

Terna and Biodiversity protection



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Introduction

This annex describes the path the Company has embarked upon – in terms of growing awareness and progressively identified and adopted solutions – to protect biodiversity and the environment, which may be impacted by electricity infrastructure. This topic is clearly related to the conservation of our planet's natural capital, which is also linked to social and relationship capital issues. Terna's voluntary decision to consider biodiversity, and the environment in general, as a stakeholder to be protected, has led to a series of initiatives primarily aimed at mapping the impacts - and the associated potential risks - of electricity assets on biodiversity, and then identifying the best solutions to mitigate their effects.



From the outset of this journey, the Company has opted for an open and inclusive approach, based on partnerships and collaborations with environmental organisations, experts and academics, in order to find a balance between respect for the environment and biodiversity, especially birdlife and between the voices of local communities, and development of the electricity grid, which is vital for Italy's economic growth.





Which strategy for biodiversity?

Terna's electricity grid is strategic infrastructure for Italy, which is present throughout the country.

The effects of the grid's relationship with the surrounding natural environment and its impact on biodiversity differ in the construction phase of new power lines and in the operational phase of existing ones.

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Positive and negative impacts of the electricity transmission grid on biodiversity

During the construction phase of an electricity substation or power line, the impact on biodiversity is linked to construction activities: building access routes to erect pylons, soil excavation, and removal of residual materials. The construction of new lines and substations requires special attention if it takes place near or within protected areas.

Once a power line has been built, its relationship with biodiversity is twofold. On the one hand, the route the power line takes may be a factor in increasing biodiversity and protecting certain species. For example, when power lines cross vast open areas or extensive cereal monoculture areas, pylons and their bases form "islands" of biodiversity concentration. The bases of pylons, especially the larger ones that support high-voltage power lines, are the only areas that are spared from intensive agriculture and unaffected by tillage and land transformation. These areas contain spontaneous grasses and brambles where wild rodents find refuge, as their burrows are not periodically destroyed by ploughing. They are also areas around which rodent predators, namely birds of prey, concentrate. Indeed, birds, and especially birds of prey, use power lines and pylons as observation points and nesting sites.

On the other hand, power lines may have negative impacts on biodiversity, primarily on birds potentially exposed to the risk of collision, above all when a power line route coincides with a high transit density migration route (see pp. 302-304)¹.

With regard to undersea cable lines (e.g. the SA.PE.I, opened in 2011; the Italy-Montenegro, in operation since 2019, and the future Tyrrhenian Link, Adriatic Link and SA.CO.I3 lines), the impacts relate to the integrity of the seabed on which the cables are laid (see p. 306).

¹ Unless otherwise indicated, page references refer to the 2023 Integrated Report.

Terna's strategy is divided into **three distinct macro-areas**: the first relates to the **definition of policies** that incorporate progressive awareness of the impacts (and associated risks) of the Company's activities on biodiversity, including precise benchmarks and operational recommendations; the second relates to **the identification of concrete mitigation measures**, including through **engagement with environmental organisations** and subsequent definition of joint activities; and the third is focused on implementation of these measures, **monitoring** their effectiveness, and subsequent **sharing of the results** achieved with the scientific community and, more generally, with all involved stakeholders (e.g. local communities).

The voluntary nature of this strategy should be emphasised, partly because Terna's business does not directly depend on biodiversity but rather only indirectly and in reputational terms, such as, for example, opposition from local communities to accommodating new electricity infrastructure that is deemed to impact biodiversity and also the surrounding landscape.

Just as the Group's business does not directly depend on biodiversity, likewise any opportunities that may arise are indirect: biodiversity-related investments, as well as mitigating biodiversity-related risks, can also result in reputational gains and improved relations with some stakeholders.

Finally, with regard to governance of these issues, which is assigned to operational departments at local level, the Board of Directors oversees the risks and opportunities related to biodiversity and natural capital protection via periodic inductions, presentation of the results of annual materiality analysis and approval by the *Audit and Risk and Sustainability Board Committee*.



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From identification of biodiversity risks to impact assessment

The potential biodiversity risks associated with the electricity transmission grid have a lifespan that coincides with the lifecycle of its main assets (the pylons), which is approximately 40 years.

The prime tool for mitigating these risks is rigorous compliance with existing regulations, reinforced by additional voluntary commitments.

The main risks to biodiversity are **collision risk** for birds, and **fire risk** for surrounding vegetation. These are prevented via installation of bird deterrents, and vegetation management.

With regard to birds, it should be noted that the risk of electrocution does not affect Terna's assets, as this is determined by the narrow gap between the conductors typically used on low- and medium-voltage power lines. This can result in the electrocution of birds, especially large ones, if they perch on a pylon and their wingspan brings phase and earth into contact. However, high-voltage power lines are associated with the risk of collision, which depends on bird density, how often birds fly close to power lines, weather conditions, and the varying flight manoeuvrability of different species (e.g. Galliformes are at high risk of collision). The key factors include the routes taken by migratory birds (especially important in Italy, which acts as a "bridge" between Europe and Africa), the location of wetlands around the country, and the presence of protected areas, nature reserves and parks. This risk has been analysed and assessed, after scientific studies carried out in partnership with qualified external organisations².

The growth of spontaneous vegetation in the vicinity of operating power lines can lead to a fire risk, especially if it reaches the height of the conductors. Therefore, Terna schedules vegetation management activities every year, with a view to averting this danger. On average, vegetation management activities are carried out along approximately 20,000 km of power lines each year.

With regard to power lines under construction, the risks to birdlife coincide with the temporary impacts of construction site activities, such as noise and disturbance caused by human presence. Terna carries out such activities in strict compliance with environmental protection regulations and any other applicable regulations, and also applies the best solutions to limit the effects on biodiversity. Indeed, Terna ensures that areas temporarily accommodating construction sites are restored to their original state, in order to promote natural rehabilitation of flora whilst respecting the pre-existing habitat and ecosystem. With regard to laying and maintenance operations related to **undersea cables**, the risks primarily concern aquatic flora species such as **Posidonia oceanica**. In 2010, the SA. PE.I. cable (the "Sardinia-Italian Peninsula" connection) was laid on the seabed of the Tyrrhenian Sea without excavating the substrate. Instead, 621 special anchorage points that prevent excessive oscillations were used. Their numbers were kept to the minimum needed to guarantee safety, resulting in reduced erosion of the underwater Posidonia seagrass meadows.

² See 2010 Sustainability Report, p. 116 "Terna-LIPU agreement: a study of the interaction between birdlife and the national transmission grid".

Benchmarks and reference documents

Caring for the environment is specifically mentioned in the **Code of Ethics**³ and is the foundation of the Group's **Environmental Policy**, which is an integral part of the Terna Group's Integrated Management System Policy⁴. First published in 2007, the Environmental Policy states that "*Terna recognises that respect for the environment is a vital element in the Company's management approach*".

Another benchmark, which also guides the Group's operations, may be found in the **2030 Agenda** of the **United Nations Global Compact**, based on 17 Sustainable Development Goals (the **SDGs**), especially SDG 15.



Protect, restore and promote sustainable use of terrestrial ecosystems

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

The ongoing definition of internal rules ("Guidelines" and "Operating Instructions"), which are generally more restrictive than the legal requirements, has always been inspired by the leading international and national reference documents related to this theme. In particular, the following documents were considered:

- **New Strategic Plan 2011-2020 of the UN Convention on Biological Diversity**, aimed at creating a world "*living in harmony with nature where, by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people*";
- **European Union Biodiversity Strategy for 2020**, implemented in Italy via the **National Biodiversity Strategy**, which sets out a commitment to halt the decline of biodiversity by incorporating the requirements of conservation and sustainable use of natural resources within national industrial policies;
- **IUCN Red List** (International Union for the Conservation of Nature), the largest existing international database on the conservation status of thousands of plant and animal species categorised according to their risk of extinction. In its analysis, Terna particularly considered the presence of bird species on the IUCN Red List and at Natura 2000 sites namely protected areas with high biodiversity (approximately 3,000 SPAs - Special Protection Areas and SCIs - Sites of Community Importance);
- **Guidance on Energy Transmission Infrastructure and EU Nature Legislation** (European Commission, 2018), a non-legal document that provides guidance on application of the EU Habitats and Birds Directives, so that they may be properly and adequately taken into account in the planning and operation of electricity transmission grids;
- **Guidelines for the management of Natura 2000 sites** (European Directives 92/43/EEC and 2009/147/EC), issued by the Ministry of the Environment and Land Protection via a Decree of 3 September 2002.

