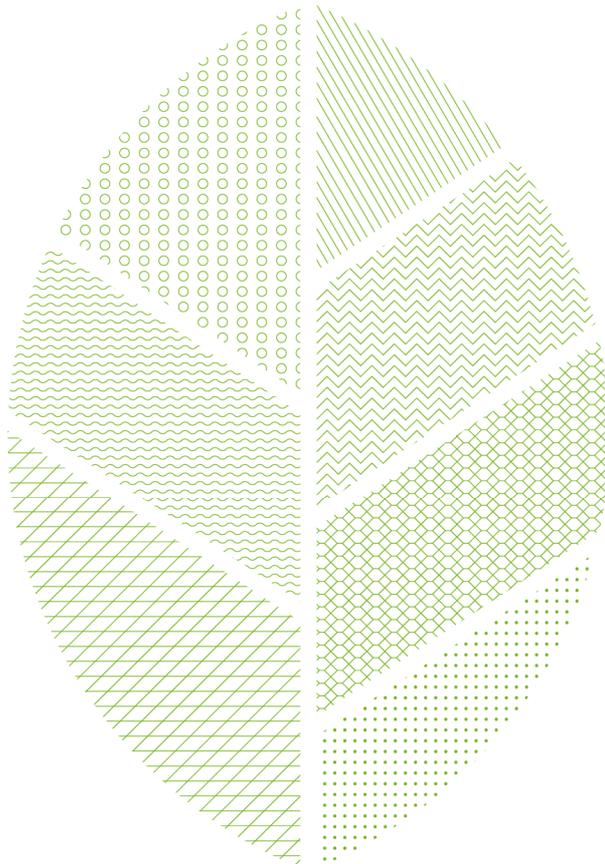




**RED**  
**ELÉCTRICA**  
DE ESPAÑA



## EMAS Environmental Statement 2018

May 2019



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## 1. Who is Red Eléctrica

In 1985, Red Eléctrica de España S.A. was set up as the first company in the world dedicated exclusively to the transmission of electricity and the operation of the electricity system.

In 2008, in order to strengthen the transparency and separation of regulated activities (electricity transmission and operation of the electricity system in Spain) from the rest of the business activities, a change was made in the Company's corporate structure with the creation of **Red Eléctrica Corporación**, as the parent company of the Group.

The main activity of the Group (the electricity business in Spain) is carried out by **Red Eléctrica de España S.A.U.**, which performs the functions of sole transmission agent and operator (TSO) of the Spanish electricity system.

As a key element of the electricity supply process, Red Eléctrica as system operator manages the electricity system in real time and is responsible for keeping generation and electricity demand in Spain in constant balance in order to guarantee the continuity and security of the supply for all citizens 24 /7.

As the sole high-voltage transmission agent in Spain, Red Eléctrica makes it possible to transport high-voltage electricity from the power generating stations to the points of distribution for its delivery to final consumers. To do this, it takes on the responsibility for developing, expanding and maintaining the transmission grid, in addition to managing the transmission and exchange of electrical energy between external systems through international interconnections.

Additionally, in 2008 a company was set up to develop electricity interconnections between Spain and France which is known as INELFE. The company was founded as a joint venture between Red Eléctrica and its French counterpart, RTE. Red Eléctrica owns 50% of the share capital of INELFE.

The Company exercises this responsibility with transparency, neutrality, independence and economic efficiency with the goal of providing an electricity service of the highest quality for society as a whole.

We are therefore responsible for the technical management of the Spanish electricity system, owners of the Spanish high voltage electricity transmission grid and the only company in Spain specialising in the activity of electricity transmission<sup>1</sup>.

Our facilities consist of electricity control systems that direct and supervise the operation of the system; 44,069 kilometres of high voltage transmission line circuit and 5,750 substation bays with a transformer capacity of 88,846 MVA.

Evolution of the facilities <sup>2</sup>		2016	2017	2018
Lines (km of circuit)	Kilometres of circuit	43,646	43,793	44,069
	400 kV	21,619	21,728	21,720
	220 kV and less	22,027	22,065	22,339
Substations	Number of bays	5,491	5,601	5,750
	400 kV	1,458	1,484	1,506
	220 kV and less	4,033	4,117	4,244
	Transformer capacity (MVA)	85,444	86,654	88,846

<sup>1</sup> Clasificación Nacional de Actividad Económica - CNAE (National Classification of Economic Activities) 35.12: Electricity transmission.

<sup>2</sup> Data corresponding to the last three years - revised and updated in 2019. Source: Sustainability Report 2018.



## 2. Environmental Management and Policy

### 2.1. Environmental Policy <sup>3</sup>

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The Red Eléctrica Group expresses its commitment to protect the natural environment and undertakes to promote and ensure that each employee in the Group performs their daily work with the utmost respect for the environment. This is achieved through ongoing improvement in the fulfilment of their duties and responsibilities.

The principles of our environmental policy are as follows:

- Apply the principles of excellence adopted by the Company and incorporate and promote best practices in the field of environmental management.
- Ensure compliance with environmental legislation, regulations and laws applicable to the activities they carry out and adopt those voluntary commitments regarding environmental matters which are considered to be of interest.
- Guide the Group towards sustainable development, seeking to maintain the adequate balance between respect for the environment, the promotion of progress, social well-being and economic interests, with the objective of creating value on an ongoing basis.
- Achieve leadership in environmental matters in all the companies of the Red Eléctrica Group within their scope of activity.
- Ensure continuous improvement, the prevention of contamination and the principle of caution, according to the objectives and capacities of the Red Eléctrica Group.
- Promote research, development and the use of new technologies and processes with the objective of preventing or minimising environmental impacts.
- Contribute to a sustainable energy model, with a greater presence of energies generated by clean and efficient technologies regarding electricity consumption.
- Develop and maintain a transmission grid that is not only integrated into the landscape, but also into the socio-economic environment.
- Drive the conservation of biological diversity through active collaboration on those initiatives which help reduce its loss.
- Adopt a clear commitment in the fight against climate change, backing energy efficiency and sustainable mobility as fundamental pillars.
- Develop and provide ongoing actions regarding training, awareness and motivation concerning environmental protection.
- Develop and maintain dialogue channels and means of communication to keep all interested parties informed about environmental related actions whilst promoting collaboration frameworks with stakeholder groups.
- Consider the environmental policies and requirements as one of the criteria in the selection, qualification and assessment of suppliers.

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<sup>3</sup> First Edition (PC01 replacing Edition 4 of Policy PG11) approved by the Management Committee in October 2014.



## 2.2. Responsible Environmental Management

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Red Eléctrica carries out all its activities taking into consideration environmental protection in accordance with the principles set out in its **environmental policy**, among which are included the commitment to the prevention of contamination and the principle of caution. All activities are undertaken from a position of ethical commitment to society, integrating environmental protection into the business management with the aim of creating ongoing value.

The main environmental impacts of Red Eléctrica are those derived from the presence of facilities in the territory, therefore the Company works non-stop to make them compatible with the environment, considering their entire life cycle and paying particular attention to biodiversity conservation.

Furthermore, Red Eléctrica is a key player in the energy transition towards a sustainable energy model, hence undertaking a specific commitment with climate change and energy efficiency.

Red Eléctrica's commitment not only covers its own activities, but this commitment also extends to its supply chain.

In order to carry out a continuous improvement of its environmental performance Red Eléctrica has a certified Environmental Management System in accordance with UNE-EN ISO 14.001:2015 standard, certified since May 1999 and which, since October 2001, has been registered under the EU Eco-management and Audit Scheme (EMAS) with registration number N° ES-MD-000313 (previously ES-SB-000013).

The firm and focused effort of Red Eléctrica to become a model company that is responsible, efficient and sustainable has been recognised by leading sustainability rating agencies, which has led to the Company being present in some of the key sustainability indexes as a result of their performance in this field, among the indexes of note are:

- **Dow Jones Sustainability Index.**
- **FTSE 4 Good.**
- **Euronext Vigeo Index Eurozone 120 and Euronext Vigeo Europe 120**
- **MSCI** (Morgan Stanley Capital International).
- **Ethibel Sustainability Index Excellence Europe, Ethibel PIONEER and Ethibel EXCELLENCE Investment Registers**

Among the awards and recognitions received by Red Eléctrica in 2018 for its environmental management the following are noteworthy:

- **CDP Leadership Index.** The Company has achieved a rating of A-, maintaining itself in the leadership positions, for its efforts and actions to combat climate change.
- **Worldwide leadership position in the Dow Jones Sustainability Index in the Electric Utilities sector.** Red Eléctrica is the only company in its sector that has maintained its continued presence, consecutively for the last four years, in the Dow Jones Sustainability World and Dow Jones Sustainability Europe Indexes.
- **Silver Class in the 'The Sustainability Yearbook 2019'** published by RobecoSAM.
- **Two second prizes** were obtained by the project 'Red Eléctrica Marine Forest: recovery of Posidonia oceanica seagrass meadows', awarded in the European Business Awards for the Environment in the Spanish and the European section, in both cases in the category of Business and Biodiversity.
- **Mention regarding REE in recognition of its involvement in the promotion of sustainable mobility:** issued by the Sub-Directorate for Air Quality and Environment of the Ministry of Ecological Transition (MITECO) during the European Mobility Week 2018.

More information can be found at:

<https://www.ree.es/en/sustainability/commitment-to-sustainability/leadership-in-sustainability>

<https://www.ree.es/en/publications/annual-report-2018>



## 2.3. Environmental Management System - Management Structure

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The Environmental Management System is part of a Comprehensive Corporate Management System which also encompasses the Quality, Occupational Health and Safety, and Corporate Responsibility management systems. The aforementioned management systems take into consideration all those regulatory aspects which have been defined as being potentially cross-cutting based on the existing processes and resources dedicated to each one of them, with the aim of:

- Gearing the processes to achieving objectives, increasing the satisfaction of clients and stakeholders.
- Increasing the integration and reliability of operations and effectiveness at a personal and organisational level.
- Creating a culture oriented to safety, excellence and efficiency.

Specifically, the Environmental Management System comprises all the activities performed by the company 'Red Eléctrica', with special attention to those that generate an interaction with the environment. It is integrated across the board into the decision-making process and in the Company's activities, promoting a business model that takes into account the social, economic, ethical and environmental dimensions.

- **Functional structure**

Red Eléctrica's commitment to the environment, which stems from the Company's senior management, establishes the environmental policy and implements the means for compliance with environmental requirements, being the **Chairman** of the Company who holds the maximum responsibility regarding the environment. This commitment not only covers the Company's own activities but also extends to its supply chain.

The creation of the **Sustainability Committee** responds to the strategic nature that the Board of Directors wants to grant to sustainability within the Company, contributing significantly to the positioning of Red Eléctrica in this field. Monitoring and promoting Red Eléctrica's actions related to the environment and the fight against climate change are among the objectives of the Sustainability Committee.

At a tactical level, the management area responsible for defining and coordinating the development and monitoring of the Environmental Management System is the **Institutional Relations and Sustainability Area**. The Sustainability Department is part of the Institutional Relations and Sustainability Area and is integrated into the Sustainability and External Relations Division that reports to the Chairman's Office.

The mission of the **Sustainability Department** is to design, coordinate and control the implementation of the strategies, policies, systems, criteria and actions regarding sustainability of the Red Eléctrica Group and, as part of its responsibilities, to coordinate the development and monitoring of the Environmental Management System.

The maintenance of the Environmental Management System involves all the Company's units, highlighting the key role of the **Environmental Department**, integrated within the Engineering and Environmental Department belonging to the **Transmission Division**, whose function is integrate the environmental variable in all phases of the life cycle of the facilities, ensuring compliance with the environmental conditioning factors required by the competent bodies in environmental matters and by internal and external regulations.

In addition, the involvement of all organisational units and the commitment of all those who work in the Company is fundamental for the implementation of an appropriate environmental management. The functional guideline manual includes, as a cross-cutting responsibility that is strategic in nature for all the units, that of undertaking all activities while ensuring the fulfilment of the objectives established in the various environmental management plans, in order to ensure the fulfilment of the Company's commitment to protect and respect the natural environment.

Both the Sustainability Department and the Environmental Department is comprised of a diverse range of professionals and experts in environmental matters and part of their mission is to actively support the territories in which the facilities are located. Red Eléctrica's facilities that are in the project definition, construction or maintenance phase are environmentally controlled on site by personnel from each specific regional area.



- **Documentation structure**

The Environmental Management System is based a set of applicable regulations.

The management processes include the drafting, custody, maintenance and registering of the documented information necessary for the Environmental Management System. The associated documentation is updated and easily accessible in different formats/media for all personnel.

The regulations of the Environmental Management System are composed of the following documents:

- **POLICIES:** set out general guidelines developed with the aim of achieving the business vision and strategies.
- **ACTION GUIDES:** documents that establish and provide criteria or guidelines or information to facilitate the carrying out of activities from an environmental point of view. The action guides include those documents that set out the strategic guidelines contained in the corporate policies.
- **GENERAL PROCEDURES:** regulations that govern processes of a general or corporate nature.
- **TECHNICAL PROCEDURES:** regulate those processes of a technical nature in which a limited number of organisational units take part.
- **TECHNICAL INSTRUCTIONS:** describe in detail some or all of the activities of a process.
- **TECHNICAL SPECIFICATIONS:** describe in detail the terms and conditions as well as the technical specifications required for the acquisition of goods and services that are made on a regular basis from external suppliers of the Company.
- **MANUALS:** documents that govern general areas of action as well as those of mandatory compliance and respect regarding the subsequent evolution of any standard/regulation that may affect the Organisation.
- **CIRCULARS:** notifications from the Company's management, to all or part of the Organisation. The purpose of these documents, that are updated and issued on a periodic basis, is to help clarify certain aspects related to any existing regulation or to establish rules regarding any form of activity that is not currently subject to legislation.

- **Changes in the documentation of the environmental management system 2018**

During 2018 many of the environmental management system documents were modified in order to keep them updated on an ongoing basis and introduce improvements in the management thereof. The changes are indicated in the table below.

Code	Title	Edition	Publication date	Approval date	Cancels
GN05	Internal audits	7	07.11.18	13.12.18	Edition 6
AT025	Control of the process of inspections of high voltage overhead lines	4	28.11.18	12.12.18	Edition 3
IT388	Commissioning and transfer of facilities	4	12.12.17	20.02.18	Edition 3
GN00	Crisis management (Pre-alert, alert and emergency)	5	05.11.18	28.11.18	Edition 4

The following documentation regarding the environmental management system has been cancelled or annulled:

Code	Title	Edition	Publication date	Approval date	Cancels
	Code of Good Environmental Practices	0	27.09.99	21.03.00	-----
GQ04	Register of certified management systems	5	02.11.09	09.12.09	-----



Code	Title	Edition	Publication date	Approval date	Cancels
IC001	Corporate monitoring of suppliers	3	04.05.15	14.05.15	Temporarily Annulled



### 3. Scope of the EMAS register

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Red Eléctrica de España, S.A.U has an environmental management system that complies with the requirements of Regulation (EC) No. 1221/2009 ('EMAS III') N° ES-MD-000313 whose scope covers the entirety of the Company's activities:

- The engineering, construction and maintenance of high voltage lines and electricity substations, and of telecommunication systems
- The operation of electricity systems
- The physical security of facilities
- Technological research, development and innovation projects
- The consulting and professional services in the activities described above within the national and international scope
- The provision of stakeholder attention and claims management services for all Red Eléctrica stakeholders via the corporate stakeholder attention centre ('Dígame' service)

And that are performed at:

- **Moraleja Head Office and Central Regional Office:** Paseo Conde de los Gaitanes, 177. 28109 - Alcobendas (Madrid)
- **Albatros Head Office:** C/ Anabel Segura 11, 28109 - Alcobendas (Madrid).
- **CECORE:** Parque Technological de Madrid, C/Isaac Newton, 13 Edificio REE. 28760 - Tres Cantos (Madrid).
- **System Operation Department of the Balearic Islands:** Camino Son Fangos, 100 Edificio A - 2ª planta. 07007 - Palma de Mallorca (Balearic Islands)
- **System Operation Department of the Canary Islands (Main Office in Las Palmas de Gran Canaria)** Calle Juan de Quesada, 9. 35001 - Las Palmas de Gran Canaria (Las Palmas)
- **System Operation Department of the Canary Islands (Main Office in Tenerife):** Nuestra Señora de la Ternura (Los Majuelos). 38108 - San Cristobal de la Laguna (Santa Cruz de Tenerife)
- **Western Regional Office:** Calle Zalaeta, S/N Edf. REE. 15002 - La Coruña (La Coruña)
- **Northern Regional Office:** Av de Enekuri, 60 Edf. REE. 48014 - Bilbao (Vizcaya)
- **North-western Regional Office:** Av Paralelo, 55 Edf. REE. 08004 - Barcelona
- **Southern Regional Offices:** C/Inca Garcilaso, 1 Edf. REE. 41092 - Isla de la Cartuja (Seville)
- **Eastern Regional Offices:** Avenida de Aragón, 30 Planta 14. 46021 - Valencia
- **Eastern Regional Transmission Office:** C/Puebla Larga, 18, 46183 - La Eliana- (Valencia)
- **North-western Regional Transmission Centre:** Carretera N-601, Madrid-Valladolid-León, KM 218. 47630 - La Mudarra (Valladolid)
- **Northern Regional Transmission Centre:** Carretera Zaragoza-Sariñera, Km 9,2. 50162 - Villamayor (Zaragoza).
- **North-eastern Regional Transmission Centre:** Carretera antigua Castellbisbal-Rubí, S/N Polígono Industrial Can Pi de Vilaroc. 08191 - Rubí (Barcelona).
- **Central Regional Transmission Centre:** Carretera N-I Madrid-Burgos, KM 20,7. 28700 - San Sebastián de los Reyes (Madrid).
- **Southern Regional Transmission Centre:** Carretera Sevilla-Utrera, KM 17. 41500 - Alcalá de Guadaira (Seville).
- **Balearic Islands Regional Transmission Centre:** (Polígono industrial Marratxi) C/ Gerrers esquina Siurells, 2ª Planta. Marratxi (Palma de Majorca).
- **Canary Islands Regional Transmission Centre:** (Polígono industrial MAYORAZGO) C/ Laura Grötte de la Puerta. Polígono industrial Mayorazgo- (Santa Cruz de Tenerife).



The following infrastructure or line sections are excluded from the scope of the EMAS register specifically in those areas where they are located, or through which they cross (municipalities indicated):

Facility	Municipality
Line: 220 kV Aguayo-Garona Line	Virus-Trespaderne (Burgos)



## 4. Commitment to Sustainability - Sustainable Development Goals (SDGs)

Red Eléctrica has in place the Commitment to Sustainability of the RE Group, approved by the Board of Directors in 2017. This commitment is based on four priorities and defines objectives in the field of sustainability for all business activities and geographical areas in which the RE Group operates.

This Commitment has been defined with a long-term vision for the 2030 horizon in order to be aligned with the time period defined for global objectives such as the Sustainable Development Goals (SDGs) of the United Nations, and within the 2030 Climate and Energy Framework of the European Commission. Aware of the fact that the role of companies is key to achieving the SDGs, during 2018 the Company has carried out a process of identification and prioritisation of the most relevant SDGs for the Company in the countries and sectors of activity in which it operates.

As a result of this process, the most relevant SDGs have been classified into two levels of relevance for Red Eléctrica:

Identification and Prioritisation of SDGs for the RE Group						
SDGs High Relevance						
SDGs Medium Relevance						

In the process of developing the 2030 Commitment, an internal and external sustainability study of the Red Eléctrica Group was carried out, which serves as a key input in the identification of the relevant aspects of the Company (materiality study), in accordance with an internationally recognised methodology for the analysis of materiality and endorsed by organisations of world reference such as the Global Reporting Initiative (GRI).

The analysis determined 24 relevant issues (material aspects) for the RE Group and its stakeholders. Among them are those with an environmental component that is more significant and also prioritised with a greater criticality for the achievement of the Company's long-term objectives. These are the following:

- **Biodiversity and natural capital**
- **Climate change: carbon footprint and adaptation**
- **Integration of facilities into the environment**

The aforementioned material aspects establish the 3 vectors on which the Company's Annual Environmental Plan is set out and which encompass all the areas of action. The vectors are interrelated.



## 5. Red Eléctrica's Activities and the Environment

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Red Eléctrica's facilities are located nationwide due to the fact that the aim of the electricity transmission grid is to link the points of energy generation to the electricity distribution points, so it can be provided to the final consumer. The presence of electricity infrastructure, in no case, represents a significant alteration in the way of life of the communities affected.

The interaction of the electricity facilities with the environment is mainly linked to their presence in the territory and to the works associated with their construction and maintenance. Therefore, it can be understood that the main environmental impacts are associated with the territory and landscape where the substations are located, and which are crossed by electricity lines.

The main measure to reduce and even avoid the undesired effects of the facilities is the selection of their location. For this reason, the Company conducts a detailed study of the territory, and works in coordination with the public administration and key stakeholders in the definition of the jointly-agreed siting (location) of substations and regarding the routes the electricity lines will follow, as their adequate siting is crucial to reduce and even avoid undesired impacts on the environment and on the local communities. In addition, it establishing the appropriate preventive and corrective measures before undertaking the various tasks (whether it be the construction of new facilities or the modification of existing ones) is essential to reduce, to the highest degree possible, the potential impacts that these activities may have on the territory.

The best tool that makes it possible to define the most appropriate project and establish the suitable preventive and corrective measures is the Environmental Impact Assessment procedure; a procedure which the majority of the Company's projects are legally required to carry out. Said Assessment sets out and defines the alternatives, which being technically and economically feasible, have the least social and environmental impact.

When the law does not require any regulated procedure, Red Eléctrica performs an assessment of an environmental nature which allows preventive and corrective measures to be defined and applied, and voluntary communication with the competent authority is established.

To ensure the implementation, continuity and effectiveness of the established measures, environmental monitoring programmes are defined and executed. These are applied in the construction of the facilities and in the first years of their operation, and they facilitate the definition of new measures that may be deemed necessary.

For the facilities in operation, the Company conducts periodic reviews in order to verify compliance with environmental standards and identify the necessary actions.

It should be noted that, during 2018, work began on a **maintenance management project**, which consists of compiling and integrating into the Comprehensive Corporate Management System all the environmental conditioning factors that must be taken into account when requesting authorisation and carrying out maintenance works on facilities (more than 50 conditioning factors within 200m on each side of each line), in order to ensure that all of them are analysed before carrying out any activity.

Among the preventive and corrective measures applied noteworthy are those aimed at the protection of habitats and species (biodiversity protection measures), and those aimed at reducing potential impacts on the socio-economic environment. Currently one of the most relevant issues in relation to the integration of facilities into the environment is to improve their acceptance by society. Carrying out public consultation and participation processes represents a key tool to accomplish this goal.

The diagram on the following page schematically illustrates the main environmental criteria applied in the main transmission grid development phases:

## Development and implementation phases for transmission grid infrastructure

 <b>Infrastructure proposal</b> (Drawn up by REE)	 <b>Transmission grid planning</b> (Drawn up by MITECO)	 <b>Project design</b> (New facilities and modifications)	 <b>Construction or modifications of facilities</b>	 <b>Maintenance</b>
<p>Environmental Feasibility Study</p> <ul style="list-style-type: none"> <li>· Analysis of all proposals from an environmental point of view.</li> <li>· Only includes environmentally feasible projects.</li> </ul>	<p>Strategic environmental assessment of plans and programmes.</p> <p>Public participation of stakeholder groups (SGs) through the submission of comments or arguments.</p>	<p>Prior dialogue with stakeholders before defining the project (Autonomous Communities, local councils and NGOs).</p> <p>Environmental Impact Assessment.</p> <ol style="list-style-type: none"> <li>1 Prior consultation with SGs.</li> <li>2 Defining the alternative of least impact.</li> <li>3 Public information. Submission of arguments by SGs.</li> <li>4 Proposal for preventive and corrective measures.</li> <li>5 Publication of results. Environmental authorisation.</li> </ol>	<p>Implementation of preventive and corrective measures.</p> <p>Environmental monitoring (monitoring of preventive and corrective measures).</p> <p>Monitoring the work of contractors regarding compliance with environmental requirements.</p> <p>Environmental certification of works taking into account compliance with environmental requirements.</p>	<p>Environmental monitoring programmes in the initial years of operation of a facility.</p> <p>Periodic inspections of facilities to verify compliance with standards and identify improvement measures.</p> <p>Application of environmental improvement measures.</p>

Taking the previously shown diagram regarding the environmental criteria applied as a reference, the following are relevant events that occurred during 2018:

**1. Transmission Grid Planning**

The current infrastructure planning (Energy Planning, 2015-2020 Electricity Transmission Grid Planning), approved by the Council of Ministers in October 2015, covers a period of six years and is binding in nature for Red Eléctrica. This planning includes the projects for new transmission grid infrastructure that is necessary to guarantee the electricity supply nationwide. In 2018, a modification was published that incorporates new requirements for the electricity system, particularly the integration of renewable energy.

The planned infrastructure is essential for the integration of new renewable energy, the commissioning of electricity lines for the high-speed train, the improvement of the efficiency of the electricity system and maximising the use of the existing renewable energy capacity (thanks to grid meshing and international interconnections) and the electrification of the Spanish energy system, which facilitates the increased use of renewable energy.

All the proposals included in the Planning have been analysed from the point of view of physical, technological and environmental viability.

The Planning undergoes a Strategic Environmental Assessment process regarding plans and programmes by the competent environmental authority. Furthermore, and as a result of the obligations derived from the Environmental Report, Red Eléctrica collaborates with the Ministry of Ecological Transition in the drafting of the annual reports of environmental monitoring; these basically consist of the calculation of a series of performance indicators defined in said environmental report.

The indicators established during 2018, like those of 2016, are different in nature to those carried out for the previous Planning, as they correspond to the 2015-2020 Strategic Environmental Planning currently in force.

**2. Definition of Projects**

This year has been marked by the presentation of the Environmental Impact Assessments (EIS) of those project applications that were submitted for prior consultation in 2016, or from which Environmental Documents were drafted and which have finally been presented to begin the complete environmental permitting process, together with any new requirements that may have derived from the aforementioned processes.

Environmental permitting processes were initiated for **18 investment projects**:

	Permitting process initiated		
	2016	2017	2018
Initial document	7	0	1
Environmental Document	28	5	4
Environmental Impact Study	10	2	13
<b>Total initiated</b>	<b>45</b>	<b>7</b>	<b>18</b>

As for maintenance projects, only one of them has been submitted for it to undergo an environmental permitting process (*220 kV Cordovilla-Orcoyen line and the 220 kV Cordovilla-Muruarte line*).



The evolution of the conclusion of the environmental permitting process of projects for new facilities in the last three years is as follows:

	Permitting processes completed		
	2016	2017	2018
Positive Environmental Impact Statement	2	3	3
Negative Environmental Impact Statement	0	0	0
Environmental Resolution	11	5	6
<b>Total</b>	<b>13</b>	<b>8</b>	<b>9</b>

Environmental authorisation was obtained for 9 projects<sup>4</sup>, all of which received a positive environmental impact statement.

At year end, **60** projects are at different stages of the environmental permitting process.

Regarding maintenance tasks, during 2018 a comprehensive analysis was conducted of the environmental permitting requirements associated to the overall maintenance actions scheduled for 2018 (Renovation and Improvement Projects (RIP), replacement of grounding cable for fibre optic (FO) cable, Asset Management (AM) and third-party modifications).

Once said requirements are analysed (for projects in which initially a regulated environmental permitting process is not required), a letter of consultation is prepared and registered with the corresponding public administration offices accompanied by documents and reports that are required in each case. Noteworthy is that as a result of the aforementioned, in 2018, **6** replies were obtained in the way of authorisation and/or exemption from the environmental permitting process. This has guaranteed, from an environmental point of view that the planned maintenance activities have received clearance prior to them being carried out.

	2016	2017	2018
Renovation and Improvement Projects (RIP)	20	4	0
Fibre Optic cable	7	7	6
Third party modifications	3	1	0
Asset Management	48	5 <sup>5</sup>	0
<b>Total<sup>6</sup></b>	<b>78</b>	<b>17</b>	<b>6</b>

<sup>4</sup> The list of projects can be consulted in the Annex: *Environmental Actions 2018*

<sup>5</sup> REPEX (Replacement Expenditures), MAR (Grid Asset Improvement).

<sup>6</sup> Data regarding letters replied to from an archaeological point of view is not included, nor that of various responses from different agencies concerning the same facility.



### 3. Construction or modification of facilities

Red Eléctrica performs environmental monitoring on the construction of new electricity lines and substations as well as renovations, upgrading and enlargements of those facilities already in service. This monitoring consists mainly of verifying that the preventive and corrective measures defined in the project are implemented, verifying their effectiveness and defining new measures, if deemed necessary, based on the results obtained.

Additionally, there is a continued increase in the dedication of resources to the tasks prior to the commencement of works (e.g. inventories of trees felled) and the subsequent tasks included in the Environmental Monitoring Programmes to be carried out during the start of the operating phase of the facility, primarily due to the increased requirements included in the environmental authorisations.

The following infrastructure was brought into service in 2018: **12** substations and 61.7 km of line.

The following infrastructure under construction during 2018; **34** substations and 230.3 km of line.

With the aim of ensuring the suitable fulfilment of the environmental requirements and verifying the effectiveness of the implemented preventive and corrective measures, environmental monitoring was carried out throughout the year on the entirety of new infrastructure underway (88), in other words, 100% of the construction works in substations and 100% of the works on lines (this percentage also considers modification works of existing lines).

The **permanent**<sup>7</sup>, environmental supervision, aimed at intensifying the control and monitoring, covered **92%** of total works performed.

Environmental supervision of construction works				
		2016	2017	2018 <sup>8</sup>
Substations	No. of works supervised	27	44	34
	Permanent environmental supervision	26	41	33
	% Permanent environmental supervision	<b>96.3</b>	<b>93.2</b>	<b>97.1</b>
Lines	Total km of works supervised	757.5	724.3	460.6
	Km of line with permanent environmental supervision	677.9	588.9	430.2
	% Permanent environmental supervision	<b>89.5</b>	<b>81.8</b>	<b>93.4</b>

The most notable preventive, corrective and compensatory measures carried out in this phase during 2018 can be consulted in the Annex: Environmental Actions 2018, shown at the end of this document.

<sup>7</sup> Supervision carried out to a higher degree than that set as a minimum in Environmental Instruction IA015.

