivize employees participation in the inventive process, empowering them on the strategic importance of all findings.

At the same time, Enel continued to design the digitization processes of IP rights management as part of the above organizational procedures. The use of proprietary digital tools, in line with Enel's specific needs, makes it possible to streamline IP titles according to business strategy, reporting and ongoing monitoring of both the status of the IP portfolio of the entire Group and codifying of intellec-

tual property rights originating from inventions developed within Enel's innovation ecosystem. This increases the transparency of procedures and the reliability of internal processes.

As of December 31, 2023, the Group owns 497 patents for industrial invention, 292 of which are granted titles and 205 are pending applications, belonging to 170 patent families, 16 utility models and 181 design registrations. In addition, under Gridspertise (a joint venture company), according to a stewardship model on network management techniques and platforms, there are 232 patents belonging to 15 patent families, 11 utility models and 64 design registrations. Compared to the previous year, the change in the Group's IP portfolio is mainly due to Gridspertise being removed from the scope of consolidation, as well as the outcome of the iterative rationalization activity of IP titles carried out by the Group Functions to ensure constant alignment between the IP rights structure and strategic objectives. As a result, a limited number of expiring titles were not renewed.
Together with the patents, utility models and designs, IP rights also include copyrights, *sui generis* database rights and trade secrets of a technical and commercial nature, which are constantly codified and protected in line with the requirements of the Trade Secrets Management organizational procedure.
In terms of trademarks, the Group holds 1,907 registrations, 1,617 of which have already been granted and 290 applications are pending. With particular regard to internal IP generation, 70 inventions were proposed through the corporate portal in 2023 (compared to 61 in 2022), following a now steady growth trend.

In 2023, IP protection activity continued in the Global Business Lines, Service and Staff Functions:

- In **Enel Grids and Innovability**® it is worth highlighting:
  - **i.** two patent applications, as part of Grid Blue Sky solutions, to protect innovative systems based on algorithms for planning grid interventions, and to enable more efficient and precise management of the electricity grid through timely interventions and reduction of waste, downtime and costs associated with repairs;
  - **ii.** a patent application covering a system for identifying components and possible network anomalies through the use of aerial imagery and advanced algorithms. This technology improves operational efficiency, reduces repair time, and helps ensure a more reliable energy supply, thereby optimizing resource utilization and reducing Enel's overall environmental impact;
  - **iii.** a patent application in the area of managing flexibility services for medium- and low-voltage users connected to the distribution network in order to resolve operating problems relating to network congestion, voltage regulation and contingent faults;
  - **iv.** a patent application for a system to enable the detection of grid faults using medium-voltage line impedance analysis. This technology has the potential to greatly improve grid restoration times, reducing power outages and customer inconvenience, particularly during extreme weather events;
  - **v.** a patent application for a data clustering method to optimize the organization of response teams in the shortest time possible.

- In **Enel X Global Retail**, it is worth mentioning:
  - **i.** a patent application for a method for calculating the risk of failure of a lighting system to make maintenance interventions more efficient and to predict the remaining life of particular public lighting systems, with economic and environmental impact benefits;
  - **ii.** the filing of a community design which protects the graphic interfaces of the vivielettrico.it website – a portal dedicated to energy efficiency and to disseminating best practices to private users for achieving savings in bills and approaching the energy change.

- In the field of **electric mobility**, new solutions have been protected with the filing of:
  - **i.** a patent for a modular street substation with an electric vehicle charging device (WayCabinet);
  - **ii.** a patent and a community design to protect the technology and aesthetics of a quick socket release device, respectively;
  - **iii.** a community design for a charging station with the shape of a rack arranged to accommodate micromobility vehicles such as bicycles or scooters (WayPad);
  - **iv.** a utility model and community design for the structure and particular configuration of a shelter with a photovoltaic panel installation system for charging micromobility vehicles (WayPark Micro).

- The following titles are highlighted in **Enel Green Power and Thermal Generation**:
  - **i.** in the photovoltaic sector, a patent application for a polymer formulation for the manufacture of specific plastic components of a photovoltaic module;
  - **ii.** in the wind and solar sector, a patent application for a process automation method based on artificial intelligence and robotic process automation; the method assists control room operators in the optimized management of remote restarts, through a multivariable analysis and evaluation of business priorities based on the type of plant stoppage;
  - **iii.** in agrivoltaics, a patent application for a technological integration of photovoltaic plants and microalgal growth reactors to boost the environmental sustainability and social acceptability of the photovoltaic

plant with a high value-added solution, while also significantly reducing CO_2 emissions into the environment;

iv. a number of patent applications for industrial inventions have been filed in 3Sun, relating to the efficiency of photovoltaic cells and manufacturing processes.

- **Global Energy and Commodity Management** has protected, through the registration of two community designs, the special shapes of two high-voltage pylons which improve the environmental impact in the area. Also noteworthy is the authorial protection of the graphical interfaces of an app, which measures the energy produced by renewable plants up to 10 MW in real time.

- **Enel Global Services**, in the area of environmental sustainability, has produced a handbook containing guidelines for estimating the impact of digital technology in terms of CO_2 emissions, through an innovative calculation method. The benefit presented by this method, which is protected under copyright law, relates to the Group's zero emissions goal.
  Through a patent application, the Brand Reputation Index has also been protected, which makes it possible to: (i) measure reputational performance based on the external perception of the Enel brand; (ii) take measures to manage Enel's Top Management communication plan; and (iii) prevent threats and risks to safeguard the Group's reputation.

- **Global Customer Operations** has protected, through the filing of a patent, the architecture of a data model (GCO Data Model) which enables the monitoring of the performance of Group companies with regard to contract activation processes, billing, customer care, payment and credit management, as well as the analysis of the respective data. The graphical interface of the model has been protected through a community design. In addition, the codifying activity was extended to four software programs within the same platform, protected under copyright law, which enable (i) database creation, (ii) aggregation, (iii) virtualization, and (iv) data visualization and analysis.

- Lastly, with regard to the Group's **Staff Functions**, it is noted:
  i. the filing of a patent application for the Climate Scenario Adaptation Model, a model that characterizes the climate change resilience of industrial assets. Specifically, the patent covers a method for generating risk maps of localized and distributed infrastructure in areas to be monitored;
  ii. authorship protection on Economic CirculAbility©® and Asset CirculAbility©® indicators, which make it possible to measure the resources allocated by a company to assess the increase in financial and industrial performance;
  iii. the Data Protection platform, protected under copyright law, which facilitates the process of defining the processing of personal data by providing objective indications for the assessment of privacy risks and supporting the business in managing data processes.

With regard to joint ventures, the Enel Group is applying the stewardship model to continue its path of investment and development in the intellectual property tied to technologies and platforms for grid infrastructure management, through the company **Gridspertise**.

In 2023, Enel continued its activities to protect the **trademark portfolio** owned by the Group. In this regard, the Company filed the verbal trademark **"Tutto Enel, è Formidabile"** to distinguish and enhance the campaign of commercial offers launched by Enel, aimed at simplifying the lives of the customers with new efficient, sustainable solutions designed for different consumption needs, having Enel as a single interlocutor.
These activities consolidate the ongoing process of overall portfolio protection and management, which in the first half of 2023 led (among other things) to the application to register the Enel brand in the Special Register of Historic Brands of National Interest, which has already been granted. Also worth mentioning is the registration of the E-MIA Engagement – Materiality & Impact Analysis trademark, which aims to support all users involved in the process of stakeholder engagement and materiality analysis at Group level.