³ See p. 36 of the Code of Ethics, available at: <https://www.terna.it/en/Governance/business-ethics/code-ethics>

⁴ The latest update of this Policy was approved by Terna's Board of Directors on 22 March 2023.

⁵ Natura 2000 is the main European Union policy instrument for biodiversity conservation. It is an ecological network spread across the entire European Union, which was established under Directive 92/43/EEC "Habitat" to ensure the long-term conservation of natural habitats and flora and fauna species that are threatened or rare in the European Union. The Natura 2000 network consists of Sites of Community Interest (SCIs), identified by Member States in accordance with the Habitats Directive, which are subsequently designated as Special Areas of Conservation (SACs), and also includes the Special Protection Areas (SPAs) established under the Wild Birds Directive 2009/147/EC regarding the conservation of wild birds.



Implementation of the strategies set out in these reference documents has led the Company to voluntarily bring forward future legal obligations, as in the case of the:

- **Strategic Environmental Assessment (SEA) Process** (EU Directive 2001/42/EC transposed by Part II of Legislative Decree 152/2006), an administrative tool designed to determine the environmental compatibility of plans and programmes (in Terna's case, the electricity projects included in the Development Plan). The SEA anticipates the inclusion of environmental considerations in public decision-making processes. With a view to involving directly affected stakeholders, Terna adopted the SEA tool back in 2002, four years ahead of the legal obligation. To complete the picture, it should be pointed out that the tool used after the SEA (which examines projects at their initial planning stage) as envisaged by the lawmakers, is the **Environmental Impact Assessment (EIA)** process, which determines the environmental compatibility of each specific project.

Policies and tools

All these references are included in the **Terna Group's Integrated Policy**, which defines the Company's methodological approach in the key processes related to quality, occupational health and safety and the environment. One of the management tools used is the ISO 14001-certified Environmental Management System (EMS) - aimed at continuous improvement of all corporate processes that have environmental impact - which is an integral part of the Group's Integrated Management System.

The commitments undertaken by Terna in its Integrated Environmental Policy include:

- verifying the suitability of the context in which the Terna Group operates, preparing a **periodic assessment of the risks and environmental impacts of its activities and related risks**, and seeking solutions to minimise any negative effects its activities may have on the environment;
- carrying out procedures to define agreements (commercial and otherwise) with third parties, conducting **due diligence** to confirm the reliability and integrity, including in environmental terms, of the parties identified for the development and implementation of initiatives that may have repercussions on Terna's environmental stance;
- **verifying**, via inspections incorporated within occupational health and safety monitoring, **the environmental protection actions** that are carried out by the relevant company units;
- promoting **collaboration with the competent authorities** (environmental protection agencies, such as ARPA and ISPRA) in order to establish an effective two-way communication channel, aimed at continuous improvement of environmental protection performance;
- providing **transparent communication** about the Company's environmental activities;
- recognising the importance of gaining **social acceptance** of the Group's infrastructure from the communities in which it operates, in order to execute projects whilst paying attention to the environment, the landscape and the interests of local and national communities, and reducing their impact on local areas as much as possible;
- adopting a **preventive approach**, by listening directly to the views of the **main environmental organisations** and the needs voiced by authorities in the area where grid works are built, and by seeking shared solutions that reconcile consideration of the characteristics of the local area and environmental and biodiversity protection criteria with the safety requirements of the electricity system, as well as taking into account the more general interests of the community in terms of benefiting from an efficient grid and a cost-effective and quality of service;
- on the basis of scientific programmes agreed upon with reliable institutes and associations, allow Company facilities to be used for the **purposes of protecting and increasing biodiversity**, whilst keeping within the safety limits of the infrastructure and the electricity service as a whole. In particular, with regard to birdlife, the Company undertakes to use the latest devices in order to minimise any negative impacts its infrastructure may have on birds. Therefore, the Company gives priority attention to any reports of negative impacts caused by its infrastructure, collaborating willingly in any investigations or assessments and, if necessary, testing and adopting mitigation measures. Efforts are made to develop protection systems that blend in with the environment surrounding the infrastructure;
- recognising that **climate change** and curbing CO₂ emissions is an important sustainability issue for the whole planet. Even though not involved in electricity generation and emission trading schemes, Terna is committed to reducing its direct and indirect emissions, within the scope of its obligations relating to the safety, continuity and cost-effectiveness of the electricity service. An assessment of the effects of CO₂ emissions is included in data regarding planned investment, enhancing their positive impact on the system as a whole.

Therefore, in 2018, Terna set out its biodiversity protection guidelines in a document entitled **Commitment to Biodiversity**⁶, which is based on the principle *no net loss of biodiversity and, if possible, net improvement of biodiversity*. In particular, with regard to the no net loss commitment, if impacts cannot be avoided, the effects are reduced or mitigated, or measures are taken to offset any residual negative impacts by using natural engineering techniques.

⁶ The document is available on Terna's website at: <https://download.terna.it/terna/0000/1067/48.PDF>



In this formal commitment, Terna also includes **paying attention to deforestation**, which may potentially be linked to electricity infrastructure construction activities. Therefore, Terna monitors and mitigates potential impacts via robust precautionary procedures, which are defined ex ante during the design phase, and remain in place throughout the management of on-site activities. The effectiveness of these procedures is periodically assessed. In 2023, as in the previous year, no significant risks were identified, which confirms that the issue is fully managed via environmental impact checks and monitoring carried out at construction sites by qualified personnel.

Finally, in its Commitment to Biodiversity, Terna draws up action plans to help achieve its set goals. These include establishing a working group focused on managing any bird interference with electricity infrastructure (e.g. nesting on electricity assets).

In 2023, Terna finally adopted operating instructions regarding the **Definition of a Birdlife Protection Plan (PPA)**, comprising a set of actions aimed at protecting biodiversity, and reducing the risks arising from interaction between birds and the electricity grid. The plan defines operational procedures for managing the various activities, including minimising impacts on birdlife during construction activities, adopting mitigation measures to reduce the risk of collision, alternative use of pylons for the benefit of birdlife, monitoring and management of nesting, and organising training and communication initiatives on birdlife and power line issues.

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Terna's Bird Team

In 2017, Terna set up an in-house **Bird Team**, comprising specialised operational personnel in local districts and departments and a team of experts, with a view to:

- finding appropriate solutions for critical electricity system issues caused by birds or bats;
- developing solutions in line with national and international regulatory frameworks;
- improving and consolidating relations with environmental organisations;
- improving external communication of Terna's biodiversity actions.

In 2017, the Bird Team drew up operating instructions on the **"Use of Terna's assets to mitigate effects on birdlife"**⁷, which was updated in 2023, in order to promote:

- initiatives to mitigate interference by birds or bats with grid infrastructure;
- studies on power outages directly or indirectly caused by birds or bats;
- initiatives to manage and promote artificial nests on pylons, and natural nesting at substations;
- appropriate management of natural nesting on grid structures, including any necessary limitation in the interests of safety;
- initiatives to mitigate the impacts of new power lines on birds and bats;
- support for the management of engagement with local environmental and scientific organisations with regard to their areas of expertise;
- initiatives aimed at compliance with the requirements of European, national, local regulations (especially relating to protected sites), specific agreements and memoranda of understanding;
- support for settlement of disputes regarding birds, bats and the electricity service;
- active participation in national and international activities (working groups, conferences, technical meetings) with counterparties from other TSOs and research groups;
- collection and updating of international scientific literature, and maintenance of a database.