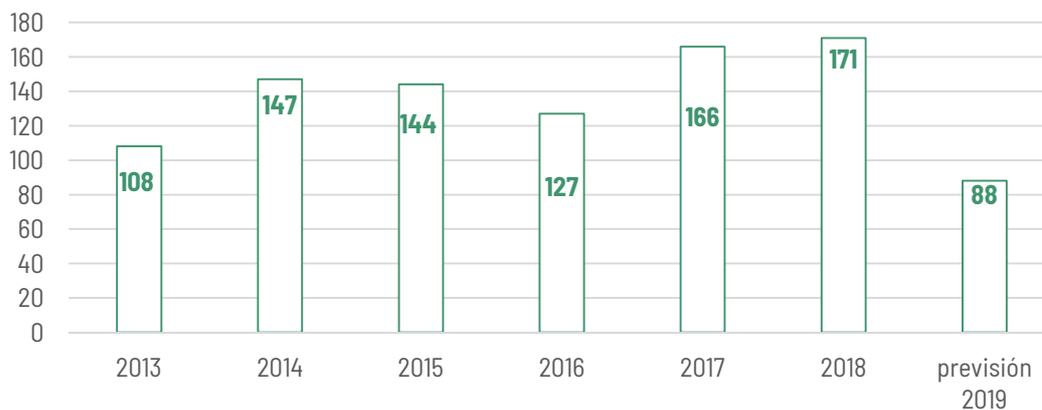
<sup>8</sup> Renovation and improvement works, together with investments, are encompassed within the environmental supervision calculation.



## 4. Maintenance of facilities

In 2018, during the maintenance phase, a total of 171 environmental inspections were carried out in substations. This total represents 25.1% of the 678 substations in operation in 2018. It has been established that every 3 years it is necessary to carry out an environmental inspection in those substations that have power transformers and at least one inspection must have carried out in each of the substations within a maximum period of 6 years.

### Number of environmental inspections in substations.



The results of these supervisions allow environmental improvement actions to be identified and considered in the planning of actions in both the renovation and improvement plans as well as in the maintenance programmes.

In addition, the environmental risk of the work to be carried out during the year is analysed and the environmental supervision of the subsequent works related to the maintenance of the facilities is carried out:

- Modification and adaptation work regarding power regulating equipment (power transformers, reactors, phase shifters, auxiliary transformer units with more than 1,000 litres of oil).
  - Transfer, emptying and filtering of oil
  - Replacement of power terminal blocks
  - Repair of faults or repairs involving the transfer or movement of oil
  - Transportation / transfer
  - Decommissioning
- Construction, adaptation and/or remodelling of oil tanks and collection pits.
- Remodelling or comprehensive remodelling of buildings in which earthworks/civil works are carried out.
- Characterisation and/or cleaning of soils (excluding incidents).
- Silvicultural operations on the strips of land around the perimeter of substations.
- Work in which asbestos waste may be generated.
- Work where SF<sub>6</sub> gas is handled by an external company in gas insulated substations.
- Work associated with the repair of damages caused by accidents that have environmental consequences (excluding incidents).

During 2018, a total of 242 environmental supervisions of maintenance work were carried out in a total of 170 maintenance, renovation and improvement works, consolidating the implementation of environmental supervision in activities that have a significant environmental impact.



## 6. Environmental Aspects

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During all the activities carried out in the development and implementation phases regarding transmission grid infrastructure (fundamentally: the definition of the project, construction/modification and maintenance of facilities), Red Eléctrica identifies and evaluates the direct and indirect environmental aspects that can interact with the natural environment, producing some type of negative impact, not just under normal operating conditions but also under abnormal conditions and as a result of emergency situations.

For the identification, assessment and recording of environmental aspects, it is necessary to indicate that in the system differences exist between the various phases:

- **Definition of projects (new facilities and modifications):** the effects or impacts and by extension, the aspects associated to the same, for each one of the new infrastructure projects, are identified in the corresponding environmental impact study and the appropriate environmental impact statement or resolution, which also include the preventive and corrective measures which shall be adopted in the construction phase of each facility.
- **Construction or modification of facilities:** for each construction project for new lines, new substations or enlargements with environmental relevance, the associated environmental aspects of the same are identified and evaluated. The results of the evaluation are incorporated into the Environmental Monitoring Programme (EMP), and/or the environmental specifications of each project, a procedure that ensures they are properly monitored and that they are in compliance with the preventive and corrective measures defined in the design of the projects.

The environmental criteria established for the assessment of aspects, under both normal and abnormal operating conditions are: magnitude and intensity.

- **Maintenance of facilities:** the environmental aspects detected during the maintenance activity are identified and evaluated periodically, under both normal and abnormal operating conditions and at different levels, depending on the status of the environmental aspect related to a higher degree of assessment (maintenance phase), or at lower degrees (regional work centre and/or logistics centre/building). The evaluation of environmental aspects is performed annually, after year end.
- **For the evaluation of maintenance aspects, the following general environmental criteria have been established:**
  - Under normal operating conditions, start-up and shutdown conditions and reasonably foreseeable emergency conditions: Magnitude, nature/sensitivity and prevention.
  - Under reasonably foreseeable emergency conditions: Probability of occurrence and potential impact.

### Environmental aspects considered in the definition of projects for new facilities

The environmental aspects for each of the projects for new facilities are identified in the corresponding environmental impact study and the appropriate environmental impact statement or resolution, which also sets out the preventive and corrective measures that shall be taken in the construction phase of each facility.



## Environmental aspects in the construction of facilities

The construction activities for new lines and substations that are susceptible to generating environmental aspects are:

Activities that generate environmental aspects
Storage and transfer of oils and fuels
Storage and management of waste
Work sites (substations)
Land compacting
Clearing, pruning and felling
Excavation and landfill works
Concreting and cleaning of containers used
Hanging/stringing of conductors and grounding cables (lines)
Equipment assembly (substations)
Use of machinery

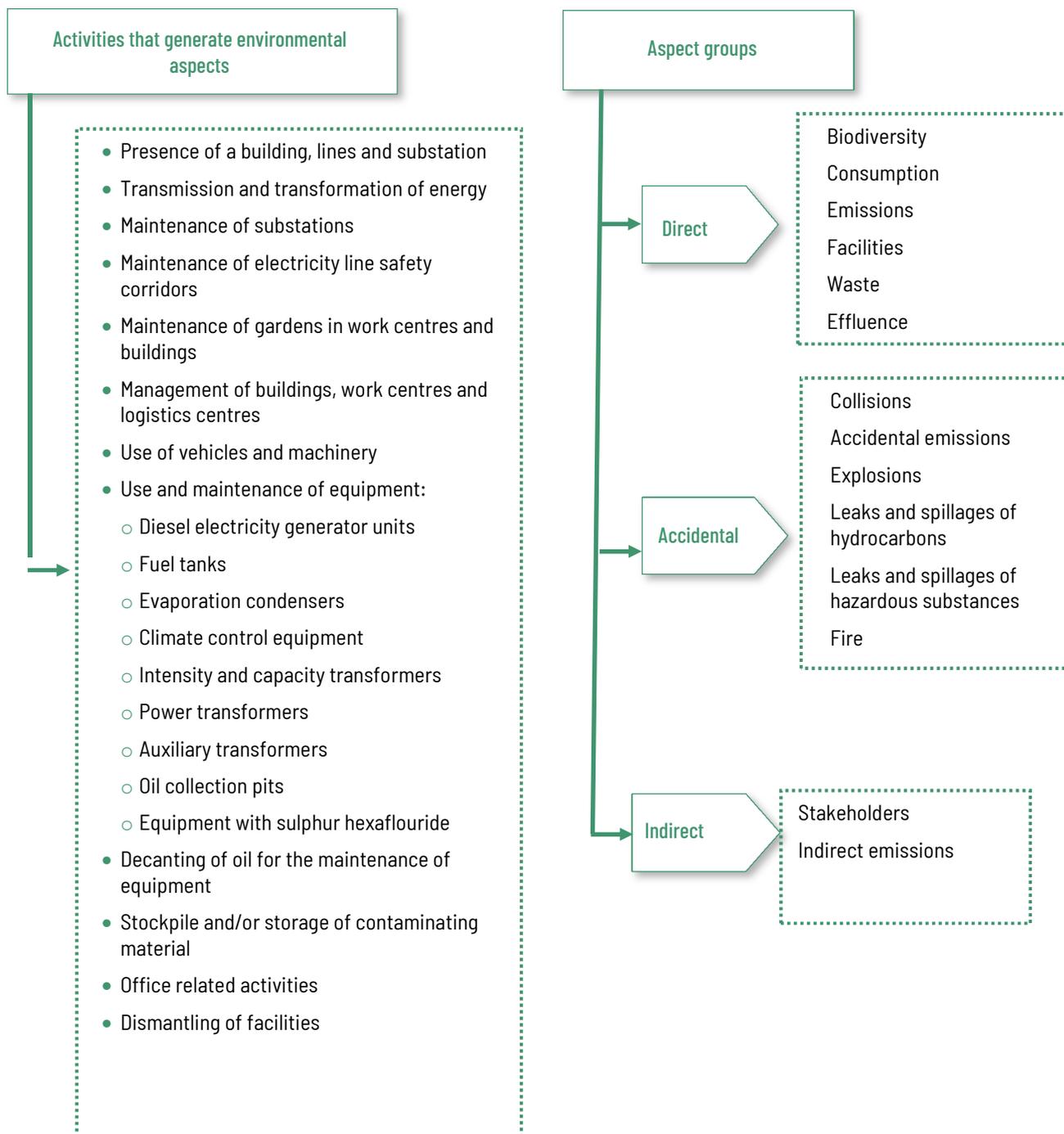
Although the environmental aspects associated to each of the works are specifically evaluated, those that generally have a significant impact on the construction of new lines and substations are detailed in the following table:

Significant environmental aspects in the construction of lines and substations	Environmental aspect susceptible to impact	Impact
Affecting fauna	Biological	Altering population behaviour
Affecting flora	Biological	Elimination of flora/vegetation
Affecting land/soil	Physical	Possible modification of physical characteristics of ground, erosion etc.
Affecting historical and cultural heritage	Socio-economic	Potential landscaping impact, affecting archaeological sites, crops, etc.
Risk of fire	Physical/Biological/Socio-economic	Potential degradation
Risk of oil and fuel spill during use of machinery	Physical	Potential contamination of ground and water sources
Risk of oil and fuel spill during storage and transfer of oils and fuels	Physical	Potential contamination of ground and water sources
Risk of oil spill during assembly of equipment	Physical	Potential contamination of ground and water sources
Risk of affecting water during land movements	Physical	Potential contamination of ground and water sources
Risk of affecting birdlife	Biological	Potential collisions
Non-hazardous waste	Physical	Potential impact due to inadequate storage
Hazardous waste	Physical	Potential contamination of grounds and water sources due to storage and management



## Environmental aspects in maintenance activities

The activities carried out in facilities in service (*substations, lines, work centres and corporate buildings*) that can generate an environmental aspect are the following:





The evaluation of aspects is conducted annually. Those aspects shown in the following table were identified as relevant in the 2018 assessment:

Aspect	Relevant evaluation	Environmental aspect susceptible to impact	Impact	Observations
<b>Biodiversity</b>				
Clearing, pruning and felling	All Regional Areas	Biological	Potential impact on species	40% or more of the actions are carried out in protected areas, forested areas or areas of high fire risk.  For the evaluation, the most restrictive criteria have been used due to the lack of detailed information.
<b>Consumption</b>				
Water consumption	Canary Islands Regional Area, North-Eastern Regional Office, Canary Islands Regional Office, La Moraleja Head Office	Physical	Reduction of natural resources	These are significant due to the fact that consumption has increased with regard to the average value of last year.
<b>Hazardous waste</b>				
Soil contaminated with hydrocarbons	North-Western, Central and Southern Regional Areas	Physical	Potential contamination of ground and water due to storage or waste	The amount of hazardous waste has been significant and has exceeded 5,000 kg/year on average per generation centre in each Regional area and those that, with an average production of between 500-5,000 kg/year whose final destination is controlled disposal.
<b>Accidental aspects</b>				
Birdlife collisions	North-Eastern Regional Area	Biological	Potential impact on species	Collision of a Northern Goshawk ( <i>Accipiter gentilis</i> ) with the 400 kV Ascó-Pierola line in an unmarked span.
Accidental emission of SF <sub>6</sub>	North-Eastern Regional Area	Physical	Potential pollution of the atmosphere	Leak at the Sallente substation (153 kg SF <sub>6</sub> ).
Fire on a line	Southern Regional Area	Biological	Elimination of flora	Fire in the 400 kV Bienvenida-Guillena line (4 ha. affected).
Leaks or spills from oil-filled submarine cables	Southern Regional Area	Physical	Potential contamination of ground and water	Oil leak in the submarine section of the 400 kV Tarifa-Fardioua interconnection line (29,000 litres).
Leaks or spills from the fuel tank of diesel generator units	North-Eastern Regional Area	Physical	Potential contamination of ground and water	Result of a leak in the generator unit (937 litres) located in the southern mouth of the tunnel (Junquera-Portal Sur).

NOTE: The paper consumption aspect in 2018 could not be evaluated due to the lack of reliable data for 2017 about the internal consumption of paper not dedicated to publications and therefore not having been able to make the comparison of consumption between both years. In 2019, the evaluation of this aspect will be resumed.



## 7. Environmental Performance 2018

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To ensure the correct operation of the transmission grid, the facilities require permanent ongoing maintenance, an appropriate renovation as well as the relevant repairs in the case of failure, and these activities must be compatible with the environment in which the facilities are located. It is therefore necessary to be aware of both the existing natural values as well as those elements of the activity that could impede the Company from being able to act in the most respectful way possible.

Similarly, in its role as transmission agent and electricity system operator, the Company focuses its efforts on developing a more sustainable energy model, contributing to reaching the European *20-20-20* targets (2020 Horizon) and the *40-32-32.5* targets (2030 Horizon), through the integration of renewable energies (developing the transmission grid necessary for their evacuation, and facilitating their integration into the system), and the activities to increase the energy efficiency of the electricity system.

In addition, Red Eléctrica has voluntarily undertaken to work on reducing its own emissions of greenhouse gases.

The way in which Red Eléctrica carried out its activities regarding the environment in 2018 is included within the set of strategies that allow the environmental variable to be integrated throughout the entire life-cycle of the transmission grid facilities, and therefore of all the works performed by the Company. These strategies also encompass both raising the awareness of stakeholders and encouraging their participation.

Throughout this section, Red Eléctrica's environmental performance and behaviour during 2018 regarding the Company's overall activities is set out as per each of the following environmental aspects:

- Climate Change and Energy Efficiency
- Biodiversity – Natural Capital
- Saving of Resources: Water and Paper
- Socio-economic environment
- Circular Economy and Waste Management
- Ground/Soil
- Stakeholder Groups
- Innovation



## 7.1. Climate Change and Energy Efficiency

Red Eléctrica, as the transmission agent and operator of the Spanish electricity system, is a key player in order to tackle the decarbonisation challenges and contribute to accelerate the energy transition towards a more sustainable energy model, and whose key elements must be the electrification of the economy, the maximum integration of renewables in the energy mix and efficiency, while always guaranteeing security of supply.

Aware of its important role and the need for companies to have a firm and clear stance on climate change, since 2011 the Company has showcased a voluntary commitment in the fight against climate change, which is materialised through a **Climate Change Action Plan** (2015-2020-2030), which was recently updated in 2018, with the purpose of introducing more ambitious targets in terms of emission reduction, consistent with the global emissions reduction target for 2030 approved by the Science Based Targets initiative (SBTi).

The approved targets are in line with the objective of not surpassing a temperature increase of 2°C at the end of the century.

Red Eléctrica undertakes to reduce its Scope 1 and 2 emissions by 40% per MWh transported by 2030 compared to 2015 figures. This relative target translates into a commitment to reduce absolute Scope 1 and 2 emissions by 30% for the year 2030 with respect to 2015, having approved a previous emissions reduction target of 10% for 2020 with respect to that same year.

Red Eléctrica therefore, even though it is not subject to regulations that apply in this regard, has decided to adopt a firm commitment to reduce the emissions associated with the development and execution of its activities.

In addition to working to mitigate climate change, it is necessary to tackle both the unavoidable physical changes in climate parameters and the social, economic and regulatory changes associated with the fight against climate change. Although risks and opportunities arising from climate change have been identified and evaluated periodically, and various measures have been applied within the framework of this analysis, in 2018 work began on the implementation of the recommendations of the Task Force on Climate-related Financial Disclosures in this matter.

Since 2011, Red Eléctrica has annually participated in the Carbon Disclosure Project (CDP<sup>9</sup>) survey and discloses its responses to society. The Company has established as an objective, the progressive improvement of its score. In 2018, (corresponding to the 2017 fiscal year), the Company obtained a rating of A-, maintaining itself among the leading positions.

The **Climate Change Action Plan** is based on four main lines and a cross-cutting line of innovation: contribution to a sustainable energy model; reduction of the carbon footprint; positioning and dissemination; and adaptation to climate change. The plan includes not only the actions related to its activity as transmission agent and operator of the electricity system, but also actions related to reducing its carbon footprint.

In relation to Red Eléctrica's business, there are various activities that are particularly relevant in the fight against climate change and the achievement of European climate targets:

- Develop facilities that help facilitate the electrification of the economy, connect new renewable power capacity to the grid feeding the rail transport network.
- Achieve the maximum integration of renewable energy into the electricity system by optimising system operation and the operations of CECRE (Control Centre of Renewable Energies), the improvement of generation prediction tools, participation in regulatory proposals and the integration of energy storage

<sup>9</sup> CDP (Carbon Disclosure Project) is an independent non-profit organisation that manages and keeps updated the largest global database of corporate information on climate change to offer institutional investors a unique analysis of how companies are responding to climate change around the world.)



systems, and participation in different promotional projects, making it possible to integrate the maximum amount of renewable energy under safe conditions.

- Contribute to the increased efficiency of the electricity system by improving knowledge on electricity demand and the development of demand-side management measures
- Prepare the system operation area for the inclusion and efficient integration of the electric vehicle
- Develop measures and studies to reduce losses in the transmission grid and increase its efficiency.

In connection with its carbon footprint, Red Eléctrica works on quantifying its emissions (GHG Inventory) and has established different actions that are described throughout this section.

Red Eléctrica is also a member of the Spanish Green Growth Group, an association for the promotion of public-private collaboration to jointly advance the decarbonisation of the economy, working on aspects related to mitigation actions and adaptation to climate change and circular economy.

### 7.1.1. CO<sub>2</sub> Emission Inventory

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Red Eléctrica drafts its emissions inventory based on the methodology of the GHG Protocol. Since 2013, the inventory has been submitted to independent review in accordance with ISAE 3410. Since 2015, Red Eléctrica has registered its emissions inventory in the Carbon Footprint Registry, compensation and carbon dioxide absorption projects of the Spanish Office of Climate Change (Ministry of Ecological Transition).

Red Eléctrica works constantly to improve the calculation of the emissions associated with its activities, developing methodologies for calculating the carbon footprint associated with the life cycle of the different electricity facilities; this has already been completed for the overhead lines, underground cables and substations. The designed tool allows the footprint of the aforementioned facilities to be calculated using the project data and subsequently adjusted with the data collated during its construction.

In addition, during 2017 the review and adjustment of the methodology for the calculation of indirect emissions (Scope 3) has been conducted, reviewing the application of each of the categories indicated in the GHG Protocol guide for the calculation of emissions associated with the value chain and defining the criteria for its calculation.

The inventory of greenhouse gas emissions of Red Eléctrica in the last three years can be seen on the following page:



Greenhouse gas emissions (t CO <sub>2</sub> equivalent) <sup>10</sup>	2016	2017	2018
SF <sub>6</sub> <sup>11</sup>	28,770	26,453	36,921
Climate control equipment (HVAC systems)	610	709	545
Fleet vehicles	1,898	1,556	1,604
Diesel power generator units	222	275	202
<b>Total direct emissions (SCOPE 1)</b>	<b>31,499</b>	<b>28,994</b>	<b>39,272</b>
Emissions associated with electricity consumption <sup>12</sup>	1,664	946	801
Emissions derived from losses in transmission <sup>13</sup>	1,044,416	1,162,865	1,116,606
<b>Total indirect emissions (SCOPE 2)</b>	<b>1,046,080</b>	<b>1,163,812</b>	<b>1,117,407</b>
<b>Totals (SCOPE 1+2)</b>	<b>1,077,579</b>	<b>1,192,806</b>	<b>1,156,679</b>

Indirect emissions (SCOPE 3) (t CO <sub>2</sub> equivalent)	2016	2017	2018
Purchased goods and services <sup>14</sup>	249,584	295,787	267,901
Capital goods	195,804	111,619	156,747
Energy generation (not included in Scope 1 and 2)	674	517	431
Waste	91	134	97
Transportation and distribution <sup>15</sup>	1,594	2,288	1,332
Business travel <sup>16</sup>	1,399	1,487	1,389
Employee commuting	2,926	3,918	3,985
Leased assets	82	0	0
<b>Total emissions Scope 3</b>	<b>452,153</b>	<b>415,748</b>	<b>431,792</b>

<sup>10</sup> The calculation of emissions is performed from an operational control perspective. The information on the inventory scope and method is available on the REE website <http://www.ree.es/en/sustainability/sustainable-energy/energy-and-climate-change/our-carbon-footprint>

<sup>11</sup> Taking GWP to 100 years: 22,800 (Source IPCC, Intergovernmental Panel on Climate Change: 4th assessment report). The SF<sub>6</sub> emissions data (and the total for 2017) has been updated with respect to the one reported last year. The calculation of emissions is made under the operational control approach. Information on the scope and methodology of the inventory is available on the REE website.

<sup>12</sup> The emissions are calculated under the 'market based' approach, applying the emission factors associated with the market agents that supply the electricity.

<sup>13</sup> In 2018, the methodology to report the transmission grid losses was changed by REE. The data regarding emissions derived from these losses has been recalculated for the entire historical series, according to the new methodology. The emissions associated with the transmission grid losses, in the same way as for the emissions associated with the consumption of electricity, do not occur during the REE activities as they take place at the various electricity generation points. For the calculation of these emissions, the emission factors corresponding to each system (peninsular, Balearic Islands or Canary Islands) are calculated by REE based on the annual generation balance. The decrease in emissions in 2018 is mainly due to the decrease in the average peninsular emission factor (emission factor in t CO<sub>2</sub>/MWh: 0.257 in 2017 and 0.219 t CO<sub>2</sub>/MWh in 2018), which reflects the increase in generation from renewable sources. (The emission factor for the Canary Islands system has also decreased notably, although this has a lower impact in the total emissions nationwide).

<sup>14</sup> For the correct interpretation of the data, it is also interesting to consider the carbon intensity of the goods and services purchased (2017: 504.69 t CO<sub>2</sub> eq./million euros, 2018: 548.36 t CO<sub>2</sub> eq./million euros). This intensity depends on the type of purchase orders placed during the year.

<sup>15</sup> Corresponds to the emissions associated with internal logistics and other emissions for the transfer of materials.

<sup>16</sup> Includes trips made by train, plane, own vehicle, rental vehicle and taxi.



## 7.1.2. SF<sub>6</sub> Emissions

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The main direct emissions derived from Red Eléctrica's activities are those coming from sulphur hexafluoride (SF<sub>6</sub>).

This gas, in spite of its high potential for global warming, provides huge technical advantages. It is a non-toxic gas that allows a huge reduction in the distances to be maintained between the various elements of facilities making it possible to reduce the size of the installation and, therefore, better blend it into the landscape. The emissions of this gas are associated to small leaks in the equipment, leakages due to moving/transferring the gas and those one-off accidents/equipment faults that may occur and which make it complicated to establish reduction measures and/or targets of the same.

For Red Eléctrica this is a priority issue and it has various courses of action underway aimed at improving the control of the gas and reducing leaks. The most important courses of action are the following:

- Improvement of the procedures for recording the inventory of the gas, control measures and the recording leaks.
- Training of people involved in the handling of the gas. Red Eléctrica has two legally recognised training centres with a classroom for theory class and a workshop for experiments in which 483 employees have been trained since 2013 (444 of them already have been granted the official SF<sub>6</sub> gas handler certificate).
- Renewal of switchgear and replacement of old equipment for those with lower leakage rates.
- Projects to improve the detection and control of leaks. In 2018, the R&D+i project was successfully completed: 'Development of the methodology for the repair of SF<sub>6</sub> leaks in GIS facilities', which allows the repair of faults/failures without having to dismantle the damaged sections and this significantly speeds up the works. Thanks to this methodology, it has been possible to successfully carry out work in the Murterar substation, which caused 20% of the total amount of leaks this year. The result of the repairs carried out will be reflected in the data for next year. In addition, by 2019, similar repairs have been planned for an additional four facilities.

At the same time, other R&D+i projects are being developed in this field, such as the '*Implementation of a leaked gas capture system in indoor GIS substations*' or '*SF<sub>6</sub> sensors through the use of graphene-based materials*':

- Innovation projects aimed at finding alternatives to SF<sub>6</sub> gas. During 2017 and 2018, significant progress was made in the study of alternatives to SF<sub>6</sub> in GIS switchgear. Lastly, two 66 kV gas insulated switchgear units using alternative gases were purchased; said units will be installed as mobile switchgear units in the Canary Islands. The development of this project was considered a priority for the Company in 2018 (managerial objective). During 2019, in addition to continuing to develop this project, work will begin on the study of alternatives to SF<sub>6</sub> in AIS switchgear (Air Insulated Substation).

Additionally, Red Eléctrica continues working in collaboration with the Public Administration and other entities in the search for solutions aimed at controlling and reducing these emissions within the framework of the Voluntary Agreement signed in May 2015 between the Ministry of Agriculture, Food and Environment, manufacturers and suppliers of electrical equipment using SF<sub>6</sub>, electricity transmission and electricity distribution companies and waste managers of this gas and of the equipment containing it, in order to achieve a comprehensive management of the use of SF<sub>6</sub> in the electricity industry which is more respectful to the environment.



	2016	2017	2018
SF <sub>6</sub> installed (kg) <sup>17</sup>	421,666	434,566	462,119
SF <sub>6</sub> emissions/SF <sub>6</sub> installed (%) <sup>18</sup>	0.30	0.27	0.35
Total emissions (kg)	1,262	1,150	1,619

### 7.1.3. Energy Efficiency

One of the cornerstones of Red Eléctrica's climate change strategy is the commitment to energy efficiency at all levels within the activities of the Company. As a key player in the electricity sector, the Company places utmost importance on efforts geared towards efficiency and energy savings due to the enormous benefits they represent in economic, social and environmental terms. The Company has in place different projects aimed at reducing the consumption of electricity in its different facilities. The increase in efficiency in energy consumption is fundamental when it comes to reducing emissions.

#### 7.1.3.1. Electricity Consumption - Reduction of Electricity Consumption

Taking into account all <sup>19</sup> Red Eléctrica work centres, electricity consumption in the last three years has been as follows:

	2016 (kWh)	2017 (kWh)	2018 (kWh)
Total (kWh)	15,540,936	15,177,175	14,583,566
Total (Joules) <sup>20</sup>	5.59*10 <sup>13</sup>	5.46*10 <sup>13</sup>	5.25*10 <sup>13</sup>

Red Eléctrica, in addition to having an essential role in the integration of renewables, is committed to the use of renewable energy to cover the energy consumption of its facilities. 85% of the electricity consumed comes from renewable sources (energy with a Guarantee of Origin (GoO) or green energy).

<sup>17</sup> The increase in installed gas is mainly due to the commissioning of new facilities and the replacement of old equipment for SF<sub>6</sub> insulated equipment, although it is also associated with the updating of the inventory of Gas Insulated Substations (SF<sub>6</sub> insulated), which has enabled data regarding the gas contained in them to be ascertained.

<sup>18</sup> The maximum leakage rate for equipment in service established in the Voluntary Agreement for the management of SF<sub>6</sub> signed in 2015 is 0.5%. This rate is fixed for equipment commissioned as of the date the agreement was signed, allowing previously installed equipment to have higher leakage rates.

The leakage rate in 2018 increased due to the increase in gas emissions that year. This increase is due to an accident (which accounted for 12% of the gas leaks in 2018) and to various faults/failures in Gas Insulated Substations (which accounted for 51% of the leaks). Some repair work has already been carried out and is expected to continue throughout the next year. The 2017 rate has been adjusted with respect to that published in 2018.

<sup>19</sup> Includes the consumption of the Head Office, the electricity control centres (centres that operate 24/7 and have a high energy consumption) and the work centres (Regional offices and maintenance centres). Since 2016, consumption of electric vehicles is included. The 2018 data includes the electricity consumption of telecommunications shelters (activity of REINTEL, a telecommunications company of the Red Eléctrica Group).

<sup>20</sup> 1kWh = 3.6\*10<sup>6</sup> Joules; Total consumption data in Joules following criteria defined by GRI G4.



### REDUCTION TARGETS <sup>21</sup>: Electricity consumption

Reduction of emissions associated with electricity consumption: 85% in 2020 and 90% in 2030.

Reduction of electricity consumption in work centres <sup>22</sup>: 10% in 2020 and 30% in 2030.

### PROGRESS IN 2018

Reduction of **86.4%** of the emissions associated with energy consumption in 2018 vs. 2015.

Reduction of **13%** of electricity consumption in work centres in 2018 vs. 2015.

## 7.1.3.1.1. Specific Energy Measures Implemented in 2018

The main courses of action regarding the reduction of electricity consumption in 2018 were the following:

- Improvement of energy management of existing buildings and applying efficiency criteria in the construction of new buildings. Energy management system certified under ISO 50001 for buildings at the head offices.
- Reduction of electricity consumption in substations by selecting more efficient equipment and components, establishing efficiency guidelines for their use and the rationalisation of the use of lighting.
- Reduction of electricity consumption associated to the use of IT equipment: Renewal of IT equipment and systems, and the implementation of policies for the efficient use of equipment.
- Raising awareness among employees and the collaborators who work in the facilities of the Company by means of awareness raising campaigns.

Buildings	
Head office	Energy management system certified under ISO 50001
New buildings	A building is currently under construction to replace the control centre building (CECORE). This will include the use of geothermal energy and constructions measures that will bring it closer to almost zero consumption values (Nearly Zero Energy Buildings, nZEB).
Existing buildings	Improvements in HVAC systems, lighting and insulation in 11 work centres, which will mean an estimated saving of <b>172,085 kWh per year</b> .
Optimisation of assets	The offices of the North-Western Regional Office have been moved to a new building, that is better adapted to the needs of the personnel. The savings in electricity consumption is estimated at 80%. The move took place in the final quarter of the year, so the reductions will be reflected in next year's inventory.
IT Systems	
Renewal of IT equipment and systems according to criteria of maximum efficiency	<b>Renewal of IT equipment in 2018 (laptops, desktops and data storage systems) representing an estimated reduction in electricity consumption of 70,718 kWh per year.</b>

<sup>21</sup> The objectives are set using 2015 as the base year.

<sup>22</sup> This target was updated in 2018 in accordance with the new overall reduction target of the Company.



Application of efficient use policies	<b>The measures implemented since 2016 represent a decrease of 20% in the average energy consumption per computer.</b>
Improvement of IT systems	<b>Improvement of the IT systems of the Electricity Control Centre (CECOEL), which entails an estimated annual saving of 270,000 kWh.</b>
<b>Substations</b>	
Selection of equipment and components as well as establishing guidelines for their efficient use	During 2018, the lighting replacement project for a substation was continued with LED technology, for which nine times lower consumptions have been measured during lighting up times. The adaptation of the lighting systems of 18 substations has been carried out.
Rationalising the use of lighting	Rationalising the use of lighting: Since 2017, work has been done on improving remote lighting control systems, which has enabled the night-time shutdown of the lighting of a large number of substations. Shutting down lighting in these facilities was incorporated into this project in 2018 and represents an <b>annual saving of 1,788,500 kWh</b> . Currently, this criterion is applied to 72% of the substations, a figure that will increase in the coming years.
<b>Awareness</b>	
Awareness campaigns	Awareness campaigns for employees and collaborators who work at the Company's facilities.

Moreover, noteworthy are the HVAC systems based on the use of geothermal energy that have been installed in two buildings: work centre of San Sebastián de los Reyes and University Campus of Tres Cantos and work is underway for installing this kind of HVAC system in a third building which will significantly reduce the consumption of electricity.



Reductions in energy consumption <sup>23</sup>		
	kWh/annually	Joules/annually
Efficiency measures in work centres: improvements to insulation, HVAC systems and lighting.	61,065	2.2*10 <sup>11</sup>
Efficiency measures in work centres: optimisation of assets.	100,000	3.6*10 <sup>11</sup>
Efficiency measures in electricity substations: switching off of night-time lighting.	1,788,500	6.44*10 <sup>12</sup>
Efficiency measures in IT computer equipment: renewal of <b>laptops, desktops and data storage systems</b> and improvement in systems in CECOEL.	340,718	1.23*10 <sup>11</sup>

Reduction of greenhouse gas emissions	
Net savings	t CO <sub>2</sub> eq.
Savings in emissions due to contracting an electricity supply with a guarantee of origin. <sup>24</sup>	2,716
Reduction of SF <sub>6</sub> emissions as a result of repairing leaks.	1,635
Annual savings <sup>25</sup>	t CO <sub>2</sub> eq./year
Efficiency measures in work centres: improvements to insulation, HVAC systems and lighting.	3
Efficiency measures in work centres: optimisation of assets.	5
Efficiency measures in electricity substations: switching off of night-time lighting.	392
Efficiency measures in IT computer equipment: renewal of <b>laptops, desktops and data storage systems</b> and improvement in systems in CECOEL.	18
Reduction of SF <sub>6</sub> emissions by replacing old equipment with equipment with lower leakage rates.	1,447

<sup>23</sup> The estimated annual reductions of the measures carried out in 2018 have been included (estimates made based on equipment specifications or actual data on reduced consumption depending on the implementation of the measures).

<sup>24</sup> Electricity with Guarantees of Origin: 0 t CO<sub>2</sub>/kWh.

<sup>25</sup> Reductions associated with the measures implemented in 2018.



### 7.1.3.2. Sustainable Mobility

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Red Eléctrica maintains a clear commitment to efficiency in mobility. In addition, Red Eléctrica has for several years been working on optimising the trips made required to carry out its activity and reducing the emissions associated with the same.

In 2014, the Company decided to give a greater impetus to this task and approved its Sustainable Mobility Plan with the aim of incorporating a new culture of mobility within the Company. The most important measures developed in recent years include:

- **Efficient management of fleet vehicles**, by progressively improving the energy rating of vehicles used by selecting the best existing technologies and optimising their use through applications that facilitate the use of efficient routes and responsible driving. Red Eléctrica has maintained since 2015 the 'Ecological Fleet Accreditation' in its 'Master' category received from the Fleet Managers Association (AEGFA). 78% of Red Eléctrica's vehicles (including passenger cars, 4x4s, vans, car-derived vans, trucks, shared leasing, management vehicles and the Company's pool of electric vehicles) have an energy rating of A or are electric (compared to 73% in 2017).
- **Measures to optimise work-related travel**. Implementation of a corporate fleet of electric vehicles for commuting during the working day, prioritisation of the use of efficient taxis and improvements in communication tools to reduce the need for travel (video conferences and platforms for remote access).
- **Rationalising the use of private vehicles in the daily commute to work centres**. The Company has a Company bus service and shuttle services connecting the office with various locations. The transport pass is included among the options of the benefit in kind for employees and the use of carsharing is promoted (8.5% of employees are using this measure on a regular basis compared to 6 % in 2016).

Additionally, Red Eléctrica collaborates in initiatives promoted by external organisations in the field of sustainable mobility. In 2018, the Company has participated in the following initiatives:

- Advisory Board of the Sustainable Mobility Observatory (*Club de Excelencia de Sostenibilidad - Excellence in Sustainability Club*)
- The Company presented two initiatives in the European Mobility Week:
  - the installation of charging points for electric vehicles for employee cars and special conditions for the full electrical installation of a charging point at home as well as any associated installation required and
  - the identification of safe routes for those people wishing to use electric bicycles.

Furthermore, Red Eléctrica has received recognition for its involvement in the promotion of sustainable mobility, issued by the Sub-directorate of Air Quality and Industrial Environment of the Ministry of Ecological Transition.



**Climate Change Action Plan Target: MOBILITY**

**Reduction of emissions associated with the use of Red Eléctrica vehicles<sup>26</sup>: 30% in 2020 and 50% in 2030 vs. 2015.**

**Progress 2018: 24.5%**

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**Reduction of emissions associated with business travel using vehicles: 20% in 2020 and 40% in 2030 vs. 2015.**

**Progress 2018: 45.6%**

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<sup>26</sup> This target was updated in 2018 in accordance with the new overall reduction target of the Company.



Fuel consumption (litres) during 2018 associated with vehicles:

	2016	2017	2018
Diesel (l)	712,853	567,942	462,169
Gasoline (l)	49,768	52,124	201,470
Biodiesel	0	0	0
Autogas (LPG)	0	0	0
Total vehicle fuel <sup>27</sup> (l)	762,621	620,066	663,639
Consumption of diesel generator units <sup>28</sup> (not associated to vehicles)(l)	3,452	1,212	3,476
Fuel consumption (Joules) <sup>29</sup>	2.82*10 <sup>13</sup>	2.28*10 <sup>13</sup>	2.4*10 <sup>13</sup>

### 7.1.3.3. Raising Awareness

The awareness raising actions targeted at employees carried out this year have been focused mainly on the 'Sustainable City' concept through posters, intranet communications, visits, competitions etc.

In 2018, the sixth edition of the Award to the year's most noteworthy Red Eléctrica Eficiente Project took place; a recognition that arises from the need to promote best practices in energy efficiency developed or carried out in Red Eléctrica.

The ceremony for the presentation of the awards was organised on 5 March on the occasion of World Energy Efficiency Day. The following projects are noteworthy:

- **Geothermal energy in Red Eléctrica:** HVAC systems with geothermal energy in the buildings of Tres Cantos and San Sebastián de los Reyes. Both projects have been successful and represent significant savings in electricity consumption.
- **Selling off of power transformers:** commitment to the circular economy looking for alternative solutions for equipment and material that has reached the end of its useful life.
- **Smart Grids Flash App:** mobile application developed to spread the content of the Smart Grid Flash newsletter via mobile phones. This bulletin aims to keep the staff of Red Eléctrica informed about the future of the energy transition and about the changing role of the Company and its backing for this on-going trend.

Additionally, as in previous years, a number of projects and initiatives in this specific area have been carried out taking as a reference the two significant dates indicated below. These initiatives were complemented by disseminating messages and information using internal and external communication media in order to publicise the events.

- **Energy efficiency: 5 March - World Energy Efficiency Day**
- **Mobility: 16 to 22 September - European Mobility Week**

<sup>27</sup> Fuel consumed by Red Eléctrica vehicles (fleet vehicles, shared leasing and management vehicles)

<sup>28</sup> Corresponds to diesel refilled in the fuel tanks of diesel generator units in the year indicated.

<sup>29</sup> 1 litre diesel = 37\*10<sup>6</sup> joules; 1 litre of gasoline = 34\*10<sup>6</sup> joules; 1 litre of gas oil = 37\*10<sup>6</sup> joules; 1 litre of biodiesel = 32.79\*10<sup>6</sup> joules; 1 litre of LPG = 25.7\*10<sup>6</sup> joules.



## 7.1.4. Carbon Footprint. Supply Chain

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The emissions associated with the supply chain are those that have the greatest impact on the indirect emissions of the Company (Scope 3). Therefore, in 2018, Red Eléctrica has designed a roadmap to continue improving in the management of these emissions. The main objectives sought are:

- Involve suppliers in Red Eléctrica's commitment, providing appropriate guidelines to suppliers in order to promote changes in its management and to foster collaboration.
- Integrate more direct information in the calculation of Scope 3 emissions, to improve their analysis and monitoring.
- Be willing to establish ambitious commitments for the reduction of Scope 3 emissions.

During 2019, the Company will begin a specific work programme with the suppliers that have the greatest impact on Red Eléctrica's carbon footprint.

## 7.1.5. Offsetting of Emissions

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Red Eléctrica has put into effect different alternatives for the reduction of its emissions. However, given the nature of the emissions (the main direct emissions are unclear) and the characteristics of the activities carried out by the Company, in order to achieve greater progress in reducing the carbon footprint, it is important to work on emission offsetting actions.

The main method for offsetting emissions is the execution of the 'Red Eléctrica Forest' project, described in the section in this report entitled '*Biodiversity - Natural Capital*'.

In 2018, two new forests were planted: the Chajaña Forest (Tenerife) and the Asturias Forest. It is estimated that they will offset 10,020 tonnes of CO<sub>2</sub>, which is equivalent to **25.5% of the direct emissions for 2018**.

In addition, for the fifth consecutive year, the Company has offset part of its emissions derived from the daily commutes of its employees by **purchasing 2,090 VCUs** (Verified Carbon Units) under the VCS (Verified Carbon Standard), which corresponds to the emissions generated by all those workers who have answered the 2018 mobility survey (53.6% of the workforce). The offsetting has been made by supporting a project which was selected by the participants in the survey: The Madre de Dios Amazon REDD Project, a project that aims to reduce deforestation in the Amazon jungle (Peru) and contributes to the conservation of biodiversity in the area and supports the development of indigenous communities.

## 7.1.6. Transmission Grid Losses

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The energy losses in the transmission grid are accounted for within the emissions of Scope 2, as indicated by the GHG Protocol. The emissions associated with them are calculated taking into account the energy lost in the grid (transmission grid losses) and the emission factor of the energy mix (calculated by Red Eléctrica according to the amount of energy generated by the different technologies). None of these factors is under the control by the Company.

The transmission of electricity inevitably leads to energy losses in the grid. This means that, to satisfy a given final consumption, a slightly higher level of generation is required.



Several factors generate losses: the Joule effect, the corona effect and the own consumption of the electricity substations necessary for their correct operation. Of these, the most relevant, without a doubt, is the Joule effect<sup>30</sup>, associated with the flow of current through the conductors.

Red Eléctrica works to improve the aspects that depend on its management and that can influence the reduction of these losses. Among them, the following actions are noteworthy:

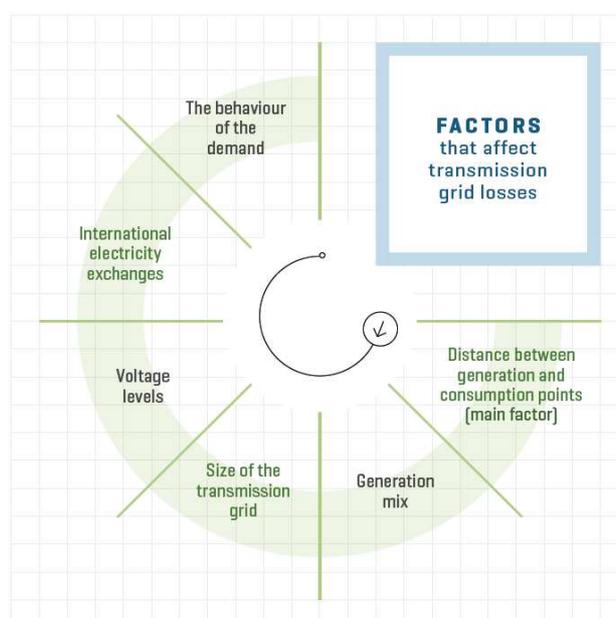
- Development and meshing of the transmission grid.
- Increase in the number of conductors per circuit.
- Use of technologies and systems with the best performance.
- Maintenance of the facilities in the best conditions to ensure their proper functioning.

The first two measures seek to create parallel routes in order to allow a given intensity to flow, which in turn results in lower resistance and, therefore, reduced losses. However, all these improvements have a minor impact on the evolution of energy losses, with those other aspects, not controlled by Red Eléctrica, having the greatest influence.

Losses increase mainly due to the increased distances between generation and consumption points. The electricity generation structure depends on the rules of the electricity market, regulated by an independent body. The function of Red Eléctrica as operator of the electricity system must be carried out in accordance with specific and mandatory operating procedures. According to these procedures, it is not possible to operate the electricity system based on loss reduction criteria, so the Company has little capacity to act in relation to said reduction.

On the other hand, it is important to note that, in the case of the Spanish electricity system, the increase in losses is closely related to the share of renewable energy in the generation mix. Normally, increases in hydro and wind energy generation are related to increased transmission distances (this type of generation is not usually quite far from the consumption points).

The increase in the percentage of losses in 2018 is mainly associated with the electricity generation mix. In 2018, the share of renewable energy increased (going from 33.7% in 2017 to 40.1% in 2018); renewable energy generating facilities are generally located far from consumption areas.



<sup>30</sup> Joule effect: the effect whereby, when an electrical current flows through a conductor, part of the kinetic energy of electrons is transformed into heat which thereby raises the temperature of the conductor. Joule effect losses are proportional to the intensity flowing through the conductor and the resistance thereof, the greater the length of the line the greater this resistance is. In view of this, it can be understood that the losses are mainly related to the distance between points of generation and consumption, which is determined by the result of the wholesale electricity market.



## 7.2. Biodiversity - Natural Capital

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The protection and conservation of biodiversity have always been essential elements in Red Eléctrica's environmental management. Red Eléctrica has a specific commitment for the management of biodiversity and a multi-year Biodiversity Action Plan which include the challenges and main objectives, as well as the main projects to be carried out in the period.

The courses of action regarding the Commitment are the following:

- Development of the transmission grid and the protection of biodiversity: search for and implementation of solutions that help make the Company's activities compatible with the protection of biodiversity.
- Biodiversity conservation: promotion and collaboration in the conservation of species of fauna and flora, especially those linked to the activity of the Company.
- Dissemination of information to stakeholders regarding the actions carried out by Red Eléctrica and the Company's stance on biodiversity.
- In addition, the Company works in two cross-cutting areas, whose development is fundamental in order to be able to advance in the three aforementioned courses of action.
- Improvement of biodiversity management: development of new systems, procedures and the implementation of new approaches and methodologies.
- Innovation applied to the management, protection and conservation of biodiversity.

Red Eléctrica continues to be a member in 2018 of the Biodiversity Pact. The Pact, promoted by the Ministry of Ecological Transition, aims to show the commitment of companies to the conservation of biodiversity. In the same way, the Company is part of the Spanish Initiative for Business and Biodiversity (IEBB) also promoted by the Ministry of Ecological Transition.

Moreover, Red Eléctrica has begun to work on incorporating the concept of natural capital into its management. In a first phase, the project has focused on the quantification of the impacts on biodiversity, so that the performance of the Company can be evaluated with respect to the zero-net loss of biodiversity.

During 2018, the most relevant components of biodiversity were identified in relation to the Company's activities and progress was made in determining the performance indicators, as well as in the definition of one specific baseline reference for the calculation.

The three components of biodiversity identified as relevant to Red Eléctrica are: **birdlife, forested areas and protected habitats**. The mitigation, corrective or offsetting actions will be focused on these three components.

In 2018, new collaborations were established in the field of biodiversity with different public administrations and organisations, in addition to taking part in the following initiatives:

- Alliance with International Union for the Conservation of Nature (IUCN) through a relationship framework with the Centre for Mediterranean Cooperation.
- SEO Birdlife. Alliance with BirdLife International through a relationship framework with the Spanish Ornithology Society.
- Extremadura Regional Government. Collaboration protocol on the conservation of biodiversity and sustainable development between REE and the Regional Ministry of the Environment and Rural Affairs, Agricultural Policies and Territorial Planning of the Extremadura Regional Government.
- Island Council of Tenerife. Collaboration framework agreement for actions regarding the environment and sustainability between the Island Council of Tenerife and REE.

In addition, Red Eléctrica maintains alliances in the field of biodiversity conservation with the competent areas of the public administration and other organisations in the various autonomous communities.



Among the recognitions received in 2018 in terms of biodiversity, noteworthy were the two second prizes obtained by the project '**Red Eléctrica Marine Forest: recovery of Posidonia oceanica seagrass meadows**'. Said prizes were awarded in the European Business Awards for the Environment in the Spanish and the European section, in both cases in the category of Business and Biodiversity.

Detailed information on all the projects spearheaded or in which Red Eléctrica participates can be found on the Red Eléctrica website: <https://www.ree.es/en/sustainability/map-of-projects>

## 7.2.1. Electricity Grids and Biodiversity

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Red Eléctrica's facilities are distributed nationwide, as the aim of the electricity transmission grid is precisely to connect the points of energy generation with those of consumption.

Avoiding areas rich in biodiversity is one of the priority criteria taken into account both in the grid planning phase as well as in the definition of each project. However, considering that 25% of the area of Spain has some form of environmental protection, it is inevitable that in some cases infrastructure crosses, or is located in protected areas or areas with species of interest.

On these occasions, Red Eléctrica implements all the preventive and corrective measures required to **minimise** the possible impacts on habitats and species (impacts associated with construction work and the modification of facilities, impacts on birdlife as a result of collisions and fire risks). These measures also include the **restoration** of affected areas, when possible. Moreover, they are complemented by environmental improvement actions to enhance biodiversity in those areas where the facilities are located, and which seek to offset some of the impacts that may have occurred.

Lastly, Red Eléctrica promotes and collaborates with the public administration, non-governmental organisations, research organisations and other interested parties in the development of biodiversity conservation projects, mainly focused on the species most related to the Company's activities.

Currently, Red Eléctrica's facilities occupy only 0.08% of Red Natura Española. Of all existing infrastructures, only 15.1% of total lines and 5.75% of substations are located in protected areas (Red Natura 2000).

## 7.2.2. Protection of birdlife

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The main impact on fauna by Red Eléctrica's facilities is the risk of birds colliding with grounding cables that protect the lines from electrical discharges during storms. The main measure to reduce that risk is **marking the grounding cables** with devices that increase their visibility.

In 2018, 116 km of line were marked with bird-saving devices. The percentage of kilometres marked with respect to the total kilometres of lines stood at 10.7% (3,180 km of line marked out of a total of 29,684 km of overhead lines).

Thanks to the project '*Birds and power lines: Mapping of bird flight paths*', which ended in 2016, the Company has a multiyear line marking plan in place for 2016-2023 in which priority is given to actions on sections of line with the greatest potential impact on birdlife. The execution of this plan will mean a reduction of 25% in the potential risk of birds colliding with overhead electricity lines.

At present, the line sections that have been identified as having a critical priority level, total 734 km in length, of which 375.7 km have already been marked.

Red Eléctrica also works on other relevant projects in relation to protecting birds from colliding with lines, noteworthy among which is the analysis of the effectiveness of the blade-type bird-saving device in various bird communities, a project undertaken in collaboration with the Doñana Biological Station (CSIC) (2013-2018).



### 7.2.3. Protection of Habitats and Species

In works associated with the construction of lines or the modification of facilities, the main impacts to be avoided are the alteration of the habitat of certain species of fauna and flora, and also the impact on vegetation due to the opening up of safety corridors, necessary to prevent fires in the operation of the line. Among the preventive and corrective measures applied, noteworthy are the following:

- Detailed field studies on specific issues, such as impact reports on Red Natura and surveys to identify the presence of protected flora and fauna.
- Introduction of modifications in the design of facilities to mitigate their impact on flora: compacting or increasing the height of towers, relocation of towers, modification of access roads etc.
- Construction of decanting pools and filters to prevent contamination of waterways.
- Signage and protection of habitats and species of high ecological value to avoid them being harmed when carrying out works.
- Use of construction techniques that minimise earthworks and the occupation of land (reducing the opening up of access roads, size of work sites and storage areas for materials): hoisting structures with a boom crane, hanging of line by hand, or carrying out works using a helicopter or drone.
- Transfer to other areas and replanting of species affected by the work.
- Biological stoppages in 100% of the works during breeding or nesting periods to reduce impacts on the fauna that may be affected.
- Recovery of affected areas: restoration of slopes, sowing of seed and the planting of flora.
- Accompanying measures and the carrying out of specific projects to improve biodiversity in affected areas.

Noteworthy in 2018 were the following specific measures that were put in place regarding the protection of habitats and species:

Specific measures that were noteworthy in 2018
<p><b>Aimed at avoiding impacts on protected flora</b></p> <ul style="list-style-type: none"> <li>• Excavation of the base of a tower (220 kV Balsicas-El Palmar line), installation of the grounding ring and concreting works, without clearing external vegetation to avoid impacts on it.</li> <li>• Hoisting of a total of seven towers using a boom crane in the 220 kV Magaña-Moncayo line and six towers in the 220 kV Moncayo line-Magallón-Trévago line, to avoid impacts on Holm oaks (<i>Quercus Ilex</i>).</li> <li>• Assembly and hoisting with a boom crane and concreting works carried out by helicopter (two towers) to prevent the need to open up accesses in El Valle and Carrascoy Regional Park: 220 kV Balsicas-El Palmar line.</li> <li>• Modification of access routes for works on two towers belonging to two lines due to the existence of Holly trees (<i>Ilex aquifolium</i>) and Chestnut (<i>Castanea sativa</i>).</li> <li>• Marking of an area occupied by sensitive species or habitats in six lines due to the presence of Dwarf juniper (<i>Juniperus communis</i>), Holly trees (<i>Ilex aquifolium</i>), European fan palm (<i>Chamaerops humilis</i>), Rock tea (<i>Jasonia glutinosa</i>), Centaury (<i>Janeri subsp.</i>), Rockfoils (<i>Saxifraga babiana</i>) and a priority habitat due to the presence of Cantabrian alder (<i>Alisedas cantábricas</i>).</li> <li>• Transplanting of Butcher's broom (<i>Ruscus aculeatus</i>) and European fan palm (<i>Chamaerops humilis</i>) in the vicinity of two electricity lines.</li> </ul>
<p><b>Aimed at avoiding impacts on protected fauna</b></p> <ul style="list-style-type: none"> <li>• Biological stoppages (of between three and seven months) for five lines due to the presence of the Golden eagle (<i>Aquila chrysaetos</i>), Bonelli's eagle (<i>Hieraatus fasciatus</i>) and Imperial eagle (<i>Aquila adalberti</i>).</li> </ul>



- Field monitoring (between two and five months) for two lines due to the presence of Iberian parsley frog (*Pelodytes ibericus*) and bats.

The rest of the actions carried out are included in the Annex: 'Environmental Actions 2018' of this environmental statement.

## 7.2.4. Contribution to Biodiversity Conservation

Red Eléctrica actively contributes to the conservation of Spain's biodiversity, leading or participating in various projects and carrying out dissemination and training activities in environmental matters. Although working in different areas, within the biodiversity action plan, the objective of the project is the definition and execution of wildlife conservation projects, mainly related to focal bird species (prone to collision). Most of the projects are aimed at the conservation of endangered bird species, although other species of fauna and flora are also included.

Also relevant are the actions aimed at restoring degraded habitats, among which the 'Red Eléctrica Forest' project is noteworthy.

### 7.2.4.1. Noteworthy Projects regarding the Protection of Habitats and Vegetation

- **Hábitat Project (2015-2021)**

The aim of this project is to know the Priority Habitats of Community Interest and other flora and vegetation formations of interest (included in other protection schemes due to their endemic nature, scarcity or rarity), that exist within the vicinity of Red Eléctrica facilities, as well as their state of conservation. The objective is to have information on the interaction between electricity transmission infrastructure and these habitats, and use it to make decisions regarding maintenance, so that the conservation of these habitats and flora and vegetation formations is ensured through adequate management.

The first phase of the project consisted of the mapping and characterisation of the flora and vegetation formations of interest present within the vicinity of the facilities (100 % of the transmission grid). As a result of this work, carried out in collaboration with the autonomous communities and experts on the subject, a digital mapping was developed with all the information, which was later validated in the field.

30,361 hectares of Priority Habitats of Community Interest and other formations of interest have been identified in the vicinity of Red Eléctrica facilities (30% of the total area of influence of the facilities).

Additionally, scientific-technical reports have been prepared along with documentation, assessment data and a proposed action plan for each case and by autonomous community. In this regard, we have identified the need to carry out additional work to standardise and integrate the information of the various territories and be able to manage and use it nationwide.

The next phase of the project will consist of the generation of a system of pressure/state/response indicators on habitats and other formations of interest. Lastly, an integrated management and improvement proposal for these areas will be prepared that is consistent with the maintenance needs of the facilities. This project seeks to acquire a more in-depth knowledge of the natural values present in the area of influence of Red Eléctrica's facilities and their state of conservation. The objective is to be able to monitor the interaction of electricity transmission lines with natural habitats of community interest, with the intention of using this information in the decision-making process regarding the operation and maintenance of facilities.

- **Recovery of the dune system of the beach in the Llevant area of Formentera (2012-2020).**



In collaboration with the Ministry of Environment, Agriculture and Territorial Planning and the Bureau of Coastal Regulation in the Balearic Islands. Maintenance and monitoring tasks are carried out.

- **Sustainable and adequate management of the different populations of orchids and, especially, regarding the bee orchid (*Ophrys apifera*) 'almaracensis' variety.**

In collaboration with the Extremadura Regional Government (2017- ongoing).

#### 7.2.4.2. Conservation Projects in relation to Focal and Threatened Species

The detailed information of all the projects spearheaded by Red Eléctrica or in which it participates in relation to threatened species can be found in the following sections of the website:

<https://www.ree.es/en/sustainability/the-natural-environment/avifauna>

- **Monachus Project: reintroduction of the Black vulture (*Aegypius monachus*) in the province of Burgos.**

Under the project, in 2018, 19 birds were released, 3 in Boumort (Pyrenees) and 16 in the Sierra de la Demanda (Burgos), 8 chicks were born in Boumort and 6 fledged, two of them were second generation. 16 territorial pairs, 12 of them are breeding pairs (laying eggs).

- **Effects of global and local change on the Iberian populations of the Egyptian vulture (*Neophron percnopterus*).**

In 2018, there were 23 occupied territories, 6 individuals have been fitted with transmitters, the information obtained is very useful for the analysis of migratory patterns (beginning of the migratory period, problems in the displacements, distances travelled, etc.) and use of the territorial space in winter.

- **Environmental education and the 'Aquila a-Life' project for the Bonelli's eagle (*Hieraetus fasciatus*) in Majorca.**

The population is composed of a total of 31 birds who have formed 8 territorial pairs distributed throughout the island of Majorca. Five of these pairs successfully reproduced and 8 chicks fledged in 2018. The celebration of the 'Day of the Eagle' (9 June) was held with the participation of REE and via dissemination in the media. In the environmental education section, educational material was published (folders, tee shirts, posters), publishing of teaching units for the 'Aquila a-Life' educational workshop and the design of a diorama (scale model) of an eagle's nest.

- **Real impact of food supplementation on the spatial and reproductive ecology of Bonelli's Eagle (*Hieraetus fasciatus*) in the province of Valencia.**

A total of 31 Bonelli's eagle belonging to 13 different territories were captured, tagged and fitted with a radio transmitter for their monitoring. In 2018, 13 birds were captured and fitted with a radio transmitter. Five chicks fledged, 4 in the Sierra de Espadán Natural Park and one in the Sierra Calderona Park. The supplementary feeding points are used by the eagles reducing their territorial area and with it, therefore, the energy they expend in hunting.

- **Platforms for the Osprey (*Pandion haliaetus*) in Andalusia.**

Since 2011, a total of 30 chicks fledged the nests installed on platforms in 3 electricity towers in the province of Cádiz. In 2018, 22 chicks fledged in Andalusia, 27% were born in Red Eléctrica's electricity towers; 9 chicks fledged in Cádiz, 66% born in Red Eléctrica's towers. Of the 14 breeding pairs in Andalusia, two of them nest in Red Eléctrica's towers (14.3%); 9 breeding pairs in the province of Cádiz, two of them in Red Eléctrica's towers (22%).



- **Other actions for the conservation of birdlife undertaken during 2018:**
  - Recovery of the population of the Golden eagle (*Aquila chrysaetos*) in Galicia. (IUCN Red List species of least concern). Since the project began, a total of 12 birds of this species have been released using the hacking method. Since 2013 a total of 3 chicks have been born within the territory of the Xurés Natural Park, a fact that had not occurred since 1997. Five territorial pairs have been formed, which represents an increase in the reproductive population of the Golden eagle in Galicia. In 2018, an educational talk entitled 'Mountainous areas and threatened species, flying with the Golden Eagle' was given in two schools in Galicia. Collaboration with GREFA (2011-2019).
  - Monitoring, conservation and recovery of the Iberian Imperial eagle (*Aquila adalberti*) population in the Doñana natural area. In 2018, 9 pairs reproduced, and 11 chicks fledged.
  - Technical programme for the execution of satellite radio monitoring work of Golden eagles (*Aquila chrysaetos*) in Navarra. In 2018, a new bird was captured and marked. Two of the eagles use the transmission grid towers in the area as a hunting perch, a point on which to rest and for roosting.
  - Foraging area and movements of the Canary Houdouard (*Chlamydotis undulata fuertaventurae*). In collaboration with the Museum of Natural Sciences (CSIC). 22 males and 13 females were captured on the island of Lanzarote and were marked and monitored between 2017 and 2018. A poster about the project was presented at the 25<sup>th</sup> Annual Conference of the Wildlife Society, Cleveland, Ohio (USA).
  - Monitoring (Extremadura) of nesting of raptors in electricity towers: 7 of the 8 towers inspected contained nests. 2 of the towers were occupied by reproductive pairs. The nests occupied in 2018 were being used by either Bonelli's eagle or crow.
  - Monitoring of artificial nests in towers (Huelva): 38 nesting boxes of which 27 were definitely occupied (1 unsure) by starling (17), Common kestrel (4), European roller (3), Little owl (3) and Common sparrow (1) and a nesting platform for osprey in a tower that was unoccupied.
  - Creation of an ornithological observatory in Mequinenza (Zaragoza) and improvements in the habitat of the Special Protection Area for Birds (SPA) of Aiguabarreig. In collaboration with the Municipality of Mequinenza and the Government of Aragón.
  - Support for the Bearded vulture (*Gypaetus barbatus*) a reintroduction project in Tinença de Benifassa Natural Park. In 2018, a guard house from which to monitor the progress of the vultures and a solar panel were purchased for an incubator.
  - Griffon vulture Census (*Gyps fulvus*) in the province of Burgos (Castilla y León). In collaboration with SEO BirdLife.