⁷ Last updated: 14 December 2023.

In view of the growing investment in undersea cables, Terna has also signed the **Marine Grid Declaration**⁸, an initiative promoted by the Renewables Grid Initiative (RGI) aimed at achieving a common commitment to managing and developing innovative solutions to overcome and mitigate the environmental effects associated with undersea cables. Participation in this initiative is in keeping with SDG 14.



Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Terna has also adopted a **Sustainability Policy**, thereby making a formal and public commitment to adopt virtuous behaviour and sustainable actions regarding ESG (*Environmental, Social, Governance*) issues deemed to be relevant for the Group, in line with the Company's Integrated Management System Policy and the outcomes of materiality analysis⁹. The policy is a kind of manifesto that formalises a commitment to adopt and integrate ESG objectives into the Company's strategy, thus encouraging the creation of shared value for all stakeholders.

The objectives of the policy are to:

- define Terna's sustainability commitments;
- identify methods for defining the Group's sustainability strategies;
- raise awareness of ESG issues relevant to the Group, and of the expected outcomes;
- disseminate a culture of sustainability within and beyond the Group.

Terna's Sustainability Policy is set against the broader backdrop of the United Nations Sustainable Development Goals (SDGs), the targets set by the Integrated National Energy and Climate Plan (PNIEC) and the European Green Deal.

The policy is applicable to all Terna Group companies, including those operating overseas. Terna is committed to promoting awareness of this policy among its employees, and to disclosing it to all interested stakeholders via such tools as the Integrated Report.

In this regard, six sustainability commitments have been identified, on the basis of which Terna is set to carry out specific actions:

1. *Enable the energy transition*
2. *Promote integrity, accountability and transparency*
3. *Promote stakeholder engagement*
4. *Enhance people*
5. *Promote inclusion, diversity and protection of human rights*
6. *Safeguard the environment and ecosystems*

In 2022, the Institute for Certification and Quality Branding of Construction Products and Services (IMCQ) approved the **Guidelines**¹⁰ prepared by Terna (the first company to do so in Italy) regarding application of the assessment criteria of the international **Envision protocol** – the first rating system for assessing the sustainability of the design and construction of infrastructure – to new electricity grid infrastructure.

⁸ <https://renewables-grid.eu/publications/marine-grid-declaration.html>

⁹ See page 54-57 of the 2023 Integrated Report.

¹⁰ The guidelines on the application of the Envision protocol to Terna's electricity transmission infrastructure are publicly available at: https://download.terna.it/terna/Envision_linee_guida_Terna_8d9f7c5e7306d40.pdf



Conceived in 2012 by the Institute for Sustainable Infrastructure, in collaboration with Harvard University, the protocol is based on a framework of **64 sustainability and resilience indicators**, called credits, which are divided into five categories: quality of life, leadership, resource allocation, the natural world, climate and resilience. For each credit, there are various levels of fulfilment of the requirement and, consequently, also scoring that determines the four levels of certification: verified (20%), silver (30%), gold (40%), platinum (50%). By applying the Envision criteria, Terna can verify the sustainability of its projects - in environmental, social and economic terms - throughout their life cycle.

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The Incremental Ecological index (IEI), a tool for measuring the ecological status of new systems

Objectively monitor the progress and state of health of new ecosystems created through vegetation mitigation and offsetting interventions: this is the aim of the **Incremental Ecological Index (IEI)**, launched by Terna in 2018, which, after progressive methodological revisions, was patented in 2022 (SIAE 2022/02452).

The construction of the index is based on a comparison of the ecosystem complexity of areas subject to intervention (treatment) with the ecosystem complexity observed at control points, namely areas close to the intervention points, which enables useful information to be gathered on the ecosystem changes taking place in the area as a whole.

The methodological development of the index entailed various phases, including:

- **First phase**, characterised by establishment of the theoretical basis of the method, in order to obtain operational indications for the subsequent phase of data collection in the field;
- **Second phase** of verification of the theoretical basis, carried out by sampling the selected indicators;
- **Third phase** of integration and statistical analysis of field data and methodological updates.

The IEI methodology is based on the analysis and combination of various ecological indicators, such as flora, vegetation, insect and bird communities. By integrating the data derived from the analysis of these components, the index provides summary information on the ecological status of a given intervention area, thus enabling a dynamic comparison between *ante-operam* and *post-operam* situations, as well as assessment of changes in terms of variations in ecosystem quality.

The IEI has a modular structure, which enables global and local assessment, with reference to the dimensions of the various areas surveyed. In its global form, the index measures the greater or lesser share of ecosystem complexity of the intervention area compared to the control area, with reference to all the ecological dimensions considered (ornithofauna, entomofauna, flora and vegetation) and all the survey sites, thereby highlighting the overall effects of the interventions.

The mathematical structure of the index enables assessment of individual survey sites and specific ecological dimensions. From an ecological point of view, among the various parameters considered, the index uses well known biodiversity yardsticks, such as Shannon entropy, Kullback-Liebler divergence and other classic measures of abundance and richness.

In 2022, the IEI's methodological approach led to the definition of a **Basic Index** that, site by site, assesses the evolution of ecological status, and a **Dynamic Index** that can show this variation over time for each individual site, as well as a global indication of the variation trend for all sites in general.

Terna's Incremental Ecological Index is set to become a reference tool for assessing the outcomes of various interventions based on natural engineering principles, thereby enabling verification of their soundness, at local and global level. This will enable fine-tuning of the restoration techniques adopted, with the ultimate outcome of optimising their implementation, minimising the impacts related to the development and maintenance of works, and overall improvement of the ecological characteristics of the intervention areas.

Implementing Terna's commitment

Terna's electricity infrastructure development and maintenance activities may lead to impacts on biodiversity, in different ways depending on the operational phase. As already mentioned, these issues, especially with regard to new works, may clash with the demands of local communities, who are often averse to Terna's projects (NIMBY - Not in my back yard syndrome).

Terna has chosen to respond to opposition from local communities by involving a third party, which itself is critical of infrastructure projects with potential environmental impacts, in order to find common ground for dialogue to identify and pursue sustainable solutions that are acceptable to all, namely **environmental organisations**.

Over time, this courageous decision has turned out to be successful in striking a balance between respect for the environment and biodiversity, especially birdlife, and development of the electricity grid, resulting in greater acceptance by the local communities concerned (see pp. 259-263).

The phases involved in the construction of electricity infrastructure (power line or electricity substation), which always include an environmental sustainability approach, are described below.



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Managing impacts on biodiversity

Terna addresses impacts on biodiversity with a series of integrated tools, which entails taking these impacts into account from the planning phase, and adopting appropriate mitigation and offsetting measures if necessary.

The approach is first and foremost preventive. As with other environmental variables, **biodiversity**, especially in protected areas, is **an input for grid development planning, which is geared towards sustainability**.

The biodiversity characteristics of areas potentially allocated to accommodate new infrastructure are carefully studied. The data gathered, which is added to the criteria for determining the final route, is available in the regional detail sections of the Environmental Report, which accompany the Grid Development Plan.

Despite the precautions taken at the planning stage, individual works may interfere with certain species or habitats. To reduce such interference to a minimum, environmental mitigation measures are undertaken, during both the construction and the operational phases. If mitigation measures are insufficient to reduce interference to negligible levels, environmental offsetting measures, namely actions in areas close to the power line, are deployed.

The main **mitigation** and **offsetting** measures involve:

- **environmental restoration** consisting of the construction of natural engineering works, which can regulate the surface runoff of rainwater and thereby curb soil erosion;
- **reforestation**, by planting native tree and shrub species that are part the local vegetation;
- **grassing**, using seeds belonging to indigenous species, distributed together with natural fertilisers and adhesives, which facilitate rooting. The use of native species prevents floristic contamination resulting from the introduction of alien species to the environment;
- **offsetting**, namely offsetting tree felling carried out along power lines by planting trees of the same species in equivalent areas.