### 7.2.4.3. The Red Eléctrica Forest

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The Red Eléctrica Forest is an ongoing project, started in 2009, which aims, firstly, to offset part of the Company's emissions through the planting of trees and the recovery of degraded natural spaces on publicly owned land, and secondly to contribute to the conservation of biodiversity. This initiative also seeks to contribute to the development of local economies by contracting work with companies or groups in the area, as well as raising awareness of the importance of forests and involving the local population and employees of the Company.

The project is carried out in publicly owned land in different areas of Spain.

Two new forests were planted in 2018:

- **Chajaña Forest (Tenerife)**
  - Completion of the restoration works for 23 ha in the Chajaña area (Corona Forestal Natural Park, in the municipalities of Arico and Fasnia).



- Planting of 7,152 trees and shrubs of various species (*almond, cedar, blue bugloss, broom and Canarian pine*). Due to the adverse weather conditions, it has been necessary to plant more than 6,700 specimens to replace those previously planted and that didn't take hold.
- Carrying out workshops for 96 children from five public education centres in collaboration with the Island Council of Tenerife and several forestry, mountaineering and farming associations.

- **Asturias Forest**

- Reforestation of 41.5 ha in Sierras de Bidur, Monte Cordal de Santín and San Fernando (municipality of Boal).
- Planting of 27,888 trees among which are: wild pines, chestnuts, wild cherry trees and oaks. The planting works have been accompanied by various forestry works and the opening up of a firebreak and a 3 km forest track.
- Carrying out of awareness activities based on the forest: workshops in the classrooms in which 106 students from 5 schools participated, 21 of which have visited the restored area and have collaborated in a symbolic planting of trees.
- Participation of a group of Red Eléctrica employees and their families (19 in total) in the planting works, thanks to a corporate volunteering activity.

**Red Eléctrica Forest in figures 2009-2018**

Trees and shrubs planted: **682,093 units**

Surface area recovered: **843 ha**

Emissions offset: **194,791 t of CO2 eq.**

Investment: **2,126,327 €**



## ○ Red Eléctrica Marine Forest

*Posidonia oceanica* is a marine plant endemic to the Mediterranean that forms a habitat of priority interest and is an essential ecosystem for numerous organisms to complete their life cycle. Similarly, *Posidonia* contributes to water quality control and the protection of the coastline, as well as being one of the main CO<sub>2</sub> sinks in the sea.

*Posidonia* seagrass meadows can be affected due to various reasons such as the laying and installation of submarine electricity cables, which is why Red Eléctrica is promoting, through its Marine Forest initiative, a project to recover *Posidonia oceanica* seagrass meadows.

In a first phase (2012-2016) an R&D+i project was carried out in collaboration with the Mediterranean Institute of Advanced Studies (CESIC-IMEDEA), which helped determine the viability of a course of action that entailed the planting of *Posidonia*, obtained either by beach-cast fragments of *Posidonia* or through seeds grown under laboratory-controlled conditions and subsequently transplanted to the seabed. Once the collaboration agreements were signed with the CSIC and the Regional Government of the Balearic Islands for the restoration of 2 hectares of *Posidonia* in a degraded area of the Bay of Pollensa (Balearic Islands), in 2018, Red Eléctrica carried out planting works of 1 hectare of *Posidonia* and published a practical guide on the methodology for planting this species.

In addition, with the aim of further raising awareness regarding the conservation of the marine environment and specifically of *Posidonia oceanica*, the Company signed an agreement with the Marine Interpretation Centre 'Aula de la Mar', having collaborated on the contracting of an environmental teacher and through the visit of 2,500 schoolchildren to the Centre.

The project 'Red Eléctrica Marine Forest: recovery of *Posidonia oceanica* seagrass meadows' received recognition in 2018 with two second prizes being awarded in the European Business Awards for the Environment in the Spanish and the European section, in both cases in the category of Business and Biodiversity.

It should be noted that the project was presented at the following: the 14<sup>th</sup> Edition of CONAMA, the International Conference 'Energy and Ecology Industry', the Biodiversity Week in Valencia, the Annual Meeting of the Spanish Association for Quality, and the Environmental and Sustainability Working Group of the Spanish Maritime Cluster.



## 7.2.4.4. Innovation Projects regarding the Management, Protection and Conservation of Biodiversity

The cost of innovation in biodiversity is €141,007, **1.7%** of REE's investment in innovation. The following projects were carried out during 2018:

Innovation Project regarding biodiversity management, protection and conservation	
<b>Biotransporte Project</b>	<p>This innovative project aims to identify, diagnose and assess the effectiveness of the bases of the towers of electricity transmission lines as corridors (also called stepping-stones or 'biodiversity islands'), between the different protected natural spaces of the Iberian Peninsula, the Balearic and Canary Islands and their electricity connections with Portugal and France, for fauna with conservation problems and low spatial distribution capacity. The establishment of a network of corridors or 'green infrastructure' is necessary and a priority to reverse or curb the loss of biodiversity.</p> <p>In the period 2008-2012, a pilot project was carried out on an electricity line in Córdoba. It was found that by making minor improvements to the vegetation at the base of the towers, satisfactory results were obtained: increased abundance and biodiversity of birds, micro-mammals and invertebrates (7 of 8 pollinators).</p> <p>With these results, in the period 2017-2018 (and in collaboration with the Biological station of Doñana-CSIC) a global study was conducted with the objective of identifying species, natural spaces and useful electricity lines for the purpose of creating a network of corridors.</p> <p>The study has given way to a proposal for a large-scale pilot project for the connection of 8 natural spaces in Andalusia, located in the provinces of Cádiz, Huelva and Seville. The decision was made to work in Andalusia as it is a territory of high biodiversity and because it has a Master Plan for the Improvement of Ecological Connectivity: Alcornocales Natural Park, the Natural Space comprised of the 'Doñana National Park' and the 'Natural Park of the Sierra Norte de Sevilla'. In addition, the aforementioned provinces are home to a total of 11 target species (micro-mammals, amphibians, reptiles, in addition to the group of pollinators, mostly insects).</p> <p>The following phases of the project propose the development of specific measures to be implemented on the surface of the bases of the electricity towers.</p> <p>These actions would allow the connection of around 60% of the spaces of the Red Natura 2000 network and would directly benefit other species from different groups, as well as many others indirectly by increasing the biodiversity of these areas.</p> <p>This project was presented at the 14<sup>th</sup> Edition of CONAMA (Technical Session on the role of Pollinators) and at the International Congress on Bird Migration and Global Change. The Ministry of Ecological Transition (MITECO) makes reference in the draft of the Government's Strategy for Green Infrastructure and Ecological Connectivity and Restoration to a proposed action to be carried out by Red Eléctrica in line with the <i>Biotransporte</i> Project.</p>



## 7.2.5. Fire Prevention

In order to minimise the risk of fire associated with the presence of transmission lines, complying with strict rules regarding safety distances between flora and facilities is critical. Red Eléctrica ensures this compliance through the proper design of safety corridors and by carrying out actions of predictive and preventive maintenance, such as the annual inspection of all facilities and the periodic conducting of forestry work.

The Company applies best practices in the design and maintenance of safety corridors, respecting shrubs and small size/slow growing tree species, minimising the impact on protected species and without using chemical treatment methods.

Red Eléctrica also works on reducing the risk of fire in the vicinity of substations. In 2018, the Company has prepared an inventory of substations located in a forest environment and identified the existing plant species around the perimeter of the substation. This has helped define the monitoring criteria and action plans for the surrounding areas of the substations.

In addition, noteworthy is the importance of the active and continuous collaboration of Red Eléctrica with the public administrations involved in forestry management. This cooperation is formalised through the signing of collaboration agreements for the prevention and fight against forest fires. In 2018, a new agreement was signed (Asturias), currently there are 13 in force, with an overall budget of more than 1,040,000 euros every four years<sup>31</sup>. The Company has set the goal of establishing this type of agreement with all the administrations concerned, a total of 21.

These collaboration agreements have resulted in the number of fires related to Red Eléctrica's facilities remaining extremely low.

Within the framework of these agreements, various relevant actions were carried out during 2018:

Territorial scope	Noteworthy projects in 2018 linked to collaboration agreements
Aragón	<p><b>Two videos to raise awareness against forest fires</b> that aim to make the problem of forest fires known and to also make people understand fire as an element that has a huge impact on the natural environment. The videos also seek to raise awareness regarding the prevention of forest fires and are geared towards specific target groups.</p> <p><b>Training of 100 agents for the protection of nature in Aragón:</b> 2 training courses 'Investigation of the causes of forest fires' and 'Verbal defence and persuasion' were given to 100 agents belonging to the Government of Aragón regarding the protection of nature.</p>
Andalusia	<p><b>Informative campaign 2018-2019 'Andalusia without fires'.</b></p> <p>Production of infomercials in video and audio formats for the general public for their broadcasting via television, radio, means of transport that have an audio-visual information service, at events (courses, conferences, symposia...) related to forest fires, and educational activities aimed at school children. The theme is information and awareness about the problem of forest fires, their effects on the natural environment as well as on private property, assets, goods and people, and the measures to be taken individually and collectively to prevent them from occurring and to minimise their impacts.</p>
Asturias	<p><b>Selective clearing of scrubland</b> respecting the areas surrounding the bases of trees to be protected in order to help in the recovery of pastureland in 41.82 ha of the Sierra de Tineo and Grullomayor highlands in Asturias.</p>

<sup>31</sup> The contribution earmarked by REE per Agreement and Year stands at 20,000 euros.



Castilla-La Mancha	<p><b>Red Eléctrica's Sponsorship</b> of the 5<sup>th</sup> Conference on Forest Fire Management and Social Perception (Organised by the Castilla-La Mancha Regional Government, the Pau Costa Foundation and Red Eléctrica).</p> <p><b>3<sup>rd</sup> edition of the 'International Forest Fire Awards 2018'</b>, which were convened in the Santa Fe de Toledo Convent within the framework of the 5<sup>th</sup> Conference on Forest Fire Prevention in Toledo, with the aim of promoting research and innovation in the field of forest fires, and to encourage the study and development of knowledge, techniques and tools for management and action in this field.</p>
Castilla y León	<p><b>Citizen awareness campaign 'Yo me enchufo a la prevención' (I am plugged into prevention).</b></p> <p>The public awareness campaign '<i>I am plugged into the prevention of forest fires</i>' has been launched with the aim of making the population aware of the need for their involvement in prevention. Promoted by CDF (León Centre for Fire Defence).</p> <p><b>Fire monitoring system installed in the El Bierzo region</b></p> <p>In 2018, the first phase of the project that includes the installation of a monitoring system for firefighting in El Bierzo, a commitment for the backing of technology as a tool focused on three lines of action: prevention, detection and intervention.</p> <p><b>Conference session on forest fires and electricity lines for environmental agents of Castilla y León</b></p> <p>The technical conference sessions addressed issues related to Red Eléctrica and how to act in the event of a possible fire in the vicinity of the lines. In addition, the conference addressed essential issues to improve coordination in the fighting of forest fires, such as communications and the practical application of the Emergency Management System for Forest Fires.</p>
Extremadura	<p><b>Training course on controlled burns.</b></p> <p>Two courses of 24 teaching hours for 30 forestry experts from INFOEX were conducted. Forestry agents with experience in forest fires have gained knowledge about the process of planning and operational control of controlled burns and have been provided with practice in the use of prescribed burning.</p>
Community of Valencia	<p><b>Preparation of audio-visual materials for the 2018 Forest Fire Prevention Regional Campaign</b> launched by the General Directorate of Forest Fire Prevention of the Ministry of Agriculture, Environment, Climate Change and Rural Development of the Regional Government of Valencia.</p>
Balearic Islands	<p>No relevant projects in 2018.</p>
Canary Islands	<p><b>Basic training in forest fire safety for volunteers</b></p> <p>Basic training in forest fire safety for 45 volunteers regarding forest fires on the island of Tenerife, with the aim of them helping in extinguishing fires. The evaluation of the course by the participants was very good.</p> <p><b>Volunteering actions regarding logistical support for forest fires</b></p> <p>Preparation of the documentation and materials necessary for undertaking voluntary work in the logistical support tasks for when there are large forest fires. This logistical support falls within the organisational framework established by the Fire Prevention and Extinction Unit of the Island Council of Tenerife.</p> <p><b>Training regarding the extinction of forest fires for 55 experts and managers of the Island Centre of Operational Coordination (La Palma).</b></p> <p>Development of three courses regarding the extinction of forest fires. Two of them dedicated to training in safety for personnel that form part of the operations designed for this purpose on the island, and a third for the productivity of personnel in forest fires, aimed at experts and managers of the Island Centre of Operational Coordination (CECOPIN).</p> <p><b>Supply of safety equipment</b></p>



	Supply of 16 portable TETRA transmitters for the security and emergency services of the Island Council of La Palma, in order to optimise the use of the Emergency and Security Network of the Canary Islands (RESCAN).
Navarra	<p><b>Supply of 55 sets of individual protection equipment</b> for personnel hired by the Government of Navarra.</p> <p><b>Forestry management of highlands using fire prevention criteria:</b> mechanical clearing carried out in Goizueta, Baltzan and Donamaria and forested areas were eliminated in the vicinity of the wildlife recovery centre in Ilundau.</p>
Basque Country	<p><b>Training</b> geared towards fire safety, extinction techniques, investigation and the development of professional skills regarding forest fires.</p> <p>In the training, 103 experts, forestry agents, foremen and operators from the Department of Sustainability and Natural Environment of the Provincial Council of Vizcaya participated. The assistants acquired skills regarding human factors and safety, evaluation and forecasting of fire behaviour, initial attack strategies and practical examples of decision making.</p> <p><b>Preventive clearing in the highlands of Vizcaya</b></p> <p>Clearance works in areas of forest fire risk, scrublands, the type of shrub to be cleared were mainly thistles in particular common gorse (<i>Ulex ssps.</i>) and to a lesser extent dried out heath (<i>Erica ssps.</i>) with a high density and an average height of shrub of 0.8 m.</p>

In addition, the training programme for State Security Forces has continued in 2018. Training sessions on forest fire prevention have been organised in 10 provinces of 6 autonomous communities, in which 957 people attended in person and 700 people took part via live streaming.

Innovation projects have also been carried out in the field of forest fire prevention:

Innovation projects on fire prevention	
<b>Vegeta (2016-2019)</b>	<p>The objective of this project is to optimise vegetation management tasks, facilitating the incorporation of legal requirements and environmental criteria into said tasks.</p> <p>In 2018, progress was made in the improvement of the algorithm (Vegeta algorithm) that, based on input variables and technical and environmental criteria, analyses the information and creates the most suitable action plans.</p>
<b>Prodint</b>	<p>Analysis and evaluation of how Red Eléctrica can use the SIGFOX wireless telecommunications network, specially designed to connect sensors of the new Internet of Things (IoT) technology. In the event this is considered applicable, the development and deployment of a prototype forest fire detection system will begin in the vicinity of the Company's lines and towers.</p>



## 7.3. Saving of Resources: Water and Paper

### Water consumption

	2016	2017	2018
Head Office (m <sup>3</sup> )	9,166	8,064	<b>10,479</b>
Head Office (m <sup>3</sup> /employee) <sup>32</sup>	9.72	8.47	<b>11.51</b>
Total work centres <sup>33</sup> (m <sup>3</sup> )	26,455	27,627	<b>22,566</b>

Withdrawal by source (%)	2016	2017	2018
Rainwater collection tanks <sup>34</sup>	0	0	<b>0</b>
Cisterns	3.27	3.14	<b>2.92</b>
Wells	34.58	33.74	<b>24.55</b>
Municipal water mains	62.15	63.12	<b>72.55</b>

### Paper consumption (office)

	2016	2017	2018
kg	19,437	24,190 <sup>35</sup>	<b>20,597</b>
kg/employee <sup>36</sup>	9.37	11.62	<b>10.10</b>

The table below shows the evolution of paper consumption in publications in the period 2016-2018.

	2016	2017	2018
kg	12,397	16,327	<b>6,321</b>
% FSC <sup>37</sup>	99.5	95.2	<b>100.0</b>
% FSC 100% Recycled	2.00	28.40	<b>65.19</b>
% FSC 60% Recycled	44.7	8.7	<b>0</b>
% FSC Mixed	50.20	62.90	<b>34.81</b>
% Ecological paper used in publications	2.6	0	<b>0</b>

<sup>32</sup> Only the Head Office buildings in La Moraleja and the staff that consume water in it are considered (employees, interns and collaborators: a total of 910 people).

<sup>33</sup> The data provided has a coverage of 83%, in terms of personnel (taking into account all personnel that work in the different work centres in Spain: employees of the Group, interns, employees from temporary staffing agencies and collaborators). The data is not available for some centres, mainly those that are not owned by the Company (rented).

<sup>34</sup> In some centres there are rainwater collection tanks for sanitary use, fire prevention and irrigation. Collection tanks do not have mechanisms to account for stored water, so the percentage of rainwater use cannot be calculated.

<sup>35</sup> In 2017, the printer service provider was not able to provide the data regarding printing on 1 or 2 sides, reporting only cumulative data since installing the printers in 2014, and it was impossible to obtain the data for 2017. For this reason, it has been estimated that in 2017 the percentage of double-sided printing was same as in 2016, 72%.

<sup>36</sup> Includes REE employees as well as interns, employees from temporary staffing agencies and collaborators: 2,058 people

<sup>37</sup> Ecological paper certified to Forest Stewardship Council standards.



## 7.4. Socio-Economic Environment

### 7.4.1. Protection of Archaeological and Ethnological Heritage

The protection of archaeological and ethnological heritage is an important factor in the design and construction of Red Eléctrica facilities.

Before carrying out any earthworks, the Company carries out an archaeological survey of the land/terrain, the intensity and scope of which depend on the probability that there is material of interest in the area. According to the results, the need for the continuous presence of an archaeologist during the works is determined and, if necessary, the preventive measures to be applied during the works are defined.

In 2018, archaeological supervision was necessary in the construction of 16 new lines, or for the adaptation of existing lines (87.5% of the adaptations were carried out with the continuous presence of an archaeologist during the earthworks phase, in the entirety or in part of the route). Archaeological supervision was necessary in the construction of 7 substations or for enlargement works of existing substations (85.7% were carried out with the continuous presence of an archaeologist during the earthworks). In addition, two archaeological surveys and one paleontological survey were carried out. The latter included intensive monitoring in the subsequent construction phase of the new substation.

Some special works were carried out after the discovery of remains and material of high ethnological and cultural value, among which the following are noteworthy:

Protection of archaeological-ethnological heritage	
132 kV Ibiza-Torrent 3 line	Discoveries of remains were made when carrying out an archaeological survey, the layout of the line was modified, and micro-tunnelling was used to avoid the area of the remains.
220 kV Candelaria-Granadilla line	During the adaptation of accesses, some rock engravings were found. The archaeological site was cordoned off prior to the start of work and on-site monitoring was carried out.
Modification to the 400kV Aragón-Morella line	Excavation of a prehistoric site found during the construction phase of a new electricity line in the Community of Valencia. It is a site with funerary structures (necropolis), consisting of 11 graves randomly arranged at varying depths, covered with slabs of natural stone. Due to the state of conservation of the buried human skeletal remains found inside one of the graves, they might be burial sites of recent prehistory (Late Bronze or Visigothic period, probably from the 7 <sup>th</sup> -8 <sup>th</sup> centuries).
220 kV Huelves-Morata line (REPEX)	During earthworks and civil works, it was found that these could affect the 'Cueva de Pedro Fernández' site which is an Asset of Cultural Interest. Four random archaeological surveys along with archaeological supervisions were conducted, however the result of the surveys proved negative.
La Farga 400/220 kV substation	During earthworks a dolmen (single-chamber megalithic tomb) catalogued in the vicinity of the work was cordoned off and signage was posted. In addition, a silo for the storage of grain was found that has been catalogued, communicated to the relevant Culture authority and after its approval, it was taken apart so that works could continue.
Magaña 220 kV substation	During the paleontological and archaeological supervision of the earthworks and civil works, ichnites were found in the northwest corner of the



## Protection of archaeological-ethnological heritage

substation. These were catalogued for further excavation and the ichnites<sup>38</sup> were covered for their protection, with the original project having to be slightly modified in order to ensure their protection.

On the other hand, in 2014 work began on the **ArqueoRED** project, whose objective is to have the cultural heritage information catalogued in digital cartography for the entire national territory. The consultation of this information prior to carrying out works in the facilities allows the necessary measures in each case to be defined and potential impacts to be avoided.

We have proceeded to compile all available documented information, which has been corrected and contrasted in the field for six autonomous communities. The revision process is expected to be completed by the end of 2020.

It should be noted that Red Eléctrica undertook some special actions after the discovery of remains and materials of ethnological value during the development of its activities, such as the excavation of a necropolis and the dating of the human bone remains (between the seventh and eighth centuries) found in El Forcall (Castellón), and the cataloguing of ichnites found in Magaña (Soria). In this last case, it has been necessary to modify the substation project in order to protect them.

In addition, Red Eléctrica actively collaborates with the public administration in the conservation of heritage by carrying out cultural projects in the areas surrounding its facilities. An example of this is the creation of a cultural route in the La Vallesa de Mandor agricultural area, within the Turia Natural Park, where one can see different military structures dating back to the Spanish Civil War, catalogued as an archaeological site under the Cultural Heritage Law of Valencia.

## 7.4.2. Electric and Magnetic Fields (EMFs)

Thanks to the criteria measures applied in the design of facilities, the levels of electric and magnetic fields (EMFs) stay below those recommended by the Council of the European Union. The Official Journal of the European Communities 1999/519/EC: limits exposure values for the general public in sites where they may remain for a period time at 5kV/m for electric fields and 100µT for magnetic fields. The most important measures are the following:

- Construction of double circuits and transposition of phases in lines.
- Increasing the height of towers, thus increasing the safety distances.
- Establishing the minimum distance of electricity lines from population nuclei and isolated houses.
- In order to verify compliance with the recommendation of the Council of the European Union, Red Eléctrica has a tool that uses specific line parameters to accurately calculate the maximum EMF levels that said facilities could generate.
- Electromagnetic field measurements were conducted using predictive software for the following infrastructure at the request of the local administration and other stakeholders:
  - *Further information on the increasing of the power transmission capacity of the double-circuit 400 kV Aldeadávila-Arañuelo/Hinojosa-Almaraz/Aldeadávila-Hinojosa line.*
  - *Further information on the Environmental Impact Assessments of the 400 kV Baza-Ribina line*
  - *Increasing the height of the towers 4 and 5 of the 220 kV Itxaso-Zumárraga line, due to the proximity of dwellings.*

<sup>38</sup> Icnita: Ichnites: fossilised dinosaur footprints



On the other hand, and also at the request of stakeholders, in-situ measurements of the levels of electric and magnetic fields have been carried out in:

- *220 kV Sagunto-Vall D'Uixó line on its route through the town of Faura, Castellón.*
- *220 kV Alhaurín - Costasol/Alhaurín - Jordana double-circuit lines and the 220 kV Alhaurín-Cartama 1 and 2 double-circuit lines in the vicinity of the 220 KV Alhaurín substation (Municipality of Alhaurín de la Torre, Málaga).*

The results of both the predictive calculations and the measurements all the values being in all cases below those recommended by the European Union.

During 2018, there were no incidents resulting from non-compliance of the norms regarding EMFs.

Nonetheless, aware that electromagnetic fields are an aspect that generate significant interest in the territories where electricity facilities are located, the Company gives special relevance to this aspect in the informative sessions regarding future projects, as has been the case with those carried out in 2018 as part of the Conceptual Plan for public participation and consultation regarding the interconnection project across the Bay of Biscay. In response to the communication needs of this project, the information related to EMFs published on the corporate website has been updated, specifically the content related to the fields generated by direct current.

In addition, with the aim of reflecting the advances of the scientific community and the latest declarations on EMFs from international organisations, as well as to incorporate the information related to new technologies in the field of electrical energy, Red Eléctrica together with UNESA has updated the publication: 'Electric and magnetic fields of 50 HZ. Analysis of the current state of knowledge'. Also, on the corporate website, the document 'Summary of the electric and magnetic fields generated by high-voltage electricity facilities' is kept up-to-date, and its purpose is to disseminate this information to the general public.

On the other hand, Red Eléctrica considers it of utmost importance to keep abreast of all new developments regarding electromagnetic fields, participating in different working groups and actively supporting research projects in this field.

<http://www.ree.es/en/sustainability/the-natural-environment/electric-and-magnetic-fields>

### 7.4.3. Noise Pollution

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Sometimes the noise produced by some of the equipment or elements that make up the electricity substations can cause inconvenience to people living in neighbouring areas. Red Eléctrica constantly works on the implementation of the most effective noise mitigation measures.

The ACURED R&D+i project was launched in 2016 in order to improve the understanding of the nature of the noise generated. The aim was to better understand how the noise was generated and assess different technical solutions to reduce such noise. To date, the phases of preliminary study, evaluation, classification and prioritisation of sources of noise have been carried out and a proposal and simulation of corrective measures has been submitted.

Within the scope of the project in 2017, a noise barrier adapted to the real needs of the Soto de la Ribera substation (Asturias) has been designed in accordance with the project for the implementation of a new reactor and considering the noise emissions expected to be generated by the new equipment. The acoustic simulation and design of the noise barrier have been carried out, placing it on the perimeter of the substation very close to the equipment. The reactor in Soto is already installed and the foundation for the noise barrier was constructed during 2018. It is estimated that the installation will be completed during the first four months of 2019.

Once the screen is built, its efficiency will be assessed in terms of noise reduction by taking new measurements in situ and comparing these results with the forecasted noise reduction levels based on the simulation models.



In addition, during 2019, the intention is to start carrying out a diagnosis of the substations in regard to noise emission levels. The necessary measurements will be taken and a report on the state of approximately 120 substations with power transformers installed will be drawn up (Phase 1).

On the other hand, a measurement was performed in 2018 due to a grievance filed by private citizens, although the results of the measurement were within the legal limits:

As a result of the installation of a phase shifter in the Arkale substation, in the municipality of Oiartzun (San Sebastián), measurements were taken at the request of the local council and people from neighbouring areas. In 2017, a ridge was built using surplus soil/material from the area, which was then populated with plants with the intention of mitigating the noise produced by the phase shifter.

**In 2018, there were no incidents resulting from non-compliance with noise regulations.**

## 7.5. Circular Economy and Waste Management

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In 2018, Red Eléctrica signed and became a member of the Circular Economy Pact led by the Ministry of Ecological Transition, whose objective is to involve the main economic and social agents of Spain in the transition towards a new economic model in which the products, materials and resources are kept within the economy for as long as possible and in which the generation of waste is minimised. Red Eléctrica, as signatory of the Pact, is committed to promoting this transition through the application of a series of golden rules aimed at implementing changes in the organisation that contribute to promoting new ways of responsible consumption.

In 2019, to respond to the commitment undertaken, the Company will design a road map that will set out the guidelines for becoming a Group of companies which is 100% circular in 2030. In it, aspects related to the use and origin of raw materials, extending the useful life of materials and equipment, waste management and the minimisation of water usage will be included.

The waste generated by Red Eléctrica is mainly derived from the following activities:

- Preventive or corrective tasks: inspections, changing of parts, oil renewal, etc.
- Improvement of facilities: renewal of obsolete switchgear, adaptation of accident prevention systems etc.
- Actions against accidents: the containment measures used in the case of leaks or spills and the associated cleaning works may lead to a large amount of waste.

The nature of the waste generating activities in Red Eléctrica makes it very difficult to predict the evolution of the quantities generated and establish quantitative reduction targets. For example, the activity for the renovation and adaptation of facilities generates a large amount of waste, but it cannot be limited as this activity is often linked to the reduction of environmental risks. Therefore, the Company works on the search for innovative solutions that make it possible to minimise the amount and hazardous nature of waste and strives to find the best solutions for their final management.

The waste generated in construction activities is managed by contractors. The Company has a waste management plan that encompasses all construction works and which sets out the management to be carried out in each project, with the criteria of minimisation and reuse established as a priority (which is especially important for surplus excavation material). In addition, Red Eléctrica includes specific waste management requirements in the contractual documentation of works and reviews compliance through monitoring of works.



## 7.5.1. Waste Management in 2018

In general terms, the total amount of waste generated in 2018 decreased by 1,394.4 tonnes compared to 2017. The data is not comparable with that of previous years, as in 2016 it was not possible to include all the metal waste in the overall figure for that year.

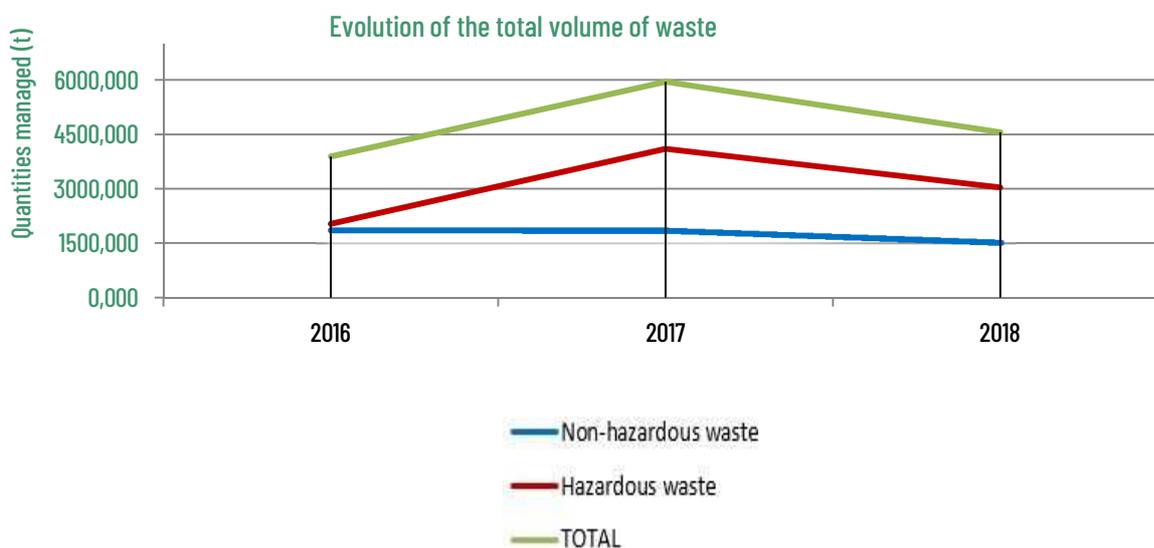
Detailed below is the data and its evolution over the last three years:

Non-hazardous waste <sup>39</sup>	2016	2017	2018
<b>Total (t)</b>	1,522.4	1,850.2	1,521.1

Hazardous waste	2016	2017	2018
<b>Total (t)</b>	2,035.6	4,102.1	3,036.8

Total waste Non-hazardous + Hazardous	2016	2017	2018
<b>Total (t)</b>	3,558.1	5,952.3	4,557.9

Therefore, taking into account the above (not accounting for scrap metal), the volume of non-hazardous waste has decreased with respect to last year by approximately 329 t (17.8%), and that of hazardous waste has also decreased, by approximately 1,065 t (26%).



<sup>39</sup> Vegetable waste is not included as it cannot be quantified: most of it is incorporated into the land, or delivered back to the landowners, as this is the most appropriate form of management. Metal waste has been included as of 2017 (the data published in the previous report has been corrected).



Regarding the generation of waste, most of these do not follow a fixed pattern of behaviour, which is largely dependent on the number of construction and maintenance activities carried out throughout the year. Therefore, the interpretation of the data obtained and the comparison with previous years presents difficulties. For the same reason it is very difficult to predict the evolution of the quantities produced and to establish quantitative reduction targets. For example, the activity of renovation and adaptation of facilities generates a large amount of waste, but it cannot be limited as this activity is often linked to the reduction of environmental risks.

- **Total amounts (tonnes) managed in 2018 by management type**

**Type of waste management (%)<sup>40</sup>**

	Non-hazardous (%)	Hazardous (%)
Re-use	0.0	0.5
Recycling/Composting/ Anaerobic Digestion	88.7	49.1
Regeneration	0.0	17.6
Valuation	0.0	0.3
Elimination (any method)	11.3	32.5

The Annex provides more specific data on waste management broken down by types of waste generated.

## 7.5.2. Zero Waste to Landfill Sites

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The zero-waste models are an initiative encompassed within the EU targets for 2020 to make our economy evermore circular. The objective is that waste that cannot be reduced, reused, recycled or monetarily quantified, be transformed into raw materials that can be used for new products in an economically and environmentally profitable way. To find alternatives and technological solutions that prevent waste from ending up in landfill sites, an in-depth knowledge of its nature and the traceability of how it was generated is required.

Red Eléctrica has started with the design of a zero waste to landfill sites model for its facilities. In 2018, a model for the Campus of the Red Eléctrica Group building was prepared and the first phase (analysis and characterisation of waste and its traceability) of the Central Regional Office model was completed, in which there are 77 centres that produce waste associated with the maintenance of the facilities. The design and implementation of this model will be finished during 2019 and is expected to be replicated throughout the rest of the Company's facilities.

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<sup>40</sup> The management of the waste corresponds to that contained in the legal documentation of the same. The amount of waste destined for recycling **was 74.6%** (included in the category are: reuse, recycling, composting, anaerobic digestion and regeneration).



### 7.5.3. Project for Selling off Obsolete Power Transformers

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Regarding the Company's efforts to minimise waste, this project is noteworthy as it is based on a reverse logistics approach that strictly follows the **3R Principle**: Reduce, Reuse and Recycle.

It consists of the resale of materials considered inappropriate for their reuse, or their waste-to-energy recovery as waste, through an auction system. The project allows the extension of the useful life of some materials and the total or partial recovery of their components or materials.

Thanks to this project, the incorporation of these obsolete power transformers in the value chain has been achieved as new resources or raw materials, so that none of the waste associated with this project has become landfill material. This has represented not only a reduction in costs, but also a financial return. This project received an award in the 6th Edition of the 'Red Eléctrica eficiente' Awards.

### 7.5.4. Sustainable Management of Soil/Earth affected by Oil and Fuel Spills

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The objective of the project is to find innovative alternative solutions to having to dig out and remove contaminated soil and then transfer it to a landfill site, and therefore reduce the volume of this type of waste generated. Innovative solutions would enable the Company to respond more quickly and effectively to potential environmental damage to the subsoil that can be caused by leaks and spills of dielectric oils and, as a result, mitigate their impact.

The priority technique to be used will be bioremediation, a green technology that not only detoxifies the soil, but also helps to restore its ecological properties. The idea is to establish a microcosm system (microorganisms) with a specific ability to work on and arrest the problems caused by oil spills. It will also deep dive into other effective decontamination techniques that would also allow an on-site remediation of the impact on the soil, thus reducing any possible impact on the facility's operation and use.

Within the scope of the project, the intention is to identify the bacterial cultures whose specific degrading capacity is optimal for the types of oils used by REE in its equipment, in order for it to be used should oil spills occur in the future.

During 2018, a first phase of the project was conducted, in which different studies and tests were carried out on two of the main types of oil used in the Company's facilities and this has allowed the following conclusions to be drawn:

- Microbial biodegradation (based on the limited periods tested) can be considered as a potentially viable technique for the treatment of soil and groundwater contaminated by the oils tested. In any case, it is necessary to carry out new test and trials of longer duration that confirm the results obtained in this study in order to confirm its true practical effectiveness and obtain more specific and enriched biodegradable cultures.
- The tests with biodegradable surfactants have produced good results and their ability to significantly emulsify both oils (20-30%) has been demonstrated, although in tests combined with inoculate microbial remediation technology, toxicity was detected.
- Tests with oxidants produced results where there was a moderate but significant degradation of one of the oils.



## 7.6. Prevention of Soil Contamination and/or Groundwater

Red Eléctrica includes among its environmental risks the risk of contamination of soil or groundwater from leaks or spills of oils, fuels and hazardous substances. On the one hand, the proper maintenance of equipment is carried out and strict working procedures that reduce the number of incidents are established. On the other hand, it has adequate containment systems as is the case of power transformers containing large amounts of oil and response protocols when faced with possible events that allow a reduction in the severity of the consequences should accidents occur. For this reason, numerous preventive and corrective measures have been established in order to minimise the risks of this type of accident.

The activity of Red Eléctrica within the context of Royal Decree 9/2005 of 14 January is set out in Annex I as 'Potentially soil contaminating activity'. REE's activity is finally encompassed within the NCEA (National Classification of Economic Activities) CNAE-2009: 35.12 and 35.13 and the scope of activity is as follows: '*Electricity substations and power transformers or reactors*'.

Since 2005, in accordance with the provisions set out in the legislation, preliminary soil reports (PSRs) in the case of new substations and mandatory periodic updates (situation reports or SRs) have been presented with the frequency established by the various Autonomous Communities that cover different cases for which they are necessary. During 2018, 41 PSRs/SRs were presented.

As a consequence of the presentation of soil situation reports, some Autonomous Communities have requested that REE present soil and groundwater characterisations in order to confirm or rule out indications of a possible impact.

In 2018, the results of the exploratory analytical research in the Sobradelo and Trives substations and also the quantitative analysis of risks were presented to the competent administration upon request. In addition, a new monitoring of groundwater quality was conducted at the Puentes de García Rodríguez substation and an update of the risk analysis in order to determine the non-existence of unacceptable risks was also carried out.

Red Eléctrica works at several levels regarding the concept of land:

- **Purchase of new land:** prior to the formalisation of the purchase of new land for the installation of a new substation, enlargement, etc..., jointly with geotechnical studies, a soil and groundwater characterisation study is carried out in order to know its state at the time of purchase and to detect, in advance, possible impacts. In the event that no impact is detected, the aforementioned soil and water characterisation establishes the state of the soil before the start of operation of the facility and may be used at some point in time as a reference point to determine in the future if there has been a significant increase in the contamination of soil and groundwater.

During 2018, 4 characterisation studies were made in the land purchase process corresponding to the lands for future substations (Ciudad Rodrigo, Cañaverál, Carmonita, Sagrajas), and prior to the works it was determined that there would be no real impact on the land.

- **Existing facilities (substations or adjacent areas) :** internal regulations establish that whenever a geotechnical study is carried out, at the same time a sampling of soil and/or groundwater is to be taken in order to determine, in an easy way and with an acceptable cost, the possible state of the land on which the substation is located. This will either confirm or rule out the presence of contaminants in the subsurface; identify possible sources of contamination and evaluate the possibility that there may have been anthropic impacts due to activities that may have been previously undertaken on the site.

13 specific characterisation studies were conducted in existing substations (*Cáceres, Salteras, Villares del Saz, El Palmar, Don Rodrigo, Totana, Miranda de Ebro, La Eliana, Conso, Almaraz E.T., Dragónera, Guillena, Palos*).



In none of the cases were values of contaminants found that would represent an unacceptable health risk.

- **Actions related to soil/groundwater as a result of accidents in previous years**

- **Environmental recovery after the Cala Mesquida accident**

In October 2016, an incident on the Majorca-Menorca link occurred due to a leak in its land section in Majorca, through a pore in the cable sheath, producing the discharge of 3,620 litres of oil onto the beach of Cala Mesquida. Different soil and water characterisation studies were carried out in order to determine the extent and depth of the impact. The affected area was 1,100 m<sup>2</sup> of land and 1,700 m<sup>3</sup> of groundwater.

Red Eléctrica followed a procedure for the recovery of soil and groundwater through article 38 of Law 22/2011, of 28 July, on Waste and Contaminated Soils, during the first quarter of 2017. The origin of the fault was found to be at the Cala Mesquida beach located in Red Natura 2000. The study area belongs to SCI (Site of Community Importance) and SPA (Specially Protected Areas for birds) of 'Muntanyes d'Artá' (code ES0000227).

In 2017, actions to recover soil and groundwater at Cala Mesquida Beach were undertaken following the recovery plan approved based on the absence of unacceptable risks but with potential risks after the analysis of uncertainties performed on them. The reduction of risks was very significant in all of the scenarios (from two to three orders of magnitude that determine relative reductions of between 97-99%) and determined that even under any analysis of uncertainties (the update of the quantitative risk analysis was performed with the highest concentration levels, so it should still be considered as more conservative), the risks are well below the threshold of non-admissibility.

During 2018, a final resolution was received from the competent administration giving their acceptance of the results obtained following the environmental recovery project carried out. Approval is still pending in order to execute the dune area regeneration project which was initially requested.

- **Environmental recovery after the Cala'n Bosch accident**

In January 2016, an incident in the Menorca-Majorca connection on the stretch of land in Menorca produced a leak through a pore in the lead shield of the cable sheath. REE followed the procedure for the voluntary environmental recovery of soil and groundwater. The extent of the impact (according to the latest estimated official data) is between 1,200-1,600 m<sup>2</sup> of soil, while the area of groundwater affected is estimated at about 2,200-2,600 m<sup>2</sup>. The fault is located in an urban area near the sea where residential and tourist activities usually take place.

The remedial system put in place (treatment plant and use of skimmers) has allowed the extraction of a total of 35,874 litres of free phase (oil) since it began operation. The pumping of groundwater and free phase, in addition to the extraction process for the separation and storage of free phase oil, entails the treatment of the water for its subsequent discharge (ensuring a discharge with no more than 600 µg/l (0.6 ppm)). A total of 17,714 m<sup>3</sup> of groundwater has been treated to date.

The Environmental Recovery Plan for the Cala'n Bosch was presented in 2018 to the General Directorate of Environmental Education, Environmental Quality and Waste even though a confirmed date for the Plan's resolution has not been set. Periodic characterisations and monitoring of groundwater have been carried out in order to control the possible evolution of the 'impact plume', said actions have verified that the plume remains stable without displacement or significant variation.

In 2019, the pilot remedial and treatment actions for dealing with the affected soil and groundwater corresponding to the Recovery Plan for the site will begin.

- **Other noteworthy actions in this field**

As a result of the fire that occurred in the RPT1 reactor located in the Aragón substation, with possible impacts on the soil, different remedial and clean-up actions were carried out in the area surrounding the foundation plinth, as a result of hydrocarbons having been detected.



Different remediation and clean-up actions have also been carried out in the substations of Hernani, La Mudarra (REA1), Torrearenillas (as a consequence of the spill from an oil containment pit belonging to an electricity distribution company that affected the property of REE), and the La Plana substation (accident generated by a contractor during power transformer maintenance work).

In addition, a detailed research study of the subsoil and a quantitative risk analysis of the Santa Llogaia converter substation were carried out, at the request of the local public administration, in order to ensure that there was no impact after the leakage of fuel from the diesel generator unit that occurred in 2017. A remediation and clean-up action proposal was also presented and is pending a response from the administration.

With regard to the accident which occurred in 2016 in Santa Llogaia, when a voltage transformer containing 838 kilograms of oil exploded and affected an area of approximately 100 m<sup>2</sup>, a detailed environmental research study of soil and groundwater was carried out, together with a quantitative risk analysis. Said actions led to the drafting of a proposed remediation action plan, and an approved control and monitoring programme was carried out.

- **Environmental risk assessment and identification of environmental liabilities in electricity substations:**

The project enabled greater knowledge to be obtained with respect to the internal risk on soil and groundwater (surface, subsoil and marine) of the portfolio of substations. Also, based on the risk obtained, a hierarchy ('ranking') was established according to the estimated severity of the environmental liabilities that gave way to the drafting of a 'risk map' of the facilities with all the information related to each site. In parallel, the external risk posed to the installation by the activities carried out by third parties in areas adjacent to the substations was also assessed.

Based on the results of the model, a set of electricity substations, those with the highest risk, was selected, and a plan of specific actions was drafted for each site.

During 2018, specific actions (of varying priority) were began and executed in a first batch of substations with the following results:

- Piérola: the results of the quantitative risk analysis (QRA) indicate that there no unacceptable risk to people exist.
- Senmenat: the results of the QRA indicate that no unacceptable risk to people exists.
- Soto de Ribera: the results of the QRA indicate that no unacceptable risk to people exists.
- San Sebastián de los Reyes: no impact identified.
- Villaviciosa: no impact identified.
- Morata: the results of the QRA indicate that no unacceptable risk to people exists.
- Grijota: the results of the QRA indicate that no unacceptable risk to people exists. New analyses are being carried out in order to evaluate the measures to be established.

The progressive implementation of the actions is expected to continue in five substations in 2019.

Once the measures defined have been carried out, the environmental risk values obtained at the substations will be updated, incorporating all those actions, measures and results obtained into the model, updating the actual state of the facilities after the renovations. Furthermore, the new substations commissioned and not included in the initial evaluation will be added.

- **Environmental risk assessment of Oil-Filled (OF) cables**

In 2016 a risk assessment study was carried out in order to prioritise the cable sections with the greatest risk from an environmental perspective and, on the other hand, a technical and economic feasibility study regarding future actions and management solutions linked to the cables.

The objective of the project was to evaluate the level of environmental risk associated with the various oil-filled cable circuits in operation (130 km distributed throughout different areas of Spain whether it be a land, marine and waterway section), prioritising these sections of line according to the level of environmental risk



and defining an action plan for the final management of these facilities. Based on the results obtained, a prioritisation of the cable sections into classes was generated, obtaining cost estimates of environmental liabilities. In addition, risk maps have been prepared that represent the classification of each facility in terms of its potential level of environmental risk.

Based on the results of the classification of the potential environmental liabilities, a specific Action Plan was prepared for each oil-filled (OF) circuit that establishes the order of priority of the actions associated with the deactivation and/or replacement of the cables, and the options available.

A working group has been established that will progressively define and agree the different actions and solutions with respect to the OF cables that are property of the Company, with the ultimate goal of reducing the risk associated with them.

- **Deactivation of the Majorca-Menorca interconnection cable**

Specifically, on the Majorca-Menorca interconnection cable, following the accidents which occurred in 2016, possible viable alternatives to the current situation began to be contemplated, taking into consideration that this cable represents the only electricity interconnection link currently available that links the Spanish Electricity Transmission Grid with the Island of Menorca.

The proposals presented required the laying of new cables to entirely replace the four existing oil-filled conductors of the link, both in its underground and submarine sections, for a new tripolar dry technology (XLPE-plastic material) cable, as this is the best technology available from a technical and environmental point of view. In this way, the risk of spillage of insulating fluid into the environment was completely eliminated. The high environmental sensitivity of the site is worth highlighting, since Menorca is declared a Biosphere Reserve and the Menorca Canal, is declared a Site of Community Interest (SCI).

Following the detection of new indications of abnormalities in the cable, the decision was made to proceed to decommission the installation and its subsequent deactivation by means of emptying the cable insulating fluid. This deactivation (emptying) was essential in order to avoid that in the event of any incident regarding the cable caused by a third party and that could affect the integrity of the cable, it would not lead to an environmental spill that might have had important consequences.

The deactivation of the cable ended in 2018. The action consisted of the injection of a hydrogel that simultaneously pushes and absorbs the oil found in the central insulating section of the cable. Once the hydrogel was injected, water was pumped through the cable to push the hydrogel towards the other end of the cable, which in turn pushes the insulating fluid towards one of the connection substations at the end of the link. A few hours after the hydrogel injection process began the pure insulating oil reached the opposite end of the link (at the substation). In addition, a specific bacteria was added to the water used to push the hydrogel so as to facilitate the biodegradation of the remaining oil inside the central insulating sections of the cable, thereby also helping to eliminate the residue (remains of oil) impregnated in the insulating paper.

Throughout 2019, the effectiveness of this biodegradation process will be checked by taking samples from inside the cable.



## 7.7. Stakeholders

The main objective of the Red Eléctrica is to establish a lasting relationship, based on trust, with its stakeholders. This includes all those stakeholder groups impacted by the Company's services or activities, and those groups whose opinions and decisions influence the Company's financial results, or may have an impact on its reputation.

For the third consecutive year, Red Eléctrica has reached the highest score (100 points out of 100) for its excellent performance and its commitment to its stakeholders in the evaluation that determines which companies form part of the Dow Jones Sustainability Index.

Red Eléctrica's stakeholder management model incorporates the requirements set out in the rules and standards of reference in the field such as the AA1000, IQNet SR10, ISO26000 or the Global Reporting Initiative. This model ensures that relevant economic, social and **environmental** aspects, associated with Red Eléctrica's activities and services, that may have an impact on its stakeholders are adequately managed, thereby avoiding the risk of not promptly identifying issues that may affect the Company's relationship with its stakeholders.

This model encompasses the following phases:

- The stakeholder **identification and segmentation** phase which is carried out by analysing the interrelationships of the processes and activities of the Company with its socioeconomic environment.
- The **prioritisation** phase performed by analysing the influence that each stakeholder group has on the achievement of the Company's strategic objectives and the impact that the Company's activities have on each stakeholder group being considered.
- The **relationship framework** helps categorise the type of relationship with each stakeholder group and defines the most appropriate relationship channels.





Additionally, among the actions carried out in 2018 within the framework of the stakeholder management model, two main projects can be highlighted:

- **Stakeholder management model in transmission grid investment projects.** In 2017, the Company launched a stakeholder management model for investment projects in the transmission grid in order to improve efficiency in the implementation of its infrastructure in the territory. The objective is to integrate into the projects a systematic and homogeneous way of managing stakeholders, aligned with the corporate model. In 2018, the Company has applied this system in 12 projects whose stakeholder management is considered a critical factor, identifying 1,041 stakeholders and defining 795 actions to be carried out. The expectation is to consolidate a methodology applicable to any type of project and adaptable to the singularities of each case.
- **Identification of stakeholders and action plan in the transmission grid planning process.** Red Eléctrica is committed to increasing transparency and providing information to all agents involved in the transmission grid planning process and to society in general. For this reason, the Company has created a working group to improve the management of stakeholders involved in the drafting process of the new transmission grid planning, promoting bidirectional communication and the disclosure of information to third parties.

### 7.7.1. Management of enquiries, claims and grievances

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The *Dígame* service has guaranteed, since 2008, the professional management of all external stakeholder enquiries (claims, grievances and requests for information), by making various communication channels available (phone, e-mail and online web form). This service is staffed by personnel from the Juan XXIII Roncalli Foundation, an organisation that facilitates the professional integration of people with some type of disability.

We monitor and attend to all enquiries and grievances/claims of an environmental nature which are sent to us by interested parties. All enquiries filed are classified by their nature (includes complaints, queries, suggestions, requests for information and recognition) or grievances.

In 2018, a total of **50** enquiries regarding environmental issues were received, **9** of them were classified as grievances.

The areas of concern which have led our stakeholders to contact Red Eléctrica in the last three years are shown in the table below. Noteworthy were the enquiries received by the different organisational units as a result of felling and pruning works of flora and the grievances thereto.



	Evolution of enquiries <sup>41</sup>			Evolution of grievances <sup>42</sup>		
	2016	2017	2018	2016	2017	2018
Birdlife	3	6	3	0	0	0
Electromagnetic fields	9	12	15	0	2	0
Consumption/Energy efficiency	3	0	0	0	0	0
Environmental costs	0	0	0	0	0	0
Emissions/Climate change	9	5	0	0	0	0
Impact on the landscape	0	1	2	0	0	0
Facilities/Infrastructure	10	3	1	7	1	0
General environmental information	4	6	0	0	0	0
Waste	1	2	2	0	0	1
Noise	2	8	8	1	1	0
Environmental management system	8	3	0	0	0	0
Flora/Vegetation	23	30	19	17	12	8
<b>Total</b>	<b>72</b>	<b>76</b>	<b>50</b>	<b>25</b>	<b>16</b>	<b>9</b>

## 7.7.2. Supply Chain

Red Eléctrica considers its suppliers as an essential link in the execution of their activities and, therefore, its commitment to the environment extends to each and every one of them.

Red Eléctrica requires all those suppliers whose activity has a greater environmental impact (providers of services that can generate direct impacts on the environment, and equipment suppliers whose manufacturing process is resource-intensive) to have an environmental management system that has been documented or certified by a third party.

With the aim of improving the environmental performance of the supply chain, Red Eléctrica has identified and prioritised the risks and impacts of an environmental nature of the supply chain, which has allowed the Company to establish controls to minimise them. These were identified within the scope of the project to identify the environmental impacts associated with each of the services contracted, and in the definition of the specific requirements that are requested from suppliers based on the type and relevance of said impacts (potential and actual).

There is therefore a matrix of impacts that covers most of the suppliers' activity and, therefore, the main risks associated. This matrix allows the Company to assess the probability of occurrence and the magnitude for each of the 20 types of impacts identified (nine of them of an environmental nature).

<sup>41</sup> The result includes all the requests received (enquiry + claim).

<sup>42</sup> The cases that may involve sanctions are detailed in another section of this Environmental Statement. Includes only grievances classified as applicable according to procedure IQ002.



During 2018, work continued to deep dive into the identification of sustainability requirements (including environmental ones). This has led to the drafting of a matrix of impacts corresponding to the supply of equipment and/or materials, and the matrix corresponding to the provision of services and construction works has also been updated.

Additionally, work has continued regarding the drafting of the impact matrix for suppliers that provide equipment and/or materials in countries that entail risk, mainly from a social perspective, and the identification of corresponding mitigating requirements.

The results obtained in this project, which will be tested in 2019, will allow the implementation of specific requirements in supplier management processes. Similarly, they will provide key data to other initiatives where synergies exist (*analysis of life cycle of assets, circular economy, regulatory compliance system...*) and will enable the revision of the Supplier Code of Conduct.

Specifically, work has been carried out on the environmental aspects in order to incorporate minimum supplier requirements according to the impact of the activity/material provided in the following aspects:

- Impact on biodiversity.
- Impacts on the soil and water.
- Climate change and air quality.
- Generation of non-hazardous and hazardous waste.
- Legal/regulatory non-compliance.
- Energy consumption
- Water consumption

To validate these criteria, they will be tested on the entire set of suppliers of the Red Eléctrica Group and those which are understood as mandatory will be fixed depending on different variables.

On the other hand, the environmental requirements, in terms of training and specifications for the execution of the works, are part of the contractual documentation for those services in which they have been identified as necessary. In the case of the activities with the greatest potential impact, such as construction, refurbishment of facilities and some maintenance activities, part of the payment of the contracted work is conditional on the result of the relevant environmental certification process, which implies an extremely thorough monitoring of the established environmental requirements.

The emissions associated with the supply chain are those that have the greatest impact on the indirect emissions of the Company (Scope 3). Therefore, in 2018, Red Eléctrica has designed a roadmap to continue advancing in the management of these emissions. The main objectives sought are:

- Engage and involve suppliers in Red Eléctrica's commitment, providing appropriate guidelines to suppliers in order to promote changes in their emission management and foster collaboration.
- Integrate more direct information in the calculation of Scope 3 emissions, to improve their analysis and monitoring.
- Be willing to establish ambitious commitments for the reduction of Scope 3 emissions.

In the near future, the Company will begin a specific work programme with the suppliers that have the greatest impact on Red Eléctrica's carbon footprint.



### 7.7.3. Internal Training and Awareness

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Red Eléctrica considers environmental training as a strategic line to form a team which is increasingly more aware of environmental protection. The training given is beyond merely a professional level; its aim is also to contribute to improving environmental habits in both the daily work and family life of each employee.

The percentage of staff of Red Eléctrica who received specialised environmental training during 2018 was 8% (compared to 2.2% in 2017), corresponding to 151 people and a total of 993 hours of training (compared to 668 hours in 2017).

Noteworthy are the following training and awareness raising actions:

- 2 course sessions on 'SF<sub>6</sub> gas handling procedures' (15 people).
- 3 sessions of the 'Specialised course on soil and groundwater' for all personnel involved in the management of accidents with environmental consequences.
- 4 awareness raising sessions on 'Dissemination of environmental values to employees of regional work centres'.

This training represents 0.76% of the total training provided by Red Eléctrica in 2018.



## 7.7.4. Stakeholder Relations

### Participation in working groups

Working Groups (WG)	Organiser
WG C3.12 'Methodologies for the calculation and reporting of carbon inventories in electricity transmission and distribution companies'	CIGRE (International Council on Large Electric Systems)
WG C3.14 Environmental responsibility	
WG C3.16: Interaction between electricity infrastructures and wildlife	
WG C3.17 Interaction between wildlife and emerging renewable energy sources and submarine cables	
WG C3.19 Responsible management of the Electric and Magnetic Field Issue.	
Study committee C3 (Environment): Secretariat of the committee	
National CIGRE committee (Environment committee member)	
Environment Community. Member and belongs to WGs	AEC (Spanish Association for Quality)
WG Assets Implementation and Management (AIM), Environmental Impact Assessment. Subgroup	ENTSO-E
SF <sub>6</sub> Voluntary Agreement Monitoring Group	UNESA, AFBEL and MAGRAMA
Biodiversity Management Observatory Consultation Committee Energy Efficiency Observatory Sustainable Mobility Observatory	CES (Excellence in Sustainability Club)
Working group on electricity lines	Spanish Business and Biodiversity Initiative (Biodiversity Foundation)
Working Groups ST14 Conservation and Biodiversity. 2030 Horizon. Active collaboration of REE in the Business and Biodiversity WG. ST17 Conservation of pollinators. REE Exhibition of the <i>Biotransporte</i> Project. GT10 Solutions based on nature. ST16 Marine strategies.	CONAMA
Spanish Green Growth Group. Various working groups	Spanish Green Growth Group
Climate Change Cluster	Forética
Working Group 'Spanish Enterprise and Biodiversity Initiative'	Biodiversity Pact
Environment and Sustainability Working Group	Spanish Maritime Cluster
Working Group of the Spanish Energy Sector	Natural Capital Factory



## Congresses, forums and informative sessions

Congresses, forums and informative sessions	Organiser
Participation in the Carbon Disclosure Project	CDP
National Environment Congress: presentation 'REE Marine Forest' and <i>Biotransporte</i> Project	CONAMA Foundation
Expansion Forum on Energy Efficiency	Expansión Forum
3 <sup>rd</sup> Energy Forum. The National Energy and Climate Plan	El Economista
ECODES Foundation for the Climate	ECODES Foundation
Commitment to Climate Change Strategic Management of Biodiversity REE Marine Forest	AEC
International Congress on birds and global change	MIGRES 3 Foundation
CIGRE Technical Conference 2018: Calculation of the carbon footprint of electricity transmission infrastructure: overhead lines	CIGRE Spain
Presentation 'REE Marine Forest' Best Practice Fair. Grids meet Renewables	RGI (Renewables Grid Initiative)/Wind Europe
Award Ceremony for the European Business Awards for the Environment	Biodiversity Foundation
Presentation 'REE Marine Forest' and workshops	Valencia Biodiversity week (Denia)
Centennial of Ordesa and Monte Perdido	Ordesa National Park
Academia conferences on <i>Posidonia oceanica</i>	Balearic Islands University
Presentation 'REE Marine Forest' in the Environment and Sustainability WG	Spanish Maritime Cluster
Presentation 'REE Marine Forest'	7 <sup>th</sup> Informative session on the Environment of the Balearic Islands
Presentation of the <i>Biotransporte</i> Project	International Congress on Migration and Global Change
Presentation of the project 'Birds and power lines: Mapping of bird flight paths' and line marking plans	MITECO Castilla y León Castilla-La Mancha
Presentation 'The Habitat Project and the vision of biodiversity in the RE Group'	Natural Capital Summit
Participation in the conference	5 <sup>th</sup> Edition of the Doñana Bird-fair
CIMAS Sponsorship	CIMAS Sierra Nevada Mountains



Congresses, forums and informative sessions	Organiser
Sponsorship of the 'Aliats per la biodiversidad' Platform (Alliance for Biodiversity)	Botanical Garden of Valencia.

## 7.7.5. Communication and Dissemination of Environmental Information

The main channels of communication Red Eléctrica has for stakeholders regarding information pertinent to the environmental performance of the organisation are the following:

- Corporate reports. Red Eléctrica makes a significant effort to publish and disseminate publications as a key tool for communication with its various stakeholders. Among these reports, the Sustainability Report stands out as the main channel to transmit to the stakeholders the Company's commitments to sustainability and the activities carried out in this area. The Sustainability Report is verified externally in relation to the ISAE3000 standard in order to ensure the reliability of the information, as well as its adaptation to international reporting standards.
- The EMAS Environmental Statement through which information is provided regarding the environmental impact and behaviour of the organisation in addition to data regarding the continuous improvement in the field of environmental performance within the organisation and this is verified externally in relation to the European EMAS Regulation.

### External communication

The corporate website is a communication tool that is developed under criteria of transparency and continuous improvement. Noteworthy in this field, are the two web-spaces that can be found in the Natural Environment' subsection of the 'Sustainability' section of Red Eléctrica's corporate website ([www.ree.es/en](http://www.ree.es/en)):

- In the 'Natural Environment' subsection of the 'Sustainability' section of the website there is a section called 'Environmental Permitting Process' where the environmental permitting process of projects is described and where the documents associated to projects currently in the processing stage are published: <http://www.ree.es/en/sustainability/the-natural-environment/status-of-the-environmental-permitting-process-of-projects>
- The Map of projects section includes a new section entitled 'Noteworthy Projects' that includes the projects 'The Red Eléctrica Forest' and 'Birds and power lines: Mapping of bird flight paths': <http://www.ree.es/en/sustainability/noteworthy-projects>

Furthermore, in 2018 the following new videos were produced and uploaded:

- Video: 'The Red Eléctrica Forest' (only available in Spanish) <https://www.ree.es/en/sustainability/noteworthy-projects/projects-that-contribute-to-the-natural-environment/red-electrica-forest>
- Video: 'The Red Eléctrica Marine Forest'. <https://www.ree.es/en/sustainability/noteworthy-projects/projects-that-contribute-to-the-natural-environment/posidonia-oceanica>
- Video: 'The fight against climate change: a challenge for humanity' (only available in Spanish). <https://www.youtube.com/watch?v=X5tbXoGxKNI>
- Video: 'We join the challenge to fight against climate change' (only available in Spanish) <https://www.youtube.com/watch?v=yJl2WqU8OqE>



On the other hand, a total of 6 press releases of an environmental nature were drafted and published on the corporate website. Additionally, 11 news publications and 2 special observatory whitepapers were published through the Entrelíneas blog (active until August 2018):

- *The Red Eléctrica Forest: reforest, offset emissions and support local development:* <https://entrelineas.ree.es/en/observatories/environment/red-electrica-forest-reforest-offset-emissions-and-support-local>
- *Sustainability Commitment of the Red Eléctrica Group:* <https://entrelineas.ree.es/en/sustainability/sustainability-commitment-red-electrica-group>

Furthermore, in 2018 different informative items regarding biodiversity were prepared and published externally:

- Monographic: 'The Red Eléctrica Forest'.
- An informative brochure on *Posidonia oceanica* seagrass / *Posidonia* Poster – by 'Renewable Green Initiative'.
- Publication: Methodological guide for the planting of *Posidonia oceanica*.
- Re-publication of brochures on best practices regarding anchoring in protected marine areas.
- Poster on the 'Bird Flight Paths...' Project – by 'International Migration Birdlife Centre'.
- Guide for the ecological restoration: *Posidonia oceanica* seagrass project. Edited and published by the Biodiversity Foundation (This is not a publication prepared by Red Eléctrica).