During construction of works, the habitats and the flora and fauna species concerned are monitored. Environmental analyses are carried out before infrastructure is built. The data obtained are compared with data sampled after the construction work has been completed, in order to promptly detect any signs of deterioration.

With regard to existing power lines, Terna has experimented with mitigation systems, particularly relating to reciprocal interference between power lines and birdlife, which are discussed on pp. 302-303.



Planning and consultation

Terna's planning uses assessments based on thematic digital cartography, mostly from official sources (regional authorities, river basin authorities, monitoring agencies), organised into an extensive and constantly updated database.

Since 2002, Terna has voluntarily initiated discussions with local authorities at this early stage. Discussions with local authorities, the Strategic Environmental Assessment (SEA) procedure from the Development Plan, and public initiatives aimed at citizens of local communities directly affected by the construction of new infrastructure, help with the definition of measures to mitigate environmental and biodiversity impacts.

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Power lines in protected areas

As proximity of protected areas or areas of natural interest is an important factor in terms of the potential negative impact of Terna's infrastructure on birdlife, the interaction between power lines and such areas is constantly monitored.

The main tool for identifying critical power line sections is the territorial database, which is populated with data from regional authorities and government ministries. These data have been acquired via exchange protocols with numerous public bodies and authorities. The data collected has been standardised and entered into a standard nationwide mapping system.

In addition to the location of power lines, the key data in the database relates to geological, hydrogeological, natural and landscape aspects, including:

- degree of seismicity;
- climate data;
- national polluted sites;
- an official list of protected areas, river parks, nature parks, nature reserves, and terrestrial and marine national parks;
- Sites of Community Interest (SCI) and Special Protection Areas (SPA);
- Important Bird Areas (IBA);
- a landscape risk map;
- legislative constraints and administrative boundaries.

With the support of this database, Terna has made **an inventory of possible interferences between its structures (power lines) and protected areas or areas of high biodiversity**, cross-referencing data relating to the electricity grid with local data, which is present in the database, and using accredited GIS (Geographic Information System) tools.

By taking into account all the types of protected areas defined by various regulations (national and regional parks, national and regional nature reserves, SCIs - Sites of Community Interest, SPAs - Special Protection Areas), and eliminating overlaps, **it was found that 10.6% of Terna's electricity grid (equal to 7,253 km) passes through protected areas**, with stretches varying from a few hundred metres to several tens of kilometres. Finally, it should be noted that, overall and discounting overlaps, protected areas cover 21.7% of Italian territory (the figure does not take into account marine protected areas).

In addition to these tools, which were adopted ahead of their mandatory application, Terna uses **ERPA criteria** as a methodology for identifying project solutions that have the least impact on the environment and biodiversity.

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ERPA land characterisation criteria

Within the scope of consultation, one of the most effective tools for selecting the least impactful land corridors is sharing **localisation criteria**, on the basis of which the degree of suitability of an area to accommodate new electricity infrastructure is determined.

Terna and the regional authorities have agreed on a system of criteria (**ERPA**), based on four categories, to be adopted when locating new electricity works:

- **Exclusion:** areas in which any kind of construction is ruled out. Currently, the exclusion criterion includes areas deemed by the regulations to be areas of total exclusion, such as airports and military zones, as well as areas not directly excluded by the regulations that are nevertheless constrained by agreements reached in advance between Terna and the authorities involved;
- **Repulsion:** areas that can only be considered in the absence of more environmentally friendly alternatives;
- **Problematic:** areas in which construction of infrastructure is problematic for an objective reason, linked to possible special local requirements that are documented by the authorities involved, which therefore need further territorial analysis;
- **Attraction:** areas with good landscape compatibility and areas already affected by power line facilities, such as infrastructure and energy corridors, where the location of a new power line is likely to be more sustainable compared to the hypothesis of involving new areas.

In seeking sustainable locations (corridors) for National Transmission Grid (NTG) development initiatives, the support of GIS technology is vital, as it enables integrated consideration of all the information layers relating to the various types of land use and protection constraints (territorial, natural, cultural, landscape, etc.), with a view to identifying the most suitable hypothetical locations in the local area concerned.



Design

Choosing the route is the most tricky design phase, as it determines the future impact on the environment and biodiversity of the entire development project.

Therefore, notwithstanding the need to identify a route that enables normal operation and maintenance of the power line, Terna seeks design solutions that minimise land occupation; interference with areas of environmental, natural, landscape, and archaeological value, as well as with urbanised or urban development areas; and easements on the affected properties.

Terna's design includes the study of site plans aimed at using existing roads or tracks to minimise the building of new tracks, especially in wooded or protected areas, and assessment of problems related to vegetation management, using methodologies and tools to minimise interference, such as optimising the height of supports and their location.

Preparation of an **Environmental Impact Study** provides detailed recommendations about the various components that assist designers in turning the blueprint into an optimised project.

Execution

Terna manages the impacts of its construction sites on the environment via operating instructions entitled "**Management of environmental aspects during the construction of works**", in line with the Group's Environmental Policy and current regulations.

These operating instructions introduce the role of environmental officer, who is tasked with overseeing the environmental provisions contained in the EIA decrees, the advice of environmental agencies, and compliance with legal obligations, including with regard to the activities carried out by contractors. The instructions also prescribe monitoring, supervised by site assistants, of the indicators envisaged in ISO 14001, which relate to any complaints/reports, environmental incidents, waste, and consumption of energy and natural resources.

Special attention is paid to identifying areas and tracks to access the construction site, which, in keeping with technical and design requirements, are in areas of lesser natural value.

On completion of the work, Terna restores the sites concerned to their original state. If such areas affect natural or semi-natural habitats, specific initiatives are carried out in addition to regular restoration actions, based on **natural engineering** techniques, such as rewilding aimed at creating suitable environments for plant and/or animal species or communities (habitat reconstruction); native live plants, which do not require irrigation or special fertilisers; and materials (including inert ones), infrastructure and other measures aimed at creating favourable living conditions for animal species (<https://www.aipin.it/>).

Terna's environmental policies, which also apply at construction sites, have been drawn up in accordance with applicable environmental laws and the requirements of ISO 14001. They include such aspects as prevention of groundwater contamination and limitation of damage to vegetation, management of accident events, minimisation of air and noise emissions, use of vehicles, and proper management of waste and excavated earth.

These aspects are enhanced, on a voluntary basis, by additional precautionary principles. Internal audit campaigns on construction sites enable monitoring of any failures to comply with the Company's environmental policies.

Requirements

The provisions, which are usually technical and/or environmental in nature, are issued by the consenting body and, together with national, regional and local regulations, represent a “binding standard” for Terna to be applied for the purposes of the detailed design and construction of electricity works.

In most cases the provisions highlight or better define the mitigation measures proposed in the environmental impact study, or impose new measures based on advice from specialised bodies (oversight bodies, river basin authorities, park authorities, etc.). These mitigations, once implemented, have the effect of further reducing the values of the impacts estimated in the study (the “Monitoring Plan”), which is carried out on each of Terna's works that is subject to an EIA. Provisions may also relate to offsets. If a residual impact is deemed to be insufficiently mitigated, the competent authority evaluates an intervention, at another location, which has an environmental rebalancing value, thereby resulting in a net benefit for the area such as, for example, reconstruction of a vegetation habitat, restoration of an architectural or cultural asset, etc.

Mitigation and offsetting

Either voluntarily or in compliance with instructions received during the consent process, Terna adopts mitigation measures to reduce impact and improve the integration of electricity works within the surrounding area.

In particular, the Company uses camouflaging systems for its electricity substations located in tourist areas and places of landscape/environmental interest; rehabilitates cultural assets; in the design phase, favours power line locations that take advantage of natural morphological backdrops; and makes use of natural engineering techniques in post-demolition restoration, habitat reconstruction, and the stabilisation of slopes or escarpments.

If mitigation measures are insufficient to reduce interference to negligible levels, environmental offsetting measures are adopted, including environmental rehabilitation or habitat reconstruction measures, and actions undertaken in areas close to power lines, such as, for example, offsetting tree felling along planned power lines by planting trees of the same species in equivalent areas.