## Internal communication

Since September 2015, the Company has a new corporate intranet '*miRED*', therefore 2018 is the third year for which data is available regarding the impact of '*miRED*' on internal environmental communication:

- Visits to *miRED*:

	2016	2017	2018
Environmental Section	Average of 24 visits/month	Average of 32 visits/month	Average of 21 visits/month
'Red Eléctrica eficiente' Community	49 followers	67 followers	67 followers
'Sustainable Mobility' Community	61 followers	81 followers	84 followers

- News of an environmental nature (includes environmental management, biodiversity, climate change, energy efficiency, sustainable mobility) published in *miRED*:
  - 39 news items published in the 'Carousel'.
  - In addition, the *miRED* wall is open for all Company employees to publish news that is of interest.

Furthermore, as in prior years, a great number of projects and initiatives have been undertaken, in four specific areas taking four key dates as a reference point. Internal communication tools (*miRED* and display screens in the foyer, corporate canteen and coffee break areas) are used for this communication purpose.

- Communication campaign 5 March 2018 (World Energy Efficiency Day): A series of messages was programmed and launched on social networks, the corporate website and to employees through the internal communication channels designed for this purpose.



- 22 March, World Water Day. Messages published via internal communication channels. Messages issued by the United Nations (UN) in its campaign for World Water Day 2018.
- 17 May International Recycling Day. Messages published via internal communication channels.
- 16-22 September - European Mobility Week. Actions linked to mobility week. Publication of messages using the various internal communication channels.

## 7.8. Innovation

During 2018, expenditure on innovation of an environmental nature increased to 583,478 euros. This amount represents **5.69%** of the total expenditure on innovation (10.25 million euros). With the collaboration of all the areas involved, the following innovation projects stand out from the point of view of sustainability and the environment:

Development of a modular, sustainable and flexible transformer	The objective of the project is the development of a modular transformer, consisting of single-phase banks that allow the interchangeability with existing three-phase or single-phase units, of a sustainable nature, or with low environmental impact, using hybrid technology that reduces the size and weight required. Technical validation of the replacement of mineral oil that is used as an insulating and cooling element in transformers for a biodegradable vegetable oil that is more sustainable and respectful towards the environment.
Office 2020 horizon	The objective is to demonstrate the feasibility of ending the use of traditional media (paper, CD, etc ...) and optimising the control of information that is handled electronically (e-mails, etc.) at work by a large number of units within Red Eléctrica.
ACURED - Noise reduction in substations	The project emerges as an opportunity to: <ul style="list-style-type: none"> <li>• Identify and characterise sources of noise in facilities.</li> <li>• Analyse the current legislation on noise.</li> <li>• Study possible solutions to reduce noise and make proposals for effective noise reduction.</li> <li>• Define solutions and carry out actions to reduce noise emissions in the vicinity of electricity substations.</li> </ul>
Tecnosuelos	The objective of the present project is to delve into the knowledge regarding certain types of soils designed with specific characteristics that could be used for different objectives in REE. There are experiences with hyper dystrophic soils (without vegetative development) that prevents the appearance of any type of vegetation. Its possible use in the complete set of substations would avoid having to carry out the clearing work by using herbicides that have to be used currently.
Study on the use of transmission lines as stepping-stones for fauna	<i>Described in section 6.2.4.4</i>
Vegeta 2	<i>Described in section 6.2.4.4</i>
PRODINT	<i>Described in section 6.2.4.4</i>
Geothermal HVAC system	Implementation in the building in San Sebastian de los Reyes.
Geothermal ventilation	Study of the use of geothermal ventilation for gas-insulated facilities and cable galleries.
Green battery	Design and validation of an energy storage system fed with renewable generation sources (wind and photovoltaic), which allows the auxiliary services of a substation to be fed (electronic equipment, HVAC systems, lighting,...) in replacement of diesel generator units.
Alternative to SF <sub>6</sub> Gas GIS switchgear	<i>Described in section 6.1.2</i>



Methodology for repairing SF <sub>6</sub> leaks in GIS	It is a project for the development of a methodology and systems for repairing SF <sub>6</sub> leaks in GIS that are different from conventional repair systems, which always involve the dismantling of GIS compartments and the conducting of subsequent high-voltage tests.
SF <sub>6</sub> sensors through the use of graphene	SF <sub>6</sub> sensors and component detectors through the use of graphene and/or carbon nanotubes.
SF <sub>6</sub> gas recovery in indoor GIS	The final objective of the project is the development of a material which has the property of retaining and confining SF <sub>6</sub> that may be released in indoor GIS substations. The motivation arises from the need to reduce the emission of fluorinated gases into the atmosphere due to their harmful effects on the environment.

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## 8. Environmental Risks

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Red Eléctrica has a comprehensive risk management system in place in order to facilitate compliance with the Group's strategies and objectives, ensuring that the risks that could affect them are identified, analysed, assessed, managed and controlled systematically, with uniform criteria and within the level of acceptable risk approved by the Board of Directors.

The Management System conforms to the ISO 31000 standard on the principles and guidelines in risk management and is ongoing and comprehensive in character.

There is also a Comprehensive Risk Management Policy and a Comprehensive Risk Management and Control Procedure, based on the Comprehensive Risk Management Framework COSO II (Committee of Sponsoring Organisations of the Treadway Commission).

The General Comprehensive Risk Management and Control Procedure regulates the process of identification, analysis, assessment and management control of the relevant risks faced by the Company. The comprehensive nature of the Risk Management System ensures the participation of all the business units of Red Eléctrica and ensures that the bodies in charge of risk control are adequately informed of the situation of such risks.

This process is carried out in order to ensure that the various levels of management of the Company are fully aware of and assess the risks and that the management of risks is carried out within the established limits of acceptable risk.

In 2018, the Company carried out a review of the risk classification, in order to facilitate a more complete identification of the risks and allow a more detailed analysis. This new structure allows the risks identified to be classified into three levels of aggregation. Operational risks are among the different types of risks for Red Eléctrica. Included among them are risks of an **environmental nature**. These risks are mainly related to the natural environment in which the activities are carried out.

In addition, the risk management system establishes a methodology for determining the level of risk so that all risks are classified individually into three categories: high-risk, medium-risk and low-risk. The level of a risk is established by combining two variables, the probability of occurrence and the impact said risk would have on the Company and on the four key elements of the business, should it materialise: electricity supply, achievement of essential strategies, reputation and economic loss.

The tables shown on the following page outline the main risks and actions that have been identified from an environmental point of view:



Code	Risks arising from climate change	Main actions for the management of risks
1A010R03	Climate change: Risk arising from greenhouse gas emissions.	<ul style="list-style-type: none"> <li>• Commitment and action plan for the fight against climate change.</li> <li>• Analysis and implementation of the recommendations of the Task Force for Climate-related Financial Disclosure.</li> <li>• Voluntary agreement for comprehensive management of SF6 gas in the electricity industry, between the Ministry of Agriculture, Food and Environment, equipment manufacturers (AFBEL), UNESA, REE and waste managers.</li> <li>• Development of system operation tools (CECRE).</li> <li>• Construction of new transmission lines for the evacuation renewable energy.</li> <li>• Strengthening of international interconnections.</li> <li>• Development of demand-side management initiatives (interruptibility service, measures to achieve a more efficient consumption profile, initiatives for the implementation of the electric vehicle).</li> <li>• Development of research and innovation projects: new technologies and technical solutions for efficient system management, new tools for emergency situations, smart demand management, energy storage.</li> </ul>
1A013R03	Climate change: Risk associated with climate change that could affect the Group's strategy, both physical risks (with impact on operations and facilities as a result of changes in climatic parameters) and the energy transition (associated with changes in policies, legislation, markets and technology necessary to move to a low carbon economy).	
1A010R03	Climate change: Physical risks on the facilities of the transmission grid associated with the effects of climate change.	

	Risk of impacts on the natural environment	Main actions for the management of risks
1A011R04	Impact on archaeological and ethnological heritage	<ul style="list-style-type: none"> <li>• Application of strict environmental criteria in all phases of planning, development and maintenance of facilities.</li> <li>• Environmental supervision of construction works.</li> <li>• Biodiversity strategy and actions.</li> <li>• Development of research projects and fire prevention plans.</li> <li>• Projects for birdlife conservation.</li> <li>• Training courses in environmental matters for field personnel.</li> <li>• Environmental awareness of suppliers.</li> <li>• Implementation of the Environmental Work Certification.</li> <li>• Establishment of collaboration agreements on environmental protection with the various Autonomous Communities.</li> <li>• Fire protection plans.</li> <li>• Contingency plans.</li> </ul>
1A012R01	Risk of fires due to lines and in substations	
1A012R03	Impact on birdlife due to transmission grid facilities	
1A012R04	Contamination of soils and / or ground, surface or marine waters due to leaks or spills of oils, fuels and hazardous substances	
1A013R01	Inadequate actions of suppliers with relevant environmental consequences	



In the process of identification, analysis, assessment and control of risks, the necessary actions are established to reduce the level of risk and take it to the acceptable risk value.

There have been no changes of a relevant nature in the assessment and classification of environmental risks with respect to 2017. **During 2018, no environmental risk has materialised.**

## 8.1. Risks arising from Legal Requirements and other Requirements

Red Eléctrica has in place a Compliance System that is aligned with the best practices in this field, in order for the Organisation to adequately comply with the established obligations and commitments undertaken.

The compliance function aims to promote a global and anticipatory vision of compliance risks, and ensure an efficient control of such risks, guaranteeing the coordination and standardisation of their management at a corporate level, improving internal control within the organisation.

One of the regulatory areas in which the compliance system is being developed is the Natural Environment. One of the key objectives is based on promoting a global and anticipatory vision of compliance risks, ensuring an efficient control of said risks, guaranteeing the coordination and standardisation of its management at a corporate level, as well as improving internal control in the organisation.

Although the Company has an environmental management system based on the 14001 standard that has been in place since 1999, it also has a process implemented for the identification and assessment of legal requirements and other requirements that allows the Company to comply with them and, more importantly, anticipate and be prepared when faced with the modification or appearance of new requirements. Nonetheless, a preliminary map of environmental compliance risk was defined and developed.

In addition to identifying and assessing risks, in 2018 a specific methodology was defined in order to identify and assess the key controls that mitigate such risks.

To date, 14 risks have preliminarily been identified and assessed. Each of which has different evaluation parameters when assessing the risk.

Risks assessed	
1. Not adopting or not complying with the necessary preventive measures to avoid damage to the natural environment.	7. Non-compliance with the Environmental Impact Statement.
2. Not adopting or not complying with the necessary corrective measures to repair any damage caused to natural resources or the environment.	8. Generation of fires.
3. Discharge of wastewater and contaminating liquid waste products without proper/dué authorisation.	9. Conducting felling and pruning works without prior administrative authorisation.
4. Existence of high-voltage overhead electricity lines that do not comply with the minimum safety distances or warning signage defined and established by the Public Administration.	10. Conducting work without authorisation in periods declared as high-fire risk.
5. The Company losing its presence in the sustainability indexes.	11. Inadequate management of hazardous and non-hazardous waste (operational and documental).
6. Not carrying out the administrative permitting process for a project and/or works subject to an Environmental Impact Assessment.	12. Loss of ISO certification.
	13. Loss of EMAS certification.
	14. Inadequate actions by suppliers having relevant impacts on the natural environment.



## 9. Objectives. Annual Environmental Plan

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In order to perform continuous improvement of environmental performance and processes, Red Eléctrica annually defines an environmental plan in which the objectives derived from the different strategies of the Company are specified and specific work actions are defined.

The purpose of Red Eléctrica's environmental plan is to develop an annual action plan that includes all those tasks of a voluntary nature that have an environmental component associated and that are expected to be carried out throughout the year.

The Environmental Plan includes the voluntary actions planned for the current year arising from the Environmental Management of Facilities, as well as those actions derived from the Multi-year Action Plans currently in force, as a result of the commitments undertaken by Red Eléctrica in the field of Biodiversity and its Commitment to the fight against Climate Change.

All the defined objectives, and therefore the actions/projects identified, are aligned with Red Eléctrica's Strategic Plan and its 2030 Sustainability Commitment, as well as with the other various strategies and programmes that the Company currently has in force, thus highlighting the growing environmental dimension of the Company and contributing to making progress in the defined courses of action that will help guarantee the success and the achievement of common goals.

The areas of action included in the 2018 Environmental Plan are grouped into three defined and interrelated vectors that correspond to the Company's most relevant areas of environmental activity:

- **Environmental management of facilities: this encompasses the activities of integrating facilities into the environment (area considered as a material aspect), the prevention of contamination, as well as the generic cross-cutting activities related with environmental management.**
- **Biodiversity.**
- **Climate Change.**

Both Biodiversity and Climate Change are also considered by the Company as material aspects and therefore require specific management, mainly to respond to the requirements of different stakeholder groups.

The main challenges for the Company regarding each of the vectors have been identified and the specific targets to be achieved have been defined. These targets are taken as a reference and help establish priorities and define the different tasks or projects to be included in the corresponding environmental plans.

Therefore, the Environmental Plan includes the actions derived from the approved Biodiversity and Climate Change action plans and the courses of action that have been defined to achieve the goals identified in relation to the Environmental Management vector.

### **The overall fulfilment of the 2018 Environmental Plan stood at 75.5% at year end.**

Regarding the degree of fulfilment, depending on the relevance of the tasks (classified as *very relevant/high relevance/moderate relevance* according to an internal methodology based on a series of parameters), it can be concluded that 87% of the *very relevant* tasks and 69% of those of *high relevance* have been fulfilled.

Only 1.8% of the tasks have been cancelled/dismissed. The rest of the tasks could not start during 2018 (7.3%) or they have not reached the degree of achievement necessary to be considered as fulfilled (15.4%). It is important to highlight that all these tasks, as well as the rest of the tasks not fulfilled in the 2018 Annual Plan, without counting those that have been cancelled or dismissed, have been carried over and included in the Environmental Plan for 2019.



The following table highlights some of the most relevant tasks undertaken with respect to each of the vectors:

Vector	Tasks	Results obtained
A. Environmental management of facilities	Corporate model of the management systems in the companies of the RE Group.	Creation of a Global Self-Managed Work Team, in which the different management systems and subsidiaries are represented, and in which other units whose functions are critical for the implementation of the model participate (in a timely or continuous manner). This specialised and multidisciplinary team, flexible in its composition, provides a vision of the global state of the management systems, proposes the guidelines to be followed in this matter and will allow a global coordination of the management systems.
	Implementation of a new version and new functionalities in the Company's environmental management application (SACORP).	New version of the operational tool with new environmental reporting and management modules implemented.
	Ratification of the systematisation in the management of stakeholders defined in 2017 through pilot implementation in ongoing investment projects.	Established stakeholder management model in investment projects.
	Unification of criteria and definition of the process of the Landscape Integration Studies in substations.	Definition of minimum construction elements to be included in the design of the substations for their correct landscape integration.
	Design and implementation of the zero-waste system at Tres Cantos Corporate campus.	Report describing the Management System and implementation of the action plan.
B. Biodiversity	Execution of the 2017-2023 multi-year line marking plan.	51.2% of the critical priority areas are already marked.
	Revision-update of the Biodiversity management approach: Incorporation of the concept of natural capital in the Company's overall activity.	Defined new methodology for impact assessment of investment projects on natural capital.
	Establish collaboration agreements with the competent entities in matters of prevention and the fight against forest fires for the promotion of adequate forestry management regarding Red Eléctrica facilities.	An agreement has been signed with Autonomous Community of Asturias and a collaboration protocol with Extremadura (13 agreements in force).
	<i>Biotransporte</i> : Analysis, identification and diagnosis in order to assess the effectiveness of the base of the towers of electricity transmission lines as stepping stones for the fauna of the different protected natural spaces of the entire Iberian Peninsula, the Balearic Islands and Canary Islands and their connections with all the electricity lines of Portugal and France.	Global study conducted in collaboration with the Doñana Biological station-CSIC with the objective of identifying species, natural spaces and useful electricity lines for the purpose of creating a network of corridors.  Proposal for a large-scale pilot project with the connection of 8 natural spaces in Andalusia, located in the provinces of Cádiz, Huelva and Seville, which is home to a total of 11 target species (micro-mammals, amphibians, reptiles, as well as the group of pollinators, mostly insects).
	Offsetting of felling works in the construction of new facilities: Phase 1 Inventory of the total surface area of native forest cleared in 2018.	An inventory conducted of the surface area of native forest cleared in 2018.



C. Climate Change	Climate Change Action Plan: Definition of 2030 Commitments. Science Based Target (Definition and approval of reduction commitments Scope 1).	Approval of new emission reduction targets, consistent with the global goal of emission reduction for 2030 approved by the Science Based Target (SBTi) initiative.
	Plan of efficiency measures in buildings: application of measures in maintenance work centres (Includes basic measures, building automation control (demotics), structural and renewable: geothermal). Measures equivalent to 60,000 kWh per year.	Various efficiency measures have been implemented in work centres. Improvements in insulation, HVAC systems and lighting in 2018 have resulted in an estimated savings of 61,065 kWh.
	R&D+i SF <sub>6</sub> projects. Alternatives to SF <sub>6</sub> gas contained in high voltage switchgear: 66 kV mobile units using an alternative gas to SF <sub>6</sub> .	Awarding of the tender for two 66 kV gas insulated switchgear units that use alternative gases, which will be installed as mobile units in the Canary Islands.
	Improvements related to the use of lighting. Analysis and implementation of measures for the efficient use of lighting in existing substations: night-time lighting shutdown of 70 substations.	In 2018, the night-time shutdown of lighting in more than 70 substations took place.



## 10. Accidents with Environmental Impacts

At Red Eléctrica we are well aware of the consequences that an accident may have on the environment, and for this reason, we apply preventive measures to reduce the likelihood of them happening, or in the event they might occur; minimise the impact on the environment. The evolution of incidents with environmental impact in the last three years is reflected in the following table:

Incidents reported	2016		2017		2018	
	Accident	Incident	Accident	Incident	Accident	Incident
<b>Construction activities</b>	<b>1</b>	<b>44</b>	<b>0</b>	<b>35</b>	<b>0</b>	<b>35</b>
Fires due to fault in lines	0	0	0	0	0	0
Fires due to fault in substations	0	0	0	0	0	0
Leaks and spills of oil due to error in the filling of transformers	0	0	0	0	0	0
Leaks and spills of oil and hydrocarbons due to minor breakdowns during the use of machinery during construction works	0	33	0	35	0	35
Leaks and spills of hazardous substance due to explosion of equipment	1	0	0	0	0	0
Leaks and spills of hazardous substance	0	4	0	0	0	0
SF <sub>6</sub> leaks	0	1	0	0	0	0
Effects on flora	0	6	0	0	0	0
<b>Maintenance activities<sup>43</sup></b>	<b>14</b>	<b>43</b>	<b>8</b>	<b>36</b>	<b>8</b>	<b>31</b>
Fires due to fault in lines	1	1	0	0	1	0
Fires due to fault in substations	1	1	0	0	0	0
Towers brought down due to severe weather conditions	0	0	0	0	0	0
Leaks and spills of oil and hydrocarbons during the use and maintenance of substation equipment	5	36	8	35	2	31
Oil leaks in lines	5	0	0	0	1	0
Floods	0	0	0	0	0	0
SF <sub>6</sub> leaks due to explosion of equipment or other accidents	2	1	0	1	4	0
Leaks and spills of hazardous substances	0	3	0	0	0	0
Effects on flora	0	1	0	0	0	0

<sup>43</sup> Bird collisions with electricity lines in service and under construction are dealt with in a separate table.



As of 2017, a new category has been identified in order to improve the prevention of accidents and the management of environmental risks associated with accidental events. This category has been called 'Near Accident' which is defined in the internal regulations as: "*that event that has the potential to cause an accident or incident of an environmental nature without it actually materialising. It does not generate damage, but it has the potential to generate it*". During 2018 no 'near accidents' were identified.

- **Construction**

In the construction phase **there were no accidents during 2018 with environmental consequences** and there were 35 incidents reported, which represents 53% of the total environmental incidents (construction + maintenance) that occurred during 2018.

All the incidents correspond to leaks and spills of oils and hydrocarbons, the main causes being the rupture of flexible hoses or small leaks and drips from the machinery used in the construction of electricity lines and substations.

- **Maintenance**

In the maintenance phase **there were 8 accidents**, which represent 100% of those occurred during 2018, 31 incidents (representing 47%) and no 'near accidents'.

The accidents are associated with: 4 due to SF<sub>6</sub> leaks (50%), 2 due to leaks and spills of oils and hydrocarbons in substations (25%), 1 due to an oil leak in a line (12.5%) and 1 fire due to a fault in a line (12.5%).

One of the accidents was classified as serious (12.5%), four were classified as relevant (50%), one was classified as low relevance (12.5%) and two were classified minor (25%).

The accident classified as serious occurred due to a breakage in the submarine cable (ESMA1-cable 4) of the 400 kV Tarifa-Fardiuoa line. This situation resulted in an estimated discharge of about 29,000 litres of insulating fluid. This fluid, necessary for the electrical insulation of submarine cables, is easily biodegradable. Due to the location and depth at which the incident occurred, the high dispersion due to strong currents in the Strait of Gibraltar and the lack of there being of any trace of the fluid neither in Moroccan waters nor in Spanish waters, it is estimated that this accident had no harmful consequences for the marine environment.

The exact location of the accident was established to be 9.2 kilometres off the coast of Morocco and at a depth of 480 metres in Moroccan territorial waters. Moroccan legislation is applicable in these waters and therefore the direct environmental actions in the area of the incident are coordinated by ONEE (*Office National de l'Electricité et de l'Eau Potable*).

The source of the breakage is due to external causes that affected the electricity cable, this was determined based on the following:

- The cable was found to have been moved some 20 metres for its initial installation location.
- Certain elements were found to be wound around the cable, apparently gear used for fishing.

Both anomalous situations are compatible with an external aggression to the cable. The sealing work on the damaged cable was completed at the end of 2018.



## Birdlife collisions with overhead lines

Regarding bird collisions in 2018, 39 collisions were detected corresponding to species of birds catalogued as vulnerable and/or in danger of extinction according to the Regional Catalogue, the National Catalogue and/or the IUCN Red List. A further 30 collisions were detected, however these corresponded to focal species.

Only 5 of the collisions correspond to endangered species according to the National Catalogue and the IUCN Red List as shown in the following table:

Endangered species affected	No. of birds affected
Great Bustard ( <i>Otis tarda</i> ) <sup>44</sup>	1
Pin-tailed sandgrouse ( <i>Pterocles alchata</i> ) <sup>45</sup>	1
European turtle dove ( <i>Streptopelia turtur</i> ) <sup>46</sup>	2
Egyptian vulture ( <i>Neophron percnopterus</i> ) <sup>47</sup>	1
<b>Total</b>	<b>5</b>

<sup>44</sup> Vulnerable species according to IUCN Red List.

<sup>45</sup> Vulnerable species according to the National Catalogue of Endangered Species.

<sup>46</sup> Vulnerable species according to IUCN Red List.

<sup>47</sup> Species in danger of extinction according to the National Catalogue of Endangered and Vulnerable Species according to the IUCN Red List.



## 11. Legal Compliance Assessment

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In the case of legal, regulatory and other mandatory requirements, the Company assumes as a commitment, as part of the Environmental Policy the Red Eléctrica Group, to comply with the environmental legislation, regulations and other mandatory requirements applicable to the activities it carries out.

In order to identify and assess the applicable legal requirements, Red Eléctrica has in place a process that systematically covers all the phases of the activity; planning/project, construction and maintenance, and considers not only the requirements originating from European, national, regional and local regulations, but also those obligations derived from the Environmental Impact Statement and other administrative authorisations, as well as the voluntary commitments that the organisation subscribes to (pacts, agreements, etc.)

For the identification and evaluation of the legal environmental requirements that apply to the different phases involved in the development and implementation of transmission grid infrastructure, in their respective scopes of applicability: European, national, regional and local, the following process is put in place:

- **Definition of Projects:** those facilities that have an 'Environmental Impact Study' incorporate the applicable environmental legislation during the design phase of the project and in any case, all applicable requirements are registered through an IT application.
- **Construction or modification of facilities:** during the construction phase, the applicable environmental requirements (internal and external) are set out in the environmental specifications of each project and/or in the construction Environmental Monitoring Programme (EMP), if applicable. In order to assure and reinforce the process, it is established that prior to the start of the execution of a construction project, an initial assessment will be carried out regarding the legal environmental compliance with all the applicable legal requisites (including those at the municipal level), in order to detect possible shortcomings prior to the execution. Subsequently, an assessment is performed one year after the start of the project, during each environmental supervision visit, and once it is finished.
- **Maintenance of infrastructure:** during the maintenance of infrastructure/facilities, apart from the applicable regulations, environmental requirements are identified in the Environmental Monitoring Programme for the operation phase (in facilities with Environmental Impact Statement - EIS) and in the transfer document for maintenance. All facilities have a transfer document, which includes all the requirements, and internal and external environmental commitments (among them, the ones defined in the EIS for the operation phase). In addition, the infrastructure/buildings shall meet the requirements set out in the authorisations for felling and pruning, removing nests, wells, septic tanks, waste generation and fuel tanks.

Once the results of the legal compliance reports are available, solutions are analysed and established for those cases where deviations occur with respect to what was foreseen. Depending on the case, tasks and actions will be established within the annual environmental plan, or corrective actions will be adopted that allow the activities to be adapted to the legal and regulatory requirements set.

In addition, activities are carried out regarding the identification, registration, updating, compliance assessment and reporting of requirements related to any agreements, contracts and voluntary engagements of an environmental nature undertaken by Red Eléctrica.

**The activities carried out by Red Eléctrica comply with the applicable environmental requirements of a European, national, regional and local nature, as well as the requirements voluntarily subscribed to.**

Those possible practices considered inadequate that result in cases/claims that are given leave to proceed, are resolved in all cases with administrative sanctions of low monetary value. The following table details the type of infringement committed and the total cost of the same (as a result of the claims/cases resolved with a sanction) in the period **2012-2018**.

The data is reviewed annually to include the resolved cases/claims that were initiated in previous years. The data affected by the cases/claims resolved in 2018 appears in **red** in the table on the following page.



Type of infringement	2012		2013		2014		2015		2016		2017		2018	
	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)	No. of claims / cases	Amount (€)
Fire risk <sup>48</sup>	4	1,082	6	6,522	1	100	2	811	2	751				
Unauthorised felling and pruning	1	300	4	1,597	2	2,175	2	200	2	7,060			<b>1</b>	<b>330</b>
Felling, pruning and clearing without preventive measures														
Fire due to line discharge	1	3,948												
Waterway obstruction/works in areas without authorisation			1	1,200	2	3,600								
Activities that could contaminate soils														
Accumulation of biomass waste			1	100										
Fauna in captivity without authorisation			1	100										
Works in protected areas without authorisation														
Unauthorised works	2	62.153	1	2.000										
Opening up of a forest trail without authorisation					1	1,001	1	2,000						
Use of a helicopter in a critical birdlife area without authorisation							1	1,000						
Electricity line crossing livestock trail without authorisation							1	30,051	1	30,051				
Incorrect waste management							1	2,500						
Total No.claims/cases/€	8	67,483	14	11,519	6	6,876	8	36,562	5	37,862			<b>1</b>	<b>330</b>

<sup>48</sup> Fire risk due to lack of maintenance of flora or the abandonment of material.



## 12. Environmental expenditure

During 2018, Red Eléctrica has made environmental investments totalling **1,160,634.26 euros** in new facilities, equating to 0.30% of the total amount invested in the transmission grid (378 million euros). These investments correspond to the execution of Environmental Impact Assessments of all projects, implementation of preventive and corrective measures, environmental monitoring of electricity facilities under construction and the application of compensatory measures related to environmental aspects.

Similarly, during 2018 expenditure totalling **23,539,321.90 euros** was made in the improvement and protection of the environment.

	2016	2017	2018
<b>Investment</b>	<b>2,983,757.15</b>	<b>1,334,887.40</b>	<b>1,160,634.26</b>
Engineering and construction of facilities <sup>49</sup>	2,983,757.15	1,334,887.40	1,160,634.26
<b>Expenditure</b>	<b>19,665,124.98</b>	<b>21,336,233.48</b>	<b>23,539,321.90</b>
Development of methodology and Systems <sup>50</sup>	116,853.62	169,876.00	208,397.98
Environmental studies and analyses	108,434.50	224,040.00	111,435.80
Environmental actions in facilities in service	17,679,436.20	19,026,028.09	21,174,054.64
Prevention of contamination <sup>51</sup>	1,395,593.67	2,115,872.72	1,429,676.30
Protection of biodiversity, landscape <sup>52</sup>	14,820,438.97	15,437,015.84	18,268,161.57
Climate change <sup>53</sup>	974,994.08	1,067,021.52	851,828.77
Waste reduction and management	488,409.48	406,118.01	624,388.00
Research and development	440,738.91	593,857.18	583,478.00
Training and communication	48,861.84	136,752.04	210,895.98
Environmental training and awareness programmes	15,125.02	16,821.35	24,285.17
Communication <sup>54</sup>	33,736.82	119,930.69	186,610.81
Environmental taxes and levies	51,359.91	61,294.17	282,421.26
Cost of personnel dedicated to activities of an environmental nature	1,219,440.00	1,124,386.00	968,638.24
	<b>22,648,882</b>	<b>22,671,121</b>	<b>24,699,956</b>

<sup>49</sup> Environmental impact studies carried out on all projects, application of preventive and corrective measures, environmental supervision at electricity facilities under construction and application of environmental improvement measures.

<sup>50</sup> Certifications, audits, environmental consultancy.

<sup>51</sup> Adaptation of facilities, repair of equipment, analysis, etc.

<sup>52</sup> Fire prevention (inspection of facilities, felling, pruning and clearing of vegetation for the maintenance of the safety distances, projects related to the prevention and fight against fires) line marking with bird-flight diverters, bird-nesting deterrents, management of nests, landscaping adaptation, biodiversity conservation projects, etc.

<sup>53</sup> The climate change and energy efficiency costs are bundled within the climate change section.

<sup>54</sup> Affiliations, congresses, brochures and reports, stands at fairs, publicity in general, collaboration and sponsorships agreements.



The following table shows the evolution of the environmental expenditure and investments in environmental aspects as a percentage of the total expenditure, and the investment in the transmission grid, respectively:

Percentage of investment and expenditure on the Environment		2016	2017	2018
Percentage of investment on the environment	Environmental investment / total investment in the transmission grid	0.74	0.32	<b>0.30</b>
Percentage of expenditure on the environment	Environmental expenditure / total operating costs	2.10	2.29	<b>2.67</b>

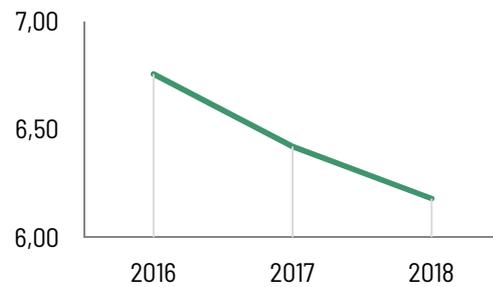


## 13. Performance Indicators

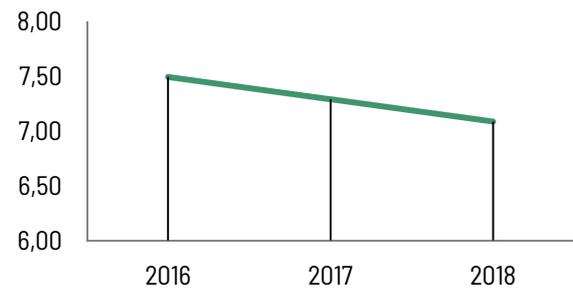
### Key indicators

#### Energy

Electricity consumption at Head Office			
A	MWh consumed		
B	No. employees at Head Office <sup>55</sup>		
Indicator	A/B		
Year	2016	2017	2018
A	8,284	8,026	7,509
B	1,226	1,250	1,215
Indicator	6.76	6.42	<b>6.18</b>



Red Eléctrica electricity consumption			
A	MWh consumed <sup>56</sup>		
B	No. employees Red Eléctrica <sup>57</sup>		
Indicator	A/B		
Year	2016	2017	2018
A	15,516.26	15,177.18	14,583.57
B	2,074	2,082	2,058
Indicator	7.48	7.29	<b>7.09</b>



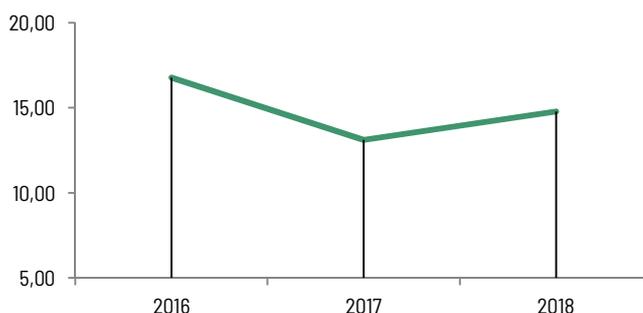
<sup>55</sup> La Moraleja and Albatros buildings. Includes interns, temporary employment agency workers and collaborators as they also tend to consume electricity.

<sup>56</sup> Includes consumption of the Head Office, the electricity control centres (centres that operate 24/7 and have special energy consumption), work centres (Regional office/work centres and maintenance centres). Since 2016, the consumption of electric vehicles has also been included. The data for 2018 includes the electricity consumption of telecommunications shelters (REINTEL activity).

<sup>57</sup> For the calculation, all personnel working in the work centres and corporate buildings (Group employees, interns, temporary employment agency workers and collaborators) are taken into account.

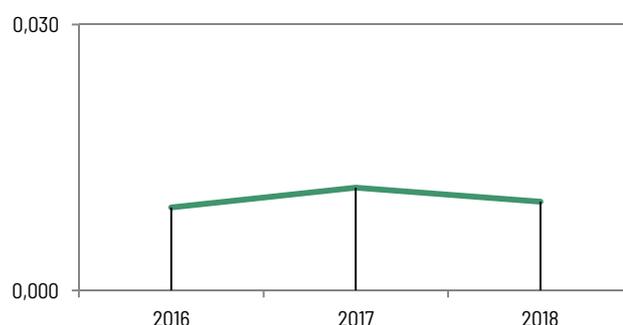


Vehicle fuel consumption <sup>58</sup>			
A	GJ (Gigajoules) consumed <sup>59</sup>		
B	Total No. of employees <sup>60</sup>		
Indicator	A/B		
Year	2016	2017	2018
A	28,200	22,810	22,810
B	1,682	1,741	1,630
Indicator	16.77	13.10	14.77



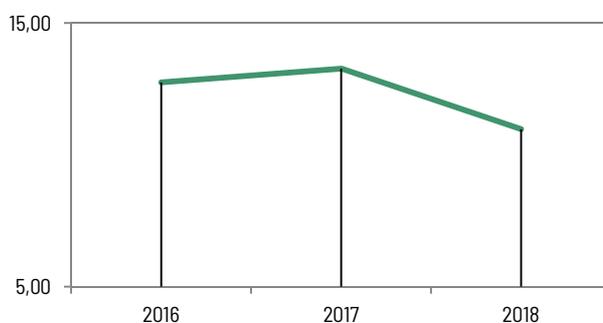
## Materials

Paper consumption			
A	Tonnes (t) consumed		
B	Total No. of employees <sup>61</sup>		
Indicator	A/B		
Year	2016	2017 <sup>62</sup>	2018
A	19,437	24,190	20,597
B	2,074	2,082	2,058
Indicator	0.009	0.012	0.010



## Water

Total water consumption			
A	m <sup>3</sup> consumed <sup>63</sup>		
B	Total No. of employees <sup>64</sup>		
Indicator	A/B		
Year	2016	2017	2018
A	26,442	27,627	22,566
B	2,074	2,082	2,058
Indicator	12.75	13.27	10.97



<sup>58</sup> Fuel consumed by Red Eléctrica vehicles (fleet, shared leasing and management/executive vehicles) and diesel fuel refilled in the tanks of the generator sets that consume electricity.

<sup>59</sup> 1 kWh = 36 \* 10<sup>6</sup> joules; 1 litre of diesel = 37 \* 10<sup>6</sup> joules; 1 litre of gasoline = 34 \* 10<sup>6</sup>, 1 litre of gas oil = 37 \* 10<sup>6</sup> joules; 1 litre of biodiesel = 32.79 \* 10<sup>6</sup> joules; 1 litre of LPG = 25.7 \* 10<sup>6</sup> joules

<sup>60</sup> Number of employees on the workforce that can use vehicles (without taking into account interns or collaborators).

<sup>61</sup> Includes interns, temporary employment agency workers and collaborators as they are also considered paper consumers.

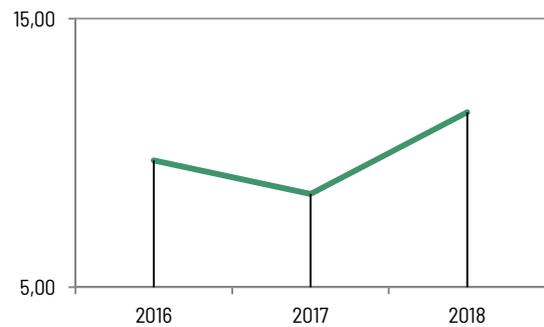
<sup>62</sup> In 2017, the printer service provider was not able to provide the data regarding printing on 1 or 2 sides, reporting only cumulative data since installing the printers in 2014, and it was impossible to obtain the data for 2017. For this reason, it has been estimated that in 2017 the percentage of double-sided printing was same as in 2016, 72%.

<sup>63</sup> The data provided has a coverage of 83%, in terms of personnel (taking into account all the staff working in the various work centres). Data is not available for some centres, mostly those that are not owned by the Company (leased/rented buildings).

<sup>64</sup> Taking into account all the personnel that work in the various work centres: Group employees, interns, temporary employment agency workers and collaborators.

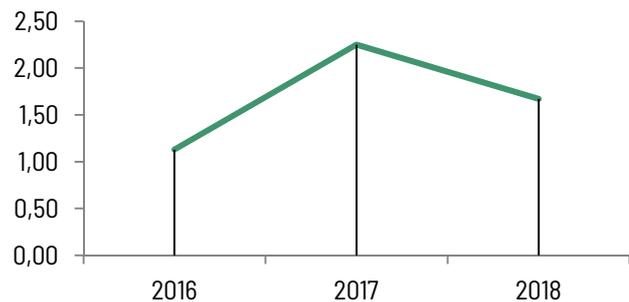


Water consumption at Head Office			
A	m <sup>3</sup> consumed		
B	Total employees at Head office <sup>65</sup>		
Indicator	A/B		
Year	2016	2017	2018
A	9,166	8,064	10,479
B	943	952	910
Indicator	9.72	8.47	<b>11.52</b>



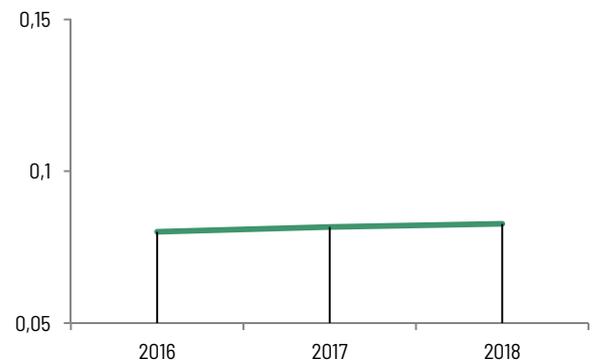
## Waste

Hazardous waste			
A	Tonnes (t) of hazardous waste generated		
B	Revenue (millions of euros)		
Indicator	A/B		
Year	2016	2017	2018
A	2,035.645	4,102.096	3,036.874
B	1,803.8	1,823.9	1,818.8
Indicator	1.13	2.25	<b>1.67</b>



## Land usage in relation to biodiversity

Biodiversity: Occupation of land <sup>66</sup>			
A	Surface area in Red Natura occupied by facilities <sup>67</sup> (m <sup>2</sup> )		
B	Total surface area of Red Natura (m <sup>2</sup> ) <sup>68</sup>		
Indicator	A/B x 100		
	Facilities		
Year	2016	2017	2018
A	179.588*10 <sup>6</sup>	180.943*10 <sup>6</sup>	181.530*10 <sup>6</sup>
B	223,011*10 <sup>6</sup>	223,354*10 <sup>6</sup>	223,358*10 <sup>6</sup>
Indicator	<b>0.080</b>	<b>0.080</b>	<b>0.083</b>



<sup>65</sup> The 'La Moraleja' buildings including interns, temporary employment agency workers and collaborators as they are considered water consumers.

<sup>66</sup> For the 2015 ratios, the base published in February 2016 was used and for the data for 2016 and 2017 the base published by MAPAMA in January 2017 and January 2018, respectively, has been used. The surface area of the Red Natura Network on the islands is superior to that mapped in previous years, which explains the variation in the shown indicators. The cartography of facilities in service is improved and updated annually, from which some variations can be derived in the calculations not related to the increase or decrease in the number of facilities.

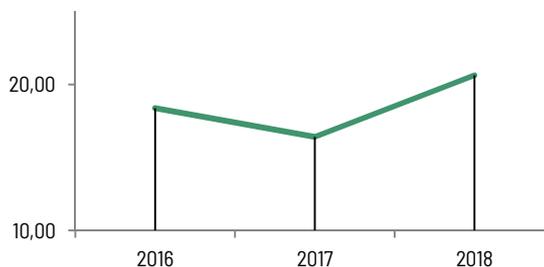
<sup>67</sup> Surface area occupied by lines and substations: The surface area of lines has been calculated assuming an occupation of 20m on each side of the line. It is necessary to keep in mind that the occupation is overhead; there is only actual occupation in the case of the towers. The surface area occupied by submarine cables has been estimated at 0.5 metres on each side of the line.

<sup>68</sup> Red Natura (Natura 2000 Network) includes: SCI (Site of Community Importance) and SPA (Specially Protected Areas for birds).

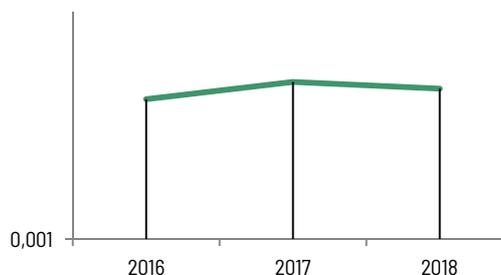


## Emissions

Direct emissions of greenhouse gases (SCOPE1) + Emissions from electricity consumption (SCOPE 2 without losses) <sup>69</sup>			
A	t CO <sub>2</sub> eq. SCOPE 1+ Emissions from electricity consumption		
B	Revenue (millions of euros)		
Indicator	A/B		
Year	2016	2017	2018
A	33,164.00	29,940.50	40,073.00
B	1,803.8	1,823.9	1,943.3
Indicator	18.39	16.42	<b>20.62</b>



Emissions SCOPE 1 + SCOPE 2 including transmission grid losses <sup>70</sup>			
A	t CO <sub>2</sub> eq. (SCOPE 1 + SCOPE 2)		
B	Revenue (millions of euros)		
Indicator <sup>71</sup>	A/B		
Year	2016	2017	2018
A	1,077,580	1,192,806	1,156,679
B	1,803.8	1,823.9	1,943.3
Indicator	597	654	<b>595</b>



<sup>69</sup> Emissions of Scope 1 and 2 (not including transmission grid losses). REE considers it relevant to monitor this indicator, without including transmission grid losses (as it is not possible to act on them). The calculation of emissions is performed from an operational control perspective. The information on the inventory scope and method is available on the REE website <http://www.ree.es/en/sustainability/sustainable-energy/energy-and-climate-change/our-carbon-footprint>. The emissions are calculated under the 'market based' approach, applying the emission factors associated with the market agents/traders that supply the electricity).

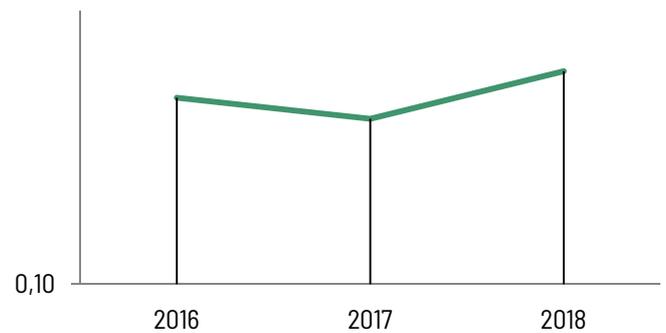
<sup>70</sup> In 2018, REE changed the methodology to report transmission grid losses. The emissions data derived from these losses has been recalculated for the entire historical series, according to the new methodology.

The emissions associated with transmission grid losses, in the same way as the emissions associated with electricity consumption, do not occur during REE's activities as they take place at the different power generation points. For the calculation of these emissions, the emission factors corresponding to each system (peninsular, Balearic Islands or Canary Islands) calculated by REE using the annual generation balances. The decrease in emissions in 2018 is mainly due to the decrease in the average peninsular emission factor (emission factor in t CO<sub>2</sub> / MWh: 0.257 in 2017 and 0.219 t CO<sub>2</sub> / MWh in 2018), which reflects the increase in generation from renewable sources. (The emission factor for the Canary Islands system has also decreased notably, although this has a lower weight in the total national emissions).

<sup>71</sup> Scope 1 and 2 emissions (including transmission grid losses). The total energy transported corresponds to the annual electricity demand measured at the power station busbars.

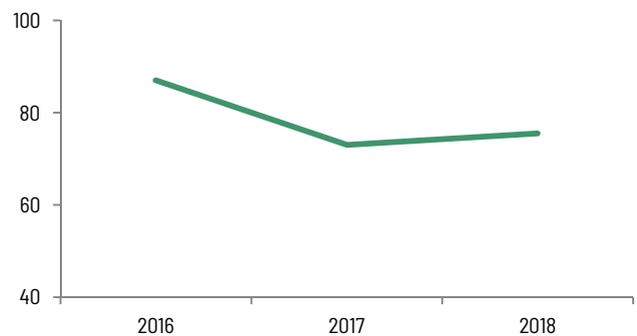


% SF <sub>6</sub> emissions <sup>72</sup>			
A	t SF <sub>6</sub> emitted		
B	t SF <sub>6</sub> installed		
Indicator	A/B x 100		
Year	2016	2017	2018
A	1.26	1.15	1.62
B	421.666	434.566	462.119
Indicator	0.30	0.26	<b>0.35</b>



## Environmental performance indicators related to the activity

% Fulfilment of the Environmental Programme			
A	Contribution of fulfilled environmental objectives		
B	Total contribution of the programme		
Indicator	A/B x100		
Year	2016	2017	2018
A	87.0	73.0	75.5
B	100	100	100
Indicator	87.0	73.0	<b>75.5</b>



Biodiversity: % critical lines marked			
A	Km of line marked in critical areas		
B	Km of line in critical areas <sup>73</sup>		
Indicator	A/B x 100 (% of line in critical area marked)		
Year	2016	2017	2018
A	217.7	276.1	375.7
B	738	734	734
Indicator	29.5	37.6	<b>51.2</b>

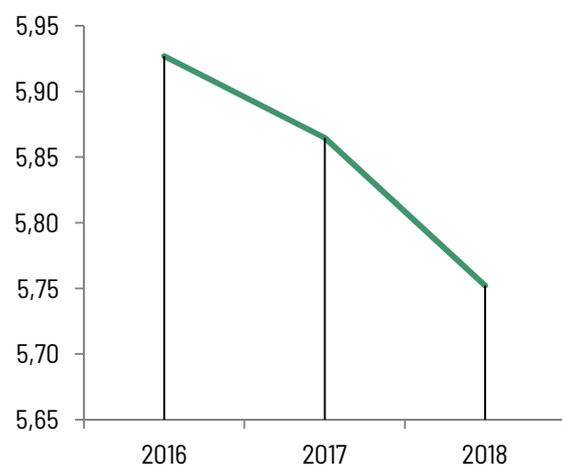
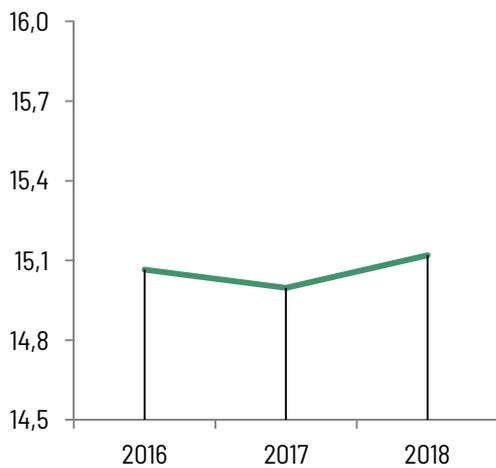


<sup>72</sup> The most representative emissions of REE's activity are SF<sub>6</sub> emissions (direct) and emissions from transmission grid losses. The emission rate has been worked out based on the emission data calculated according to actual leakage records. To assess SF<sub>6</sub> gas emissions in relation to the total SF<sub>6</sub> gas installed, it is considered more appropriate to use tonnes of SF<sub>6</sub> emitted as the unit of measure, rather than calculate it in tonnes of CO<sub>2</sub> equivalent.

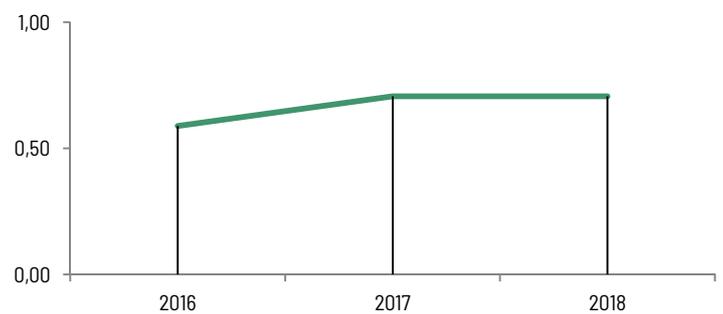
<sup>73</sup> Originally the kilometres of line in critical areas was 738 km and the reduction is due to the modification of the calculation methodology of the risk areas to integrate the Balearic Islands and Canary Islands data that was governed by a different methodology and by changes in the routes of lines made since 2015, the date on which the first risk map was drawn up. The target value may vary slightly each year depending on the variations of REE's facilities (new lines and modifications of existing ones).



Biodiversity: Impact of facilities						
A	Km of line in Red Natura <sup>74</sup>			No. of substations in Red Natura		
B	Total Km of line			Total No. of substations		
Indicator	A/B x 100			A/B x 100		
	Lines			Substations		
Year	2016	2017	2018	2016	2017	2018
A	4,704.40	4,736.24	4,791.28	39	39	39
B	31,226.07	31,582.86	31,689.50	658	665	678
Indicator	15.10	15.00	<b>15.10</b>	5.93	5.86	<b>5.75</b>



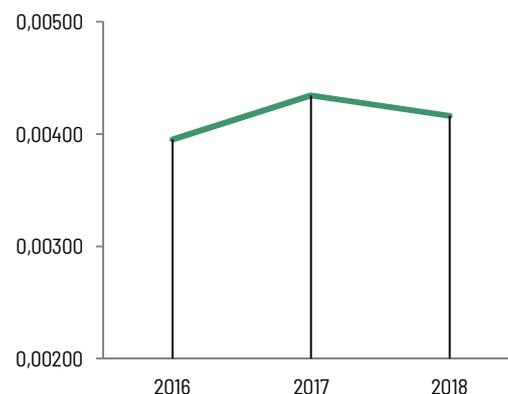
Biodiversity/Relationship with stakeholders			
A	No. of Autonomous Communities with biodiversity projects		
B	Total No. of Autonomous Communities		
Indicator	A/B		
Year	2016	2017	2018
A	10	12	12
B	17	17	17
Indicator	0.59	0.71	<b>0.71</b>



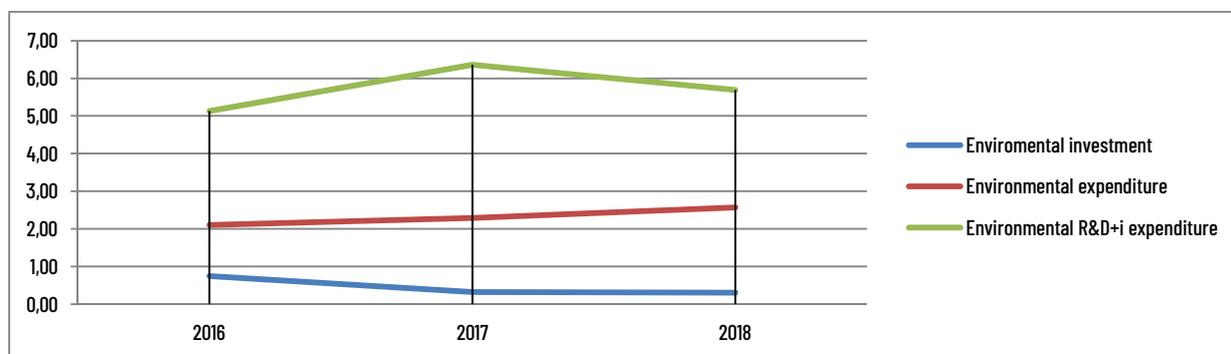
<sup>74</sup> Includes the total number of kilometres of submarine cable and those in Red Natura.



Emissions			
A	Indirect emissions derived from transmission grid losses (t CO <sub>2</sub> eq.)		
B	MWh transported		
Indicator	A/B		
	Emissions derived from transmission grid losses <sup>75</sup>		
Year	2016	2017	2018
A	1,044,416	1,162,865	1,116,606
B	264,247,290	267,745,348	268,387,270
Indicator	0.00395	0.00434	<b>0.00416</b>



Environmental expenditure									
A	Environmental investment			Environmental expenditure			Environmental R&D+i expenditure		
B	Total investment			Total expenditure			Total expenditure on R&D+i		
Indicator	A/B x 100			A/B x 100			A/B x 100		
	Environmental investment			Environmental expenditure			Environmental R&D+i expenditure		
Year	2016	2017	2018	2016	2017	2018	2016	2017	2018
A	2,983,757.15	1,334,887.00	1,160,634.26	19,665,124.98	21,336,233.48	23,539,321.90	440,738.91	593,857.18	583,478.00
B	398,511,000	411,829,185	378,244,167	936,250,000	932,497,000	914,745,279	8,582,567.37	9,330,000	10,254,320
Indicator	0.75	0.32	<b>0.31</b>	2.10	2.29	<b>2.57</b>	5.14	6.37	<b>5.69</b>

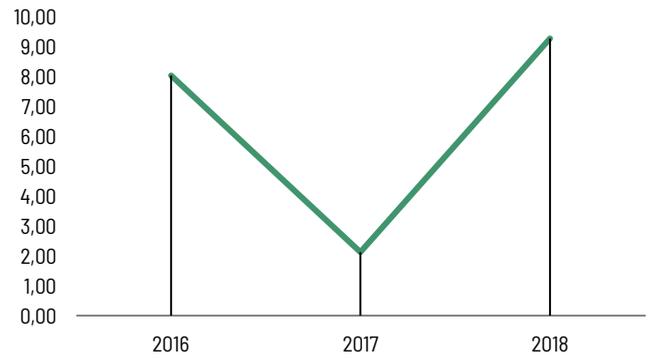


<sup>75</sup> In 2018 REE changed the methodology for reporting transmission grid losses. The emissions data derived from these losses has been recalculated for the entire historical series, according to the new methodology.

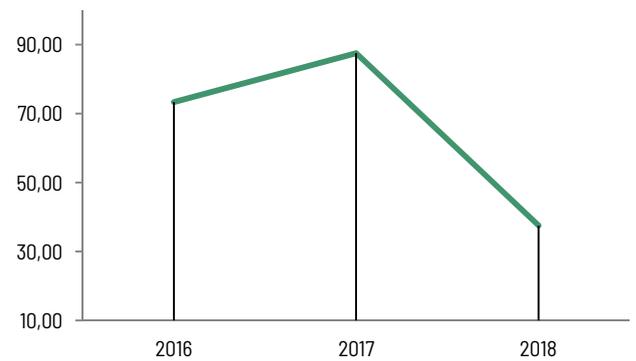
The emissions associated with transmission grid losses, in the same way as the emissions associated with electricity consumption, do not occur during REE's activities as they take place at the different power generation points. For the calculation of these emissions, the emission factors corresponding to each system (peninsular, Balearic Islands or Canary Islands) calculated by REE using the annual generation balances. For the calculation of these emissions, the emission factors corresponding to each system (peninsular, Balearic Islands or Canary Islands) calculated by REE using the annual generation balances. The decrease in emissions in 2018 is mainly due to the decrease in the average peninsular emission factor (emission factor in t CO<sub>2</sub> / MWh: 0.257 in 2017 and 0.219 t CO<sub>2</sub> / MWh in 2018), which reflects the increase in generation from renewable sources. (The emission factor for the Canary Islands system has also decreased notably, although this has a lower weight in the total national emissions).



Training and awareness			
A	No. of employees who received environmental training		
B	No. of employees <sup>76</sup>		
Indicator	A/B x 100		
Year	2016	2017	2018
A	135	37	151
B	1,682	1,741	1,741
Indicator	8.03	2.13	<b>9.26</b>



Accidental spill of hydrocarbons			
A	No. of accidents involving oil or fuel spills from in-service transformers and equipment		
B	Total No. of accidents		
Indicator	A/B x 100		
Year	2016	2017	2018
A	11	7	3
B	15	8	8
Indicator	73.33	87.50	<b>37.50</b>



<sup>76</sup> Only REE personnel.



## 14. Frequency of the Environmental Impact Statement

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This Report is published annually and acts as an Environmental Statement. Its purpose is to provide information to all stakeholders concerning Red Eléctrica's environmental behaviour regarding those activities carried out during 2018.

The Spanish Association of Standardisation and Certification (AENOR), with Head Offices at Génova 6 - 28004 Madrid, and Accredited Certifying Body Number E-V-0001, is the entity that verifies that the Environmental Statement of Red Eléctrica complies with the requirements set forth in Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community Eco-management and Audit Scheme (EMAS).

The next Statement will be presented and published during the first half of 2020.