Dialogue with local communities and environmental organisations

Like other companies with significant physical assets in local areas, Terna has always considered local communities to be a key stakeholder.

The Company's preference for conducting transparent relationships and entering into discussions as early as the design phase, has been further strengthened by engagement with a third party, tasked to act as a cultural mediator in seeking shared solutions that enable investment in electricity works whilst respecting the local areas earmarked to accommodate them, namely environmental organisations. Over the years, these partnerships have led to an open innovation approach that has created best practices whose outcomes Terna continuously shares with its colleagues and the scientific community.



FOCUS

The agreement between Terna and LIPU (Italian League for Bird Protection)

The first partnership with an environmental organisation date back to 2008, when Terna signed an agreement with LIPU - Italian League for Bird Protection (the Italian partner of Birdlife International) relating to a scientific study - the first of its kind - on the interaction between High-Voltage power lines and birds. The only available studies were about electrocution, namely the death by electrocution of birds touching two conductors with their wings at the same time, which is typical of low- and medium-voltage networks.

The project was an important opportunity to study the impact - for the first time systematically and on a nationwide scale - of birdlife on high-voltage power lines. Based on their high concentration of wild birds (migrating, stopping over, and breeding), seven trial study areas were identified throughout the country. These were areas classified as SPAs ("Special Protection Areas") and IBAs ("Important Bird Areas"), which were also close to Terna power lines. The study areas included:

- Strait of Messina (ME)
- Monti della Tolfa (RM)
- Valli di Comacchio (FE)
- Gran Paradiso National Park (Val d'Aosta; Piedmont)
- Stelvio National Park (Trentino-Alto Adige; Lombardy)
- Carso Triestino (TS)
- Montepulciano (SI)

The main aims of the study, which initially lasted for 16 months, followed by a 12-month in-depth study, were to:

- assess collisions, with particular reference to the most significant species in terms of conservation;
- highlight the factors (logistical, environmental) that influence the likelihood of collision;
- identify possible measures to reduce the number of collisions.

The study showed that fewer collisions occurred in four of the seven study areas (Monti della Tolfa, Gran Paradiso National Park, Stelvio National Park and Carso Triestino). In two of these study areas (Monti della Tolfa and Stelvio National Park), no cases were reported during the monthly monitoring conducted throughout the year. Low collision numbers were also registered for the Strait of Messina area, but in view of the particular environmental (dense vegetation cover) and meteorological (fog, wind) conditions encountered, and given that this is an extremely critical collision-risk bottleneck where thousands of migrating birds are concentrated, it was deemed necessary to apply a more specific experimental protocol, which led to the study being extended, and to experimental technologies, such as radar, being used. These additional field observations revealed that there were no significant risks to birds in the area where the Sorgente - Rizziconi power line was set to pass. However, in the Mezzano and Lake Montepulciano areas, monitoring and related activities resulted in respective estimates of 1.1 and 3.4 bird collisions per km of line/year. These encompass wetlands and adjacent areas, which are characterised by heavy bird traffic. The species involved are less agile in flight. These data show that these two areas are affected by collision risk and point to the need for an in-depth investigation to assess the true extent of this risk in relation to the actual bird flows, as well as possible deployment of mitigation measures, including the application of new experimental approaches. The results of the study made a valuable contribution to the initiatives set out in the Ministry of the Environment "**Guidelines on mitigation of the impact of power lines on birdlife**" (INFS - National Institute for Wildlife, 2008) regarding the identification of suitable methods and interventions to prevent and mitigate the actual impact of high-voltage power lines on birdlife.

The study conducted by LIPU and Terna was first presented as a best practice at the conference "**Power Lines and Bird Mortality in Europe**", which was organised by BirdLife International in Budapest in April 2011, at the headquarters of the Hungarian TSO MAVIR. The aim of the conference was to facilitate dialogue between stakeholders on the need to address the issue of the mortality of large birds on power lines.



In the Strait of Messina, in addition to the voluntary study carried out in collaboration with LIPU, in compliance with a subsequent order, bird traffic has been monitored using ground radar since 2014. Details are provided in the following Focus.

FOCUS

Monitoring of bird migration in the strait of Messina

Between 2014 and 2018, as required by the Environmental Compatibility Decree for the Sorgente - Rizziconi power line, Terna once again monitored the movements of birds between Calabria and Sicily, within "Natura 2000 Network" areas, in order to obtain useful information for planning the decommissioning of old power lines in these areas.

This second round of monitoring was carried out 24/7 using radar, coinciding with spring (mid-March to mid-May) and autumn (mid-August to mid-September) bird migrations. The data recorded confirmed the low migratory flow in the area directly affected by Terna's power line, both in the easternmost Peloritani area (Sicily) and in the Aspromonte area (Calabria). This highlights the fact that the area coinciding with the route of the new power line was little affected by the migration of birds, especially birds of prey, which migrate further south-east or along the Ionian coast, depending on wind direction.

Most of the migration routes are far from the power line, while the closest ones are more than 100 metres above sea level, an altitude at which the future power line is unlikely to interfere with bird migration. The data collected were made publicly available on the [terna.it](https://www.terna.it) website¹¹.

¹¹ See: <https://www.terna.it/en/sustainability/environment/biodiversity/bird-migration-strait-messina>





In 2009, Terna signed an initial three-year strategic partnership agreement with WWF Italy to increase and monitor the level of integration of environmental criteria within the electricity grid development planning process, and to design nature restoration projects in priority areas for eco-regional conservation affected by the demolition of existing power lines.

FOCUS

The Terna-WWF Italy agreement

In January 2009, Terna and WWF signed a first memorandum of understanding relating to **sustainable development of the electricity grid**, with particular regard to **reducing the environmental impact** of large power transmission lines and **protecting biodiversity**.

The main objective of the agreement was to step up integration of environmental criteria into the grid development planning phase and bring this activity into line with the conservation strategy promoted by WWF. The three-year agreement (subsequently renewed) provided for a series of initiatives, relating to electricity grid planning, as well as minimisation of impacts in some WWF Oases.

In 2009, work began on drafting “**Guidelines for the environmentally sustainable planning and design of high- and extra-high voltage power lines in areas of high landscape and biodiversity value**”.

Planning work was also carried out and completed on mitigation, environmental monitoring and improvement of nature appreciation actions at some WWF Oases, as well as with regard to nature restoration initiatives in some national parks where the decommissioning of existing power lines was planned. The planned interventions were scheduled for completion by the end of 2010.

In 2012, Terna celebrated the International Year of Biodiversity by fully implementing restoration, mitigation and environmental offsetting initiatives in the **two** Tuscan WWF Oases of **Padule-Orti Bottagone (LI)** and **Stagni di Focognano (FI)** and in the Sicilian Oasis of **Torre Salsa (AG)**, as provided for under the agreement.

These three areas were chosen as they were representative of typical situations around Italy, as well as of potential interactions between electricity transmission infrastructure, landscape and biodiversity. The desire to experiment with new solutions borrowed from the finest achievements made in other countries, spurred top planners, with expertise in infrastructure and management of protected areas, to adapt the range of possible interventions to the situation on the ground in Italy and the various local contexts.

Terna has carried out initiatives in the **Padule-Orti Bottagone Nature Reserve** to improve the area’s potential in terms of **vegetation and fauna monitoring**, and to optimise logistical support for visits with a view to demonstrating that even areas located in highly anthropised settings (in this case close to a thermoelectric power station) can have a strong naturalistic identity that is worth protecting and enhancing.

Stagni di Focognano is an area located near the A1 motorway and a landfill site with a composting plant, which is crossed by two high-voltage power lines, including two pylons situated directly in the pond and two others located

on the boundary of the Oasis. Here, Terna has installed **collision deterrents for birdlife** on the ground wires and activated a monitoring programme including installation of **artificial nests and webcams** in order to obtain more comprehensive information on the birds that frequent the Oasis.

In Sicily, the Terna-WWF project focused on enhancing the **Torre Salsa Oasis** by improving such activities as **nature tourism, educational initiatives** and scientific research, in order to help mitigate human impacts and to restore some of the actual conditions that have been altered.

Subsequently, a new Terna-WWF agreement was signed relating to implementation of action plans for the sustainable development of the National Transmission Grid in areas of high environmental value, within the **Pollino National Park** (Calabria and Basilicata Regions) and **the Gran Sasso-Monti della Laga National Park** (Abruzzo Region), which are priority eco-regional conservation areas. Both cases involved environmental redevelopment actions linked to the dismantling of old power lines.

In the Gran Sasso National Park, the routing of the Bolognano - Bussi power line near the Gole di Popoli, an area characterised by steep slopes and a serious risk of hydrogeological instability, has led to an action to restore vegetation cover in the areas affected by the excavation and positioning of eight Terna pylons. The rugged environment where the intervention is set to take place is hostile for plant life, due to the microclimatic conditions of the sites and the stresses created by surface movement of debris, as well as the augmented runoff that rainwater can cause on soils that are no longer intact. Therefore, the plant species used were selected on the basis of their ability to colonise the soil. On the recommendation of the park authorities, these plant species were reaped on site and in adjacent areas to obtain native seeds, which were then sown. To facilitate the rooting of the new seedlings, natural engineering initiatives were implemented, including the use of bio-mats to reconstitute and consolidate the substrate, which encourages soil accumulation. This is necessary for the sowing and subsequent rooting of the young plants, and also protects them from runoff.

In the **Pollino Park**, the joint Terna-WWF initiative related to the monitoring and conservation of birds of prey, including highly valuable and in some cases endangered species, such as kites, griffon vultures, falcons, storks and owls, which nest or winter in the park in their hundreds every year.

The project also aimed to encourage the arrival and stopover of new specimens for the benefit of the park's rich biodiversity and conservation of these species, via an artificial feeding point for griffon vultures - but also for Egyptian vultures, red kites and golden eagles - which can find the food they need there.

This collaboration has continued uninterrupted since then, and, in early 2023, it was renewed for the next three years via a memorandum of understanding with the three main environmental organisations operating in Italy – in addition to WWF Italy, Greenpeace and Legambiente – with the aim of identifying and adopting solutions for the development of more sustainable electricity infrastructure, which is integrated into local areas and respects the environment and biodiversity.

Specifically, the new agreement is aimed at ambitious improvement of the environmental sustainability of the National Transmission Grid's 10-year Development Plan and Terna's Industrial Plan, including through concrete and constant discussions with the various authorities on matters and measures of mutual interest. For example, future energy scenarios, and technological innovations aimed at stepping up integration of energy from renewable sources into electricity grids, based on the targets set by European legislative packages and the national directives contained in the PNIEC (National Integrated Energy and Climate Plan for 2030) and the NRRP (National Recovery and Resilience Plan).

Key projects and initiatives

Terna's commitment to protecting biodiversity and the environment is reflected in the projects and initiatives designed to maintain and, if possible, increase the natural capital that could be potentially affected by Terna's activities, also through **finding alternative uses for pylons and power lines**.



FOCUS

The “Nests Among the Pylons”

To protect birdlife, the **Nests Among the Pylons** project was launched in the early 2000s, in collaboration with environmental associations. During the years, the project has installed approximately 500 nest boxes in 17 Italian regions.

In 2021, Terna launched a nationwide monitoring campaign to assess the condition of the nest boxes installed in past years. This led to the replacement of all the damaged nest boxes.

Monitoring of the boxes conducted by researchers from the *Ornis Italica* association collected numerous biological and ethological data and had a positive impact on biodiversity. In addition, the bird ringing carried out at the beginning of each mating season has enabled different generations to be monitored over time, confirming the high level of philopatry, in terms of birds' tendency to return to the nest in which they were born to then breed themselves.

The main species occupying these nest boxes are the kestrel, a small species of falcon who have adapted to living in man-made environments, the peregrine falcon, scops owls, the common roller, bats and storks.

Another project related to Terna's assets seen as elements able to encourage biodiversity is the **Biodotti** project, which involves power lines as a whole.

FOCUS

The “Biodotti” project

During 2022, Terna launched a new environmentally responsible project, called “**Biodotti**”, which consists of a series of renaturing measures for areas underlying pylons to increase the ecological value of landscapes. In particular, Terna completed the pilot project in Lombardy, Tuscany and Sicily involving a total of 17 pylons in agricultural areas and 5 overhead power lines, which can now act as an ecological connection between areas rich in nature.

In this way, Terna's power lines serve as real stepping stones that facilitate bird movement between various natural areas. The project involves the monitoring of the installations made during 2022, measuring the effectiveness of the initiatives through the **Incremental Ecological Indicator**.



In 2022, in accordance with the Net Improvement standard stated in its Commitment for Biodiversity, Terna launched several environmental protection initiatives. These initiatives include Terna's participation in the tree planting programme across Italy as part of the **Green Mosaic** forestation campaign, designed and promoted by AzzeroCO₂ and Legambiente, and the creation of **Tiny Forests**, described in the following focus.

FOCUS

The “Tiny Forests” project

During 2022, Terna, in collaboration with the Italian Botanical Company, launched the first pilot project, which led to the creation of three Tiny Forests, two in Lazio (in Rome) and one in Campania (in Caserta), involving land owned by three local social cooperatives.

The Tiny Forests are micro-forests, small plant communities that are very efficient as they adopt the Japanese botanical method ‘Akira Miyawaki’, based on the reproduction of natural forest groups. This method applies extremely strict rules to speed up the growth of plants, the development of biodiversity within these micro-forests and, as a result, their ability to absorb CO₂.

The first three Terna Tiny Forests are 200m² micro-forests (the maximum size according to the Miyawaki method), created through planting in 10m by 20m plots. Each plot has been divided into 1m² cages, inside which two small plants have been planted, for a total of 400 plants. The plants have been densely distributed to increase competition, rapid growth and create a self-sustaining ecosystem.

The varieties of plant chosen for the project were carefully selected based on soil conditions and the phytosociological characteristics of the planting sites, taking into account the Mediterranean Bioclimatic Region's specifications. Both the shrub and tree species were selected from local native varieties, tailored to the conditions of the area. The small plants used were derived from genetic material recovered in areas with a well-defined traceability and subsequently planted in public gardens kept under control for one to two years.

Following completion of the planning phases, in which the cooperatives were involved, the Tiny Forests created became part of the planned activities of the three organisations.

Overall, the project entailed the use of 7 shrub species and 11 tree species, making a total of 18 species.

Specifically:

- *Nuova Arca (RM)*: during 2023, the cooperative collaborated with nurseries and elementary schools in the 5th Municipality of Rome, hosting courses inside the sensory garden (already managed by the cooperative), to discover nature and biodiversity. The Tiny Forest is the last step in this experience. The children were able to learn about the project and its importance. As of today, 24 classes and a total of approximately 590 kids have been involved. The collaboration with the municipality was confirmed again for 2024; similar activities are planned for the coming year.
- *Fuori di zucca (CE)*: da sempre la cooperativa organizza attività e laboratori con le scuole dell'infanzia locali per far avvicinare i bambini all'agricoltura sociale. In tali occasioni i bambini hanno avuto modo di conoscere il progetto e seguire la crescita della Tiny Forest.
- *La Mistica (RM)*: the cooperative is visited by at least 300 people a week, who had the opportunity to view the project.

In terms of communication, thanks to the preparation of an explanatory video, 500 people were able to learn about the project as a whole.

The project was also presented in three different external events:

- *Festival of Environmental and Social Sustainability – I Care*, 13-14 May 2023, Rome, La Nuova Arca. Each year, the cooperative organises two days of discussion of environmental and social sustainability issues, aiming to raise awareness on the topics among the local community. In one of the two days, the head of the project described the various steps that led to the creation of the Tiny Forests and explained their benefits.
- *31st European Vegetation Survey (EVS)*, 21-25 May 2023, Rome. A meeting that involved a working group from the International Association for Vegetation Sciences (IAVS), bringing together plant ecologists interested in the survey and classification of vegetation in Europe and beyond. During the event, at the same time as the launch of the video, a PR activity was conducted to present the pilot project and the first scientific results to the community.
- *General Green States*, 24 November, Rome. A day dedicated to discussion and study to assess the state of Rome's green heritage, the initiatives introduced and future prospects for its protection and regeneration, in view of the environmental challenges that the city will have to face. The project was presented by the Director of the Botanical Garden, as part of the "the climate changes as the city changes" panel discussion.

The results obtained from the trial will be required to establish guidelines for the identification of the best species and associated plants to create other Tiny Forests across Italy. During 2024, the project will be extended to the rest of the nation with the creation of an additional two Tiny Forests in Lombardy and Veneto.





Laying submarine cables, for Terna, always requires the accompanying search for solutions to protect marine biodiversity, in particular Posidonia seagrass – a prioritised habitat of the Mediterranean infralittoral plane, which serves as a habitat for numerous animal and vegetal organisms – at risk of erosion due to the oscillating movements of the cable laid on the seabed.

FOCUS

Laying submarine cable and protecting marine biodiversity

Since 2006, a year in which the first geophysical and geotechnical surveys began on the seabed for the construction of the SA.PE.I. submarine cable (Sardinia – Italian mainland), Terna has monitored the most sensitive areas of sea, above all the “Cetacean Sanctuary” and Posidonia seagrass and Cymodocea nodosa seagrass, located in the harbour of Nettuno (RM).

To minimise any potential impact on these meadows, the cable was laid on the seabed without digging through the substrate and then fixed to the ground with particular types of anchorage, similar to brackets, positioned by specialist divers. The decision to resort to these devices (621 were used) stopped the cable’s movements from creating holes in the seabed that would lead to erosion.

Over time, Terna has developed further initiatives, such as, for example, the transplanting and relocation of Posidonia seagrass to mitigate the impact of its submarine cables.

During 2022, in combination with the beginning of preparations for instalment of the submarine section (34 km out of a total of approximately 37 km) of the connector between the island of Elba and the mainland, Terna – in collaboration with ECON, who carried out the transplant under the supervision of the National Inter-university Consortium for Sea Science (CoNISMa) - completed the transplanting and relocation of approximately 53,000 cuttings of Posidonia seagrass in the Gulf of Follonica, covering a surface area of over 1,540m².

The techniques used for this activity have already been successfully tested in the “LIFE SEPOSSO” (Supporting Environmental governance for the Posidonia Seagrass Sustainable Transplanting Operations) project¹².

During 2023, the second phase of the project began, based on an environmental conservation and monitoring plan. The plan will last ten years, with work taking place every quarter for the first two year and then less frequently.

¹² Further information is provided on the website <https://lifeseosso.eu/>.

Finally, in 2023, the Odisseo project, described in the following Focus, was launched. The project aims to use environmentally friendly technologies for deep water surveys.

FOCUS

Launch of the trial use of a submarine drone for deep water surveys

Terna, in collaboration with the American start-up, Terradepth, has launched **Odisseo**, an innovative project that uses submarine drones – Autonomous Underwater Vehicle (AUV) – to inspect deep waters and submarine ecosystems to support an effective planning of submarine power lines and, once installed, the subsequent monitoring of the cables.

The first test of the Odisseo project was conducted at the port of Casamicciola Terme, on the island of Ischia. During the test, Terna's technicians assessed the performance of the **Gavia drone**, a Terradepth AUV equipped with advance sensors, such as, for example, a multibeam sonar, lateral scanning and HD cameras.

The trial of this marine drone is important for the security of underwater electricity infrastructure, starting with their planning and moving through to the adoption of adequate installation and protection techniques for the cables, in line with the ten-year Development Plan (latest edition: 2023), which envisages a significant increase in investment in submarine cable projects. This particularly regards the **Tyrrhenian Link**, which will connect Campania, Sicily and Sardinia, the **Adriatic Link**, connecting the Marche and Abruzzo regions, and **Elmed**, the energy bridge between Italy and Tunisia, representing Terna's sustainable response to ever-growing energy demand, using innovative, effective solutions that will limit the impact on the environment as much as possible.

Terna's main projects for biodiversity and environmental protection are completed by various environmental responsibility and cultural promotion initiatives within the organisation.

In terms of environmental responsibility, Terna has developed a plan to **make the most of Italy's monumental trees**¹³, an initiative that aims to highlight the landscape, natural, monumental, historic and cultural value of these species, which are listed in a dedicated national registry. The initiative involves the identification of a monumental tree for each self-governing region or province, aiming to enhance its value by installing architectural features, such as benches, fencing or other structures to enable the public to access and enjoy the sites. Terna has already signed agreements with ten Italian municipalities in 2023, whilst the others will be formalised during 2024.

Lastly, regarding the initiatives aimed at employees, Terna regularly publishes on its corporate intranet **EcoTips: good sustainability practices**, a section promoting responsible behaviour and good practices for the environment. These provide opportunities to expand personal knowledge, such as, for example, the chance to visit eight WWF reserves spread across Italy with a dedicated guide and free of charge. These excursions enabled participants to learn about these protected ecosystems at first hand. Approximately 900 people have taken part in this initiative.

¹³ A monumental plant or tree is a plant of landscape, natural, monumental and cultural and historical value, and officially protected due to certain peculiar characteristics.



Recommendations of the Task Force on Nature-related Financial Disclosures (TNFD): Terna’s disclosures

In October 2023, the Task Force on Nature-related Financial Disclosures (“TNFD”) published its recommendations, giving Terna the opportunity to carry out this initial alignment process for its reporting on this topic.

Terna’s approach to nature stands out for its solid strategy to prevent and minimise the impact of its operating activities, in line with the so-called **mitigation hierarchy**. Starting from the application of **ERPA criteria** (Exclusion, Repulsion, Complexity and Attraction) in the Strategic Environmental Assessment (SEA) of the Development Plan, Terna’s approach aims to prevent any negative impact and intervene with mitigating initiatives (such as, habitat recovery, the transplanting of Posidonia seagrass), enhancing, where possible, the interaction of its infrastructure with nature, in order to achieve a positive impact.

In this regard, **stakeholder engagement** is crucial. The Group is constantly committed to establishing and implementing the most efficient forms of engagement and **participatory design**, with particular focus on local communities affected by grid development projects. Generally, Terna’s work follows certain general operating standards, with regard to stakeholder engagement activities to be carried out, in the various phases of the NTG development process, from planning through to the SEA stage for the Plan, and from the planning of individual works to the related consents and completion¹⁴.

Nature-related issues are also considered in the Group’s corporate policies, such as the **Sustainability Policy** and the **Integrated Policy**, both approved by the Board of Directors, who establish the Group’s commitments for the protection of biodiversity and the landscape during the planning and maintenance of the NTG.

From an operating point of view, this topic, in addition to the departments that specifically cover the ESG performances involves all those departments engaged in the preparation of the Environmental Report for the Development Plan, in complying with the environmental regulations both during the planning phase and in the construction and operation of the grid and in the Environmental Risks Assessment, which identifies and thoroughly analyses the environmental aspects connected to Terna’s infrastructure and activities.

The following table provides the references which, within this report, represent an initial response to the recommendations – summarised in the column “Description” and divided by topic area – provided by the Task Force on Nature-related Financial Disclosures.

TOPIC AREAS	DESCRIPTION	REFERENCES (INTEGRATED REPORT 2023)
Governance	Oversight of nature-related dependencies, impacts, risks and opportunities, also including respect for human rights and stakeholder engagement.	Sustainability Governance
		Respecting Human Rights
Strategy	Nature-related dependencies, impacts, risks and opportunities in the short, medium and long term and the related impact on the organisation’s business strategy and financial planning, also in terms of resilience, communicating the location of assets and activities in the direct operations of the organisation and, where possible, also for the upstream and downstream value chain.	Relations with local communities
		2023 Development Plan
		Security and Resilience Plan
		Focus: grid resilience and resilience methodology
		Risk management
Risk and impact management	Process of identifying, assessing, prioritising, managing and monitoring nature-related dependencies, impacts, risks and opportunities in direct operations and the upstream and downstream value chain.	Reference scenarios
		Terna’s scenarios
Metrics and goals	Metrics used by the organisation to assess and manage nature-related risks, opportunities (in line with the risk management strategy and process), dependencies and tangible impact, also including the organisation’s goals and performance with respect to those goals.	Opportunities and risks for Terna linked to climate change
		Risk management
		Managing the impact on natural capital
		Landscape and biodiversity

¹⁴ Operating standards: preventive awareness of the territory; preventive disclosure of significant stakeholders; public consultation and debate with stakeholders and citizens; engagement with citizens; preparing and using a company website; preparing specific communication channels. Further details are provided in the “Strategic Environmental Assessment of the Development Plan, 2023 Environmental Report, Non-Technical Summary” https://download.terna.it/terna/Sintesi_Non_Tecnica_8db26077064fb37.pdf

Dependencies, impacts, opportunities and risks related to nature for Terna

A description of Terna's main management procedures for nature-related dependencies, impacts, opportunities and risks is provided below, with respect to certain information included in the draft guidelines for the "Electric utilities and power generators" sector, published by the TNFD in December 2023.

Dependencies

The draft sector guidelines have not identified any dependencies directly linked to the transmission and dispatching of electricity. A potential dependency identified by the guidelines regards ecosystem services, in relation to the increasingly frequent extreme weather events due to climate change. Further information is provided in the paragraph "Disclosure on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)" on page 100.

Impacts

A selection of various impacts identified by the draft sector guidelines is provided below.

Sustainable use of land and water

Every two years, Terna publishes the NTG Development Plan, which sets out the infrastructure projects to be implemented over the course of the next ten years in Italy, and is subject to a Strategic Environmental Assessment, which analyses the potential environmental impact and the activities carried out across the country. With regard to the SEA, the partnership between Terna and the relevant authority has focused attention on finding an agreement on a sustainable location for new construction, applying various methods (ERPA criteria, indicators, etc.). The local sustainability indicators, used in the SEA to analyse and assess the overall impact resulting from implementation of the Development Plan, include: "Protecting natural and seminatural environments" and "Reducing interference with areas at hydrogeological risk".

Power lines and collision risk for birdlife

Terna actively studies the interaction between power lines and birdlife, focusing on integrating electricity infrastructure into the territory in a sustainable manner. Terna, in collaboration with LIPU, has conducted scientific research to tackle the issue regarding collisions between birdlife and power lines, demonstrating a low risk of collision. Nevertheless, Terna has installed deterrents, which make it easier for birds to see and hear the power lines in flight, thereby contributing to further reducing the potential risk of collision¹⁵.

Power lines and interference with the movement of wildlife

Power lines offer a solution to combat climate change, however, they have an impact that must be analysed given that, in view of their structural characteristics, the impact on the movement of wildlife can affect birdlife and varies based on the species and their environment. Nevertheless, the monitoring campaigns conducted on Terna's power lines, above all those covering the Stretto di Messina project – being one of the three main migratory corridors – detected no significant impact. Power lines also generate electromagnetic fields, which could affect the movements of the more sensitive species; for this reason, Terna has conducted an experiment involving bats in the Piedmont valley. The recordings of movements made through batdetectors and traffic using the batboxes installed along the pylons detected no significant impact.

¹⁵ Further information is provided in the paragraph "Electricity power lines, biodiversity and birdlife" on page 302.



Opportunities

Terna believes that protecting nature and improving the environment in the areas in which it operates is crucial, recognising the importance of quality stakeholder relations, not only for social consensus, but also in integrating economic development with respect for the environment. Over the years, Terna has promoted many nature-related initiatives, also in collaboration with environmental associations. Information on the mentioned projects “Nests among pylons”, “Biodotti” and “Tiny Forests®”.

Risks

A risk related to Terna’s activities regards the need to adjust to the climate change regulations and manage the resulting impact. Further information is provided in the paragraph “Disclosure on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)” on page 100. With regard to the potential future nature-related regulatory changes, Terna has managed this topic for some time and, in addition to already being subject to a fairly strict regulatory regime, has adopted tools, methods and measurement techniques. For this reason, it is deemed that a potential expansion of regulatory obligations will not cause issues for the Company.

Measuring biodiversity protection: Terna's metrics

The projects and initiatives described in this document are subject to monitoring and specific measurements, in order to manage them responsibly and, where necessary, implement corrective measures.

The following section provides the main indicators that measure Terna's ability to protect biodiversity and the environment over time.

Terna's indicators

The first indicator is represented by the kms of obsolete lines removed: a significant figure given that the physical removal of existing lines is one of the most radical ways in which Terna can reduce visual (**landscape amenity**) and environmental impacts, also in terms of **land use** and the **circular economy**, by recycling the materials removed.

Lines demolished (km)

2010	2011	2012	2013	2014	2015	2016*	2017	2018	2019	2020	2021	2022	2023	TOTAL
91	10	120	81	93	98	290	98	87	179	22	30	68	89	1,477

(*) The figure for 2016 is exceptional due to the demolition of over 200 km of obsolete power lines in Valtellina, which had been in preparation in previous years. After adjusting for this removal, demolitions amounted to approximately 80 km, in line with previous years (around 100 km per year). The exceptional performance in 2019 was due to a speedier execution of programmes that year, with a consequent reduction in the targets for 2020 and 2021.

These figures relate to the **freeing up of land**, which varies depending on the level of voltage of the line demolished, as shown in the table below.

Hectares of land freed up following demolitions (ha)

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	TOTAL
327	467	433	293	336	353	1.045	354	313	646	78	87	245	299	5,276



Another historic series of data required to measure Terna's commitment to protecting biodiversity is the **percentage of power lines interfering with protected areas** for routes within varying distances ranging between hundreds of metres and tens of kilometres. It should be noted that the figures reflect the progressive increase in the length of Terna's power line and include submarine cables.

Power lines in protected areas (by % and km)

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017	2018	2019	2020	2021	2022	2023
11.4%	11.4%	9.7%	11.4%	9.7%	9.3%	9%	10%	10%	10%	10%	10%	10.4%	10.5%	10.6%	10.5%	9.3%	10.6%
4,400	4,400	5,469	4,400	5,469	5,485	4,950	5,570	5,625	5,541	5,512	6,024	6,730	6,746	6,951	7,110	6,830	7,253

Strictly related to this series of data is that related to the number of bird deterrents installed on the lines which, because they coincide with bird migratory routes and interfere with the above protected areas, are deemed to be at a potential risk of collision.

Bird deterrents on the NTG

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Lines involved (no. ^o)	30	37	40	n. d.	47	51	53	57	66	70	72	77	81	88	92
Total deterrents installed (no. ^o)	8,845	8,917	9,116	11,146	12,005	13,397	13,866	14,472	14,728	15,503	15,552	16,299	16,977	17,445	17,638

Finally, with regard to the **Nests Among the Pylons** project, the following table shows the number of georeferenced nests by region at 31 December 2023

Georeferenced nests at 31 December 2023

LOCATION	NESTS		SPECIES CONCERNED ¹⁶
	NUMBER OF NESTS	OF WHICH IN PROTECTED AREAS	
Abruzzo	30	1	Kestrel
Calabria	30	23	Kestrel
Campania	31	0	
Emilia-Romagna	95	33	Kestrel; scops owl, cuckoo, common roller
Tuscany	8	0	
Friuli-Venezia Giulia	25	0	
Lazio	42	11	Kestrel, scops owl, common roller
Lombardy	20	0	
Piedmont	59	29	Common roller
Puglia	73	0	
Sicily	30	10	
Trentino-Alto Adige	8	0	
Veneto	14	1	
Total	465	108	

¹⁶ The species concerned are identified by the type of nest installed and by subsequent monitoring. At any rate, there is always the possibility that the nests may be used by other species not on the list.