## Glossary of terms

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<b>Environmental aspect</b>	<p>An element of the activities, products or services of an organisation which has, or which may have, an impact on the environment.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>
<b>Significant environmental aspect</b>	<p>An environmental aspect that has, or which may have, a significant impact on the environment.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>
<b>Electrical field</b>	<p>In a point in space, the force exerted on a static load located at that point. Expressed in volts per metre (V/m).</p> <p><i>(50 Hz. Electrical and Magnetic fields REE and UNESA, 1998)</i></p>
<b>Magnetic field</b>	<p>In a point in space, the force exerted on a live element located at that point. Expressed in amperes per metre (A/m). The international measuring unit is Tesla (T) or any fraction thereof, and in particular the microtesla (<math>\mu\text{T}</math>).</p> <p><i>(50 Hz. Electrical and Magnetic fields. REE and UNESA, 1998).</i></p>
<b>Nesting deterrent</b>	<p>A device comprised of several elements made of galvanised steel, and of different sizes, that deters birds from nesting or perching in the places where it is installed or on the actual device itself.</p> <p><i>(Own definition of REE).</i></p>
<b>Environmental impact</b>	<p>Any change in the environment, either adverse or beneficial, that is caused in full or in part by the activity, products or services of any organisation.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>
<b>Environmental behaviour indicator</b>	<p>Specific performance indicators providing information on an organisation's environmental behaviour.</p> <p><i>(Standard UNE-EN ISO 14031 Environmental management. General Guidelines).</i></p>
<b>Special Area of Conservation (SAC)</b>	<p>An area which, based on the biogeographic region or regions to which it belongs, contributes greatly to maintaining or restoring a type of natural habitat (...) in a favourable state of conservation so that it can help considerably in establishing the cohesion of Natura 2000 (...) and/or contributes noticeably to maintaining biological diversity in the biogeographic region or regions in question. For the animal species occupying large areas, the special areas of conservation will usually correspond to specific locations inside the area in which that species is naturally distributed, presenting the physical or biological elements that are essential for them to live and reproduce.</p> <p><i>(Directive 92/43/EC, of May 21, on the Conservation of Natural Habitats and Wild Fauna and Flora).</i></p>
<b>Environmental objective</b>	<p>A general environmental objective, which originates from the Environmental Policy and is set out as a goal to be fulfilled by the organisation and which, insofar as is possible, is measured.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>



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<b>Environmental policy</b>	<p>The general management and intentions of an organisation with respect to its environmental behaviour, put forward officially by its management teams, including the compliance with all the regulatory provisions applicable to environmental matters, as well as the commitment to continuously improve environmental behaviour. It constitutes a framework for the company's actions and for establishing environmental targets and objectives.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>
<b>Red Natura 2000</b>	<p>The European Natura 2000 Ecological Network is a coherent environmental network comprised of Sites of Community Importance whose management shall take into account the economic, social and cultural requirements, as well as the special regional and local characteristics. These sites are later designated as either Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) for Birdlife.</p> <p><i>(Law 42/2007 of 13 December, on Natural Heritage and Biodiversity).</i></p>
<b>Waste</b>	<p>Any substance or object whose owner intends to dispose of as waste or may have the intention or obligation to remove as waste.</p> <p><i>(Law 22/2011, 28 July, on Waste and Contaminated Soils).</i></p>
<b>Bird saving devices or 'spirals'</b>	<p>A white or orange spiral made of polypropylene (PVC) in the shape of a spiral, measuring 30-35 centimetres in diameter and with a length of 1 metre, which is coiled around the grounding cable or conductor to mark it and alert birds to the presence of the lines in order to reduce the risk of collisions.</p> <p><i>(Own definition REE).</i></p>
<b>Visual simulation</b>	<p>An infographic technique (based on computer applications for graphic representation) applied in order to obtain a visual representation of a project, providing an approximate idea of what it will truly look like once completed, and showing the elements that it is comprised of, as well as its integration into its environment.</p> <p><i>(Own definition REE).</i></p>
<b>Environmental management system</b>	<p>That part of the general management system that includes the organisational structure, planning of activities, responsibilities, good practices, procedures, processes and resources to develop, apply, achieve, revise and maintain the environmental policy and manage the environmental aspects.</p> <p><i>(Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)).</i></p>
<b>Special protection Area (SPA) for birdlife</b>	<p>An area of community interest for the protection of bird species listed in Annex I of the Council Directive 79/409/EEC of 2 April 1979, on the conservation of wild birds.</p>

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DECLARACIÓN MEDIOAMBIENTAL VALIDADA POR

**AENOR**

DE ACUERDO CON EL REGLAMENTO (CE) Nº 1221/2009  
modificado según REGLAMENTO (UE) 2017/1505

Nº DE ACREDITACIÓN COMO VERIFICADOR MEDIOAMBIENTAL  
**ES-V-0001**

Fecha de Validación :



## Annex: Environmental Actions 2018

### Definition of Projects (Investment + Maintenance)

#### Environmental authorisation for 9 projects:

Positive Environmental Impact Statement <sup>77</sup>
132 kV La Oliva-Playa Blanca circuit (Lanzarote-Fuerteventura)
220 kV Haro-Alcocero de Mola line
Increasing of the power capacity of the 400 kV Aldeadávila-Arañuelo/Hinojosa-Almaraz/Aldeadávila-Hinojosa lines

Environmental resolution <sup>78</sup>
Increasing of the power capacity of the 400 kV Aragón-Mequinenza line
Increasing of the power capacity of the 220 kV Rub-T Celsa-Sant Just-Viladecans line
66kV El Tablero-San Agueda line
Increasing of the power capacity of the 220 kV Sant Celoni-Vic line
Increasing of the power capacity of the 220 kV Begues-Can Jordi line
220 kV Almaraz C.N.-Almaraz E.T line

	Correspondence sent	Responses obtained <sup>79</sup>
Renovation and Improvement Projects (RIP)		0
Optical Fibre	14	6
Third party modification		0
REPEX-MAR (Grid Asset Improvement)		0
<b>Total</b>	<b>14</b>	<b>17</b>

Responses / Authorisations received in 2018: Maintenance works	
Optical Fibre	
66 kV Candelaria-Cuesta de la Villa line	Hanging Optical Fibre cable (the entire line)
400 kV Grijota-Mudarra line	Hanging Optical Fibre cable (the entire line)
400 kV Almaraz-Bienvenida line	Hanging Optical Fibre cable (towers 341-431)
400 kV Pinar-Puerto de la Cruz line	Hanging Optical Fibre cable
400 kV Guadame-Cabra 1 line	Hanging Optical Fibre cable
220 kV Almaraz-Villaviciosa line	Hanging Optical Fibre cable (towers 85-151)

<sup>77</sup> Authorisation resulting from the Complete Environmental Impact Assessment process (Environmental Impact Study)).

<sup>78</sup> Authorisation resulting from the Simplified Environmental Impact Assessment process (Environmental Document).

<sup>79</sup> The data relating to correspondence from an archaeological point of view or several responses from different organisms regarding the same facility are not included.



## Construction and modification of facilities

### Protection of flora and fauna

Protection of flora: Preventive and corrective measures	
Modification of the design of the project during works	
220kV Cañuelo-Pinar del Rey line	Modification of the Access to tower T21. Modification of the position and design of tower T3.
220kV Telleo-Pereda line (REPEX)	Partial modification to the access to tower 409 to avoid impacts on Holly trees ( <i>Ilex aquifolium</i> ). Holly is considered of Special Interest in the Regional Catalogue of Endangered Flora Species of Asturias.
400kV Nueva Escombreras-Tordesillas line	The re-siting of the towers was carried out during works. Preliminary field surveys were conducted at the beginning of the works so as not to have an impact on protected species.
220kV Balsicas-El Palmar line	The re-siting of the towers was carried out during works. Zones that form part of the work site were cordoned off. Land improvements were made taking great care to respect the species included in the Regional Catalogue of Endangered Flora Species of Murcia. Excavation for the plinths for the towers, concreting works, grounding rod and enclosure of the works without having further impacts on flora.
Magaña 220 kV substation	The original substation project was modified slightly so as to not affect the area where the ichnites (fossilised dinosaur footprints) were found.
Cordoning off and protection of habitats and areas with protected species	
Increasing of the power capacity for the 220 kV Dos Hermanas-Puerto Real line	Specimens of dwarf juniper ( <i>Juniperus navicularis</i> ) were cordoned off in the immediate surroundings of tower 217 to avoid any impact on them.
Jares 132 kV substation	A preliminary field survey was carried out at the beginning of the works so as to not have an impact on protected species, and no species with protection status were detected on the plot owned by REE.
Incoming and outgoing feeder lines – Jares -132kV Gran Tarajal-Matas Blancas line	A preliminary field survey was carried out at the beginning of the works so as to not have an impact on protected species, and no species with protection status were detected on the plot owned by REE.
220kV Villablino-Telleo line	Prior redesign of the new accesses to be opened up with the collaboration of environmental agents of the Castilla y León Regional Government.
	Preliminary field surveys carried out to locate protected species hyssop-leaved mountain ironwort ( <i>Sideritis hyssopifolia</i> ), herbaceous thistle-like flowering plants ( <i>Centaurea janeri subsp Babiana</i> ) and holarctic perennial plants ( <i>Saxifraga babiana</i> ).
	Layout of accesses minimising impacts on habitat 6510 Meadow foxtail ( <i>Alopecurus pratensis</i> ), Great burnet ( <i>Sanguisorba officinalis</i> ).
400kV Lada-Pola de Gordón 1 line	Cordoning off of holly trees ( <i>Ilex aquifolium</i> ) around the platform next to tower 109.
220kV Telleo-Pereda line (REPEX)	Cordoning off of holly trees ( <i>Ilex aquifolium</i> ) in the access and around the platform of tower 448. Holly is considered of Special Interest in the Regional Catalogue of Endangered Flora Species of Asturias. The works for the replacement of the tower and new foundations have been conducted without damaging these holly trees.
	Control and monitoring in order to avoid the opening up new accesses. The concrete of the plinths of the old tower 448 was removed by hand to avoid affecting holly trees ( <i>Ilex aquifolium</i> ) as well as preventing the unauthorised opening up of a new access.



Protection of flora: Preventive and corrective measures	
220kV Pereda-Soto de Ribera line (RE-PEX)	Control and monitoring in order to avoid the opening up new accesses.
400kV Lada-Pola de Gordón 1 line	Control and monitoring in order to avoid the opening up new accesses in Las Ubiñas La Mesa Natural Park.
Increasing of the power capacity for the 220kV Telleo-Pereda line	Control and monitoring in order to avoid the opening up new accesses.
Increasing of the power capacity for the 220kV Pereda-Soto de Ribera line	Control and monitoring in order to avoid the opening up new accesses.
220kV Villablino-Telleo line	Control and monitoring in order to avoid the opening up new accesses.
Arbillera 400/220 kV substation incoming and outgoing feeder lines	Preliminary field surveys carried out at the beginning of the works to avoid impacts on protected flora.
Arbillera 400/220 kV substation connection point for incoming and outgoing feeder lines	Preliminary field surveys carried out at the beginning of the works to avoid impacts on protected flora.
Lousame 220kV substation incoming and outgoing feeder lines	Preliminary field surveys carried out at the beginning of the works to avoid impacts on protected flora.
400kV Almaraz-Hinojosa line	The areas subject to clearing have been redesigned and signage has been put up in collaboration with the local Forestry Agent.
Macher 66 kV substation	A preliminary field survey was carried out at the beginning of the works so as to not have an impact on protected species, and no species with protection status were detected on the plot owned by REE.
220kV Escatron-Espartal line	Preliminary field surveys were carried out at the beginning of the works to locate the presence of Pamirian winterfat ( <i>Kraschenikovia ceratoides</i> ). 4 plants were relocated.
220kV Hernani-Arkale line	Cordoning off of the work area for tower T34 to avoid impacts on Priority Habitat 91E0 - Cantabrian alder trees ( <i>alisedas cantábricas</i> ).
Replacement of optical fibre cable on the 400kV Aragón-Peñaflor line	A preliminary field survey was carried out at the beginning of the works to avoid impacts on protected species, and no species with protection status were detected.
400kV Nueva Escombreras-Torremendo line	Zones that form part of the work site were cordoned off. Only those species that are allowed under the Environmental Resolution have been felled, with the permission of the relevant administration. During the summer all the prevention measures established by the relevant administration for forested lands were taken into consideration for the work.
220kV Balsicas-El Palmar line	All the species that needed to be felled or transplanted were indicated prior to the start of the works. The inventory of flora affected by the works prior to the start of the work was presented to the relevant administration. Species included in the Regional Catalogue of Endangered Flora Species of Murcia that are not compatible with the facility were transplanted. Only those that were allowed under the environmental Resolution were felled, with the permission from the relevant administration. During the summer all the prevention measures established by the relevant administration for forested lands were taken into consideration for the work.
Galapagar 400kV substation (Phase shifter)	The area affected by the substation enlargement works was cordoned off due to the works for the installation of a phase shifter. A felling permit was obtained from the competent environmental body (Community of Madrid) to fell 50 oaks, 8 junipers, 30 ash trees, 2 cypress trees and the clearing of 0.05 ha of broom bushes between 1 November and 1 April. In



Protection of flora: Preventive and corrective measures	
	accordance with Law 16/95, Forestry and Nature Protection of the Community of Madrid, an area equivalent to twice the area occupied by the enlargement works was reforested.
Magaña 220kV substation incoming and outgoing feeder lines	Prior surveys were carried out at the beginning of the works to avoid impacts on protected species (holly).
220kV Magaña line - 220kV Oncala-Trevago line 220kV Magaña-Moncayo line 220kV Moncayo line - 220kV Magallón-Trevago line	Prior redesign of the new accesses to be opened up with the collaboration of environmental agents of the Castilla y León Regional Government, in order to have the least possible impact on the existing flora and to minimise any visual impact.
Hoisting by boom crane (*)	
Arbillera 400/220 kV substation incoming and outgoing feeder lines	Hoisting/assembly with a boom crane for all the towers of the line, as well as for the dismantling of the two towers to be removed.
Lousame 220kV substation incoming and outgoing feeder lines	Hoisting/assembly with a boom crane for all the towers of the line.
220kV Balsicas-El Palmar line	Hoisting/assembly with a boom crane for towers T97N and T102N, that do not have their own access. Materials were moved with a helicopter and all works were carried out within the Carrasco Park.
220kV Magaña line - 220kV Oncala-Trevago line 220kV Magaña-Moncayo line 220kV Moncayo line - 220kV Magallón-Trevago line	Hoisting/assembly with a boom crane for towers: Action A (Magaña-Moncayo) from T12.11 to T12.14 and from T12.7 to T12.9. For Action B (Moncayo-Magallón) from T25 to T27 and from T29 to T31. Works carried out due to the presence of Holm oak.
Concreting works, hoisting by boom crane and hanging of line by helicopter <sup>80</sup>	
220kV Balsicas-El Palmar line	Towers T97N and T102N were concreted using a helicopter as there was no access and this was done to avoid the need to clear flora to create an access and all works were carried out within the Carrasco Park.
Hanging line by hand	
Arbillera 400/220 kV substation incoming and outgoing feeder lines	For all the line.
Lousame 220kV substation incoming and outgoing feeder lines	For all the line.
Planting of trees	
La Farga 400/220 kV substation	Hydroseeding on substation slopes and on access roads (17,625 m <sup>2</sup> ).
Cristóbal Colón 220 kV substation	Replacement of the vegetation barrier previously removed for the construction of the substation access road.
Increase in power capacity - 220kV Telledo-Pereda line	Specimens of butcher's-broom ( <i>Ruscus aculeatus</i> ) were transplanted to avoid them being affected by the works.
220kV Balsicas-El Palmar line	Four specimens of European fan palm ( <i>Chamaerops humilis</i> ), jujube ( <i>Ziziphus lotus</i> ) and/or cade juniper ( <i>Juniperus oxycedrus subsp. oxycedrus</i> ) were planted for each specimen affected by the works (57 European fan palm were affected).
Other	
220kV Cañuelo-Pinar del Rey line	Prior botanical survey carried out.

<sup>80</sup> Although these actions have been classified as measures for the protection of flora, in general they avoid impacts on the soil, waterways and other elements.



Protection of flora: Preventive and corrective measures	
Increase in power capacity - 220kV Cár-tama-Los Montes line	Prior survey for accesses carried out.
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Inventory of trees in the safety corridors and accesses to request a licence from the relevant administration.
Increase in power capacity - 220kV Cár-tama-Los Montes line	Survey and definition of accesses with agents involved in the work.
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Survey and definition of accesses with agents involved in the work.
Increase in power capacity - 220kV Cár-tama-Los Montes line	During periods of high fire risk, weekly reports sent by email to the Provincial Operative Centre of INFOCA regarding the forestry work planned.
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	During periods of high fire risk, weekly reports sent by email to the Provincial Operative Centre of INFOCA regarding the forestry work planned.
400kV Boimente-Pesoz line	Maintenance of the vegetation barrier of span 54-55 along the Camino de Santiago (Saint James' Road - a pilgrimage route).
400kV Almaraz-Hinojosa line	Temporary stoppage of clearance works during periods of high fire risk.
400kV Nueva Escombreras-Tordesillas line	The areas where work was taking place was communicated daily to CECOFOR (Forestry Coordination Centre) and the level of forest fire risk was checked daily, stopping works when LEVEL 3 was determined. Work carried out in the summertime with specific material to avoid fires.
220kV Balsicas-El Palmar line	The areas where work was taking place was communicated daily to CECOFOR (Forestry Coordination Centre) and the level of forest fire risk was checked daily, stopping works when the MAXIMUM level was determined. Work carried out in the summertime with specific material to avoid fires.
Modification of the 400kV Aragón-Morella line	Work stoppage on the days when a LEVEL 3 fire risk was determined for the risk of fires in forested areas or within 500m of the works.
Increase in power capacity - 400kV Catadau-Godelleta line 220kV Catadau-Godelleta line	Work stoppage on the days when a LEVEL 3 fire risk was determined for the risk of fires in forested areas or within 500m of the works.
220kV Magaña line - 220kV Oncala-Trevago line 220kV Magaña-Moncayo line 220kV Moncayo line - 220kV Magallon-Trevago line	Work stoppage on the days when the Castilla y León Regional Government determined the MAXIMUM level of fire risk (5 days in total).



Protection of fauna: Preventive and corrective measures	
<b>Biological stoppages</b>	
Replacement of optical fibre cable on the 400kV Aragón-Peñaflor line	Works carried out between the months of August and February.
220kV Balsicas-El Palmar line	Biological stoppage from December to April (both inclusive) due to the presence in the area of Golden eagle ( <i>Aquila chrysaetos</i> ) and Bonelli's eagle ( <i>Hieraetus fasciatus</i> ).
Increase in power capacity - 400kV Catadau-Godelleta line Increase in power capacity - 220kV Catadau-Godelleta line	Biological stoppage from May to July due to the presence of a Bonelli's eagle nest.
Galapagar (Phase shifter) 400kV sub-station	Biological stoppage from February to August (both inclusive) due to the presence of Imperial eagle ( <i>Aquila adalberti</i> ) that affected the civil works phase only.
400kV Mudarra-San Sebastián de los Reyes line	Biological stoppage for tower 231 due to the presence of a Booted eagle's nest ( <i>Hieraetus pennatus</i> ) - 50 metres away. The work on this tower was postponed until September. Previously, a birdlife survey was conducted identifying two further nests, but this was the only one occupied.
<b>Accompanying / offsetting measures: Installation of nesting boxes</b>	
Talavera 220kV substation incoming/outgoing feeder lines	Survey conducted, prior to the start of works, regarding possible nesting sites in the vicinity of the incoming/outgoing feeder lines of the Talavera substation.
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Survey conducted, prior to the start of works, regarding possible nesting sites in the vicinity of the towers to be replaced. In tower T205 a nest was present that was inspected together with an environmental agent. It was verified that the nest was abandoned and occupied by field rats.
<b>Other</b>	
Increase in power capacity - 220kV Cañuelo-Pinar del Rey line	Prior faunal study carried out.
Jares 132 kV substation	An initial survey of the plot was conducted to check for the presence of nesting sites and birds with a protected status. None were found.
Jares incoming and outgoing feeder lines - 132kV Gran Tarajal-Matas Blancas line	An initial survey of the plot was conducted to check for the presence of nesting sites and birds with a protected status. None were found.
Soto de Ribera 400/220kV incoming and outgoing feeder lines (line compaction)	An Egyptian vulture nest ( <i>Neophron percnopterus</i> ) was located with the assistance of an environmental agent in order to rule out possible impacts during the breeding season.



## Socio-economic environment and the landscape

Measures for the protection of the socioeconomic environment	
Other	
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Construction of levees/ridges in accesses to towers located on irrigated agricultural land.
220kV Cañuelo-Pinar del Rey line	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes, for the clearing of plots of land and the laying of pipework for irrigation channels.
220kV Cañuelo-Pinar del Rey line	Restoration of any impact produced with regard to roads/plots used in the construction of the line.
Jares 132 kV substation	Periodic damping down carried out in the area of the works and on the access road from the substation to the main road to control the emission of dust into the atmosphere.
220kV Telleo-Pereda line (REPEX and Increase in power capacity)	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes, for the clearing of plots of land and the laying of pipework for irrigation channels.
220kV Villablino-Telleo line	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes, for the clearing of plots of land and the laying of pipework for irrigation channels.
220kV Villablino-Telleo line	Agreement with the president of the highland council for landscape restoration, planting works, the installation of a lookout point and improvements in local school premises.
Increase in power capacity - 220kV Pereda-Soto de Ribera line	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes.
Increase in power capacity - 220kV Telleo-Pereda line	Improvement of the road surface for the agricultural track providing access to tower 393 by the laying of gravel (in Aldea de Ronzón).
220kV Lada-Pola de Gordón line	Cleaning up of drainage ditches and water culverts for agricultural use in the access route to towers 108B, 109 and 110. Installation of pipes and the laying of gravel.
Arbillera 400/220 kV substation incoming and outgoing feeder lines	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes and for the clearing of plots of land.
Lousame 220kV substation incoming and outgoing feeder lines	Agreements with landowners and owners of neighbouring plots for improvements of enclosures or access routes and for the clearing of plots of land.



## Landscape restoration

Landscape restoration	
Substations under construction	
La Farga 400-220 kV substation	Hydroseeding on substation slopes and on access roads (17,625 m <sup>2</sup> ).
Cristóbal Colón 220 kV substation	Replacement of the vegetation barrier previously removed for the construction of the substation access road.
Aguimes 66 kV substation	Utilisation of previously collected stone for its subsequent use on the slopes of the substation.
Arbillera 400/220 kV substation	Making good of external slopes through the application of the solid cement product, reconditioning of the main drain to make it look more natural, making good by means of ploughing the entire vicinity of the substation.
Arbillera 400/220 kV substation incoming and outgoing feeder lines	Making good of accesses and work-site platforms.
Lousame 220kV substation incoming and outgoing feeder lines	Making good of accesses and work-site platforms.
La Oliva 132 kV substation	In order to comply with point M, section f of the Environmental Impact Statement, as measures to offset the impacts on areas of barren landscape affected by the construction of the new Corralejo substation, the adjacent areas that were degraded through the extraction of rocks or illegal dumping of rubble and debris will be restored. This will be carried out when the underground section to tower 84 is executed. On the other hand, the rocks on the plot affected by the substation works have been removed and piled up carefully removing the rocks that have lichens that will be relocated in their natural position in the areas to be restored (slope and area next to the entrance). The stones without lichens have been reused in the perimeter wall.
Godelleta 400/220 kV substation	Restoration and stabilising of the external slope of the substation with aromatic plants and landscaping works using aromatic plants and the planting of olive trees at the substation entrance.
Torremendo 400/220 kV substation	Landscaping work on the outside of the substation by planting common thyme ( <i>Thymus vulgaris</i> ), halfah grass ( <i>Stipa tenacissima</i> ), black hawthorn ( <i>Rhamnus lycioides</i> ), Saltwort ( <i>Salsola genistoides</i> ), lentisk ( <i>Pistacia lentiscus</i> ), types of rosemary ( <i>Rosmarinus officinalis</i> and <i>Rosmarinus prostrata</i> ), sage ( <i>Salvia officinalis</i> ) and lavender ( <i>Lavendula officinalis</i> ).
Lines under construction	
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Elimination of slopes and the revegetation of the area around towers 192 and 199, within the scope of the conservation plan for the Imperial Eagle ( <i>Aquila heliaca</i> ) in Andalusia. The execution of the plan is pending a final decision.
Increase in power capacity - 220kV Cártama-Los Montes line	Elimination of slopes and the revegetation of the area around towers 32 and 34. The execution of the plan is pending a final decision.
400kV Boimente-Pesoz line	Trees/plants etc., planted as part of the vegetation barrier that did not survive were replaced with new ones for span 54-54, where the line crosses the Camino de Santiago (Saint James' Road - a pilgrimage route) and the cutting back of all vegetation in the vicinity of the newly planted area.



Landscape restoration	
400 KV Almaraz-Hinojosa line	<p>The carrying out of landscape restoration by the making good of the land around the towers after completing the construction of the plinths and the ditches for the grounding rods.</p> <p>A re-profiling of the land, the incorporation of topsoil and the removal of all the waste generated during the construction of the plinths have been carried out. The vicinity around the tower has been restored: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.</p>
400 kV Mezquita-Morella line	Re-profiling of accesses and work-site platforms. Sowing of seeds by hand.
Facilities undergoing maintenance works	
Cacicedo 220 kV substation	Complete elimination of pampas grass ( <i>Cortaderia selloane</i> ) as it is an invasive species.
Solorzano 400/220 kV substation	Complete elimination of pampas grass ( <i>Cortaderia selloane</i> ) as it is an invasive species.
220kV Balsicas-El Palmar line	Four specimens of European fan palm ( <i>Chamaerops humilis</i> ), jujube ( <i>Ziziphus lotus</i> ) and/or cade juniper ( <i>Juniperus oxycedrus subsp. oxycedrus</i> ) were planted for each specimen affected by the works.
400kV Nueva Escombreras-Rocamora line	Restoration of the bases of towers 10 and 23 by making good the land, and carrying out planting, irrigation and the replacement of trees etc., that were planted, and which did not survive.
400kV Nueva Escombreras-El Palmar 1 line	Restoration of Areas A and B and the base of tower 9 by making good the land, and carrying out planting, irrigation and the replacement of trees etc., that were planted, and which did not survive.



## Archaeological heritage

Protection of archaeological-ethnological heritage	
132 kV Ibiza- Torrent 3 line	Discoveries of remains were made when carrying out an archaeological survey, the layout of the line was modified, and micro-tunnelling was used to avoid the area of the remains.
220 kV Candelaria-Granadilla line	During the adaptation of accesses, some rock engravings were found. The archaeological site was cordoned off prior to the start of work and on-site monitoring was carried out.
Modification to the 400kV Aragón-Morella line	Excavation of a prehistoric site found during the construction phase of a new electricity line in the Community of Valencia. It is a site with funerary structures (necropolis), consisting of 11 graves randomly arranged at varying depths, covered with slabs of natural stone. Due to the state of conservation of the buried human skeletal remains found inside one of the graves, they might be burial sites of recent prehistory (Late Bronze or Visigothic period, probably from the 7 <sup>th</sup> -8 <sup>th</sup> centuries).
220 kV Huelves-Morata line (REPEX)	During earthworks and civil works, it was found that these could affect the 'Cueva de Pedro Fernández' site which is an Asset of Cultural Interest. Four random archaeological surveys along with archaeological supervisions were conducted, however the result of the surveys proved negative.
La Farga 400/220 kV substation	During earthworks a dolmen (single-chamber megalithic tomb) catalogued in the vicinity of the work was cordoned off and signage was posted. In addition, a silo for the storage of grain was found that has been catalogued, communicated to the relevant Culture authority and after its approval, it was taken apart so that works could continue.
Magaña 220 kV substation	During the paleontological and archaeological supervision of the earthworks and civil works, ichnites were found in the northwest corner of the substation. These were catalogued for further excavation and the ichnites <sup>81</sup> were covered for their protection, with the original project having to be slightly modified in order to ensure their protection.

<sup>81</sup> Icnita: Ichnites: fossilised dinosaur footprints



## Restoration of affected areas

Restoration works are corrective measures that fundamentally mitigate the impacts produced on the soil, riverbeds, vegetation, socio-economic environment (roads, enclosures, other elements of the properties) and the landscape.

Restoration of areas affected by works	
Increase in power capacity - 220kV Cártama-Los Montes line	Geomorphological recovery of the land around towers 32 and 34, reuse of surplus material in environmental restorations, planting works, road repairs.
Increase in power capacity - 220kV Dos Hermanas-Puerto Real line	Geomorphological recovery of the land around towers 192 and 199, reuse of surplus material in environmental restorations, planting works, road repairs.
220 kV Cañuelo-Pinar del Rey line	Replacement of supply pipe damaged when excavating the foundation of the T10 tower.
Jares 132 kV substation	Geomorphological recovery of the land around the substation through the incorporation of topsoil left over from the clearing works. The areas affected by the work have been repaired and properly restored.
Jares 132 kV substation incoming and outgoing feeder lines - 132kV Gran Tarajal-Matas Blancas line	Underground section from tower 29B to Jares 132 kV substation. Restoration of the surface of the underground section, by covering the trench.
Increase in power capacity - 220kV Pereda-Soto de Ribera line	Environmental restoration of the plinths of tower 3, 15 and 468 (recovery of the initial morphology of the land and spreading of previously stored topsoil). Restoration of the access to tower 468 (improvement of road surface, stabilising slopes and sowing them with seeds, lateral closures of plots).
Increase in power capacity - 220kV Telleo-Pereda line	Restoration of meadows where towers 390, 393, 394 and 427 are located (spreading of previously collected organic material and soil, removal of stones and the subsequent dethatching of the land with a scarifier). Repair of access roads to tower 390 (opening of waterways) and tower 393 (spreading of gravel, repair of lateral walls).
220 kV Telleo-Pereda line (REPEX)	Enclosure of new accesses that were opened up, geomorphological restoration of the work site, improvement in the condition and surface of pre-existing roads, repair of damaged concreted sections, opening of drainage ditches, installation of pipes, repair of plot enclosures and stone walls.
Arbillera 400/220 kV substation incoming and outgoing feeder lines	Geomorphological recovery of the land, reuse of surplus material in the repair of roads in the vicinity to the substation.
Arbillera 400/220 kV substation	Recovery of the external slopes with the addition of solid cement Binder that is applied mixed with water, it penetrates the soil generating a hard crust that prevents channels being formed by water run-off.
Lousame 220kV substation incoming and outgoing feeder lines	Geomorphological recovery of the land, reuse of surplus material in environmental restorations in the vicinity of the plinth.
Arbillera 400/220 kV substation	Reconditioning of the main drainage system (sowing of grasses and planting shrubs).



Restoration of areas affected by works	
La Oliva 132 kV substation	Geomorphological recovery of the land, reuse of stone with lichen in slope restoration and affected areas at the entrance. Landscape integration. Reuse of stone without lichen in the perimeter wall.
Plaza 220 kV substation incoming and outgoing feeder lines	Geomorphological recovery of the land. The sowing of seed by hand.
400kV Mezquita-Morella line	Geomorphological recovery of the land. The sowing of seed by hand.
400kV Siero-Puente San Miguel 1 line (REPEX)	Geomorphological recovery of the land.
	Improvement of tracks.
	Restoration of enclosures/walls between plots of land.
220kV Abadiano - Sidenor line (REPEX)	Geomorphological recovery of the land.
	Improvement of tracks.
	Restoration of enclosures/walls between plots of land.
Incoming/outgoing line of La Jara	Improvement of tracks.
220kV Balsicas-El Palmar line	Construction of a stone wall around towers T101N and T105N.
Increase in power capacity - 400kV Catadau-Godelleta line Increase in power capacity - 220kV Catadau-Godelleta line	Restoration of access road to tower 10 in accordance with the instructions of the environmental agent of the area.



## Waste management 2018

The following describes the waste managed and the final destination for each type in 2018.

### Total quantities managed by waste type (t)

Non-hazardous waste	Quantities managed (t)			
	2015	2016	2017	2018
Septic tank sludge	1,087.3	753.5	532.3	709.0
Metallic waste not contaminated with hazardous substances	1,476.9	333.0	161.7	210.1
Inert waste	537.5	574.0	956.0	555.9
Paper and cardboard	95.1	102.7	61.1	21.455
Toner and printer inks <sup>82</sup> (kg)	8 kg	26 kg	15 kg	12 kg
Wood	119.9	71.4	110.2	15.2
Vegetable waste <sup>83</sup>	68.3	11.7	15.2	36.7
Non-hazardous electrical and electronic waste	0.3	0.9	0.4	1.5
Plastics	15.5	15.6	16.1	7.4
Glass (kg)	10	160	385	0
Vegetable cooking oils	1.2	2.5	3.7	0
Alkaline batteries - Non-Mercury (kg)	51	44	153	37
Silica gel and other inorganic chemicals <sup>84</sup>	0.7	1.2	0.2	0.5
Absorbent and filtering materials <sup>85</sup>	0.0	0.5	0.07	0
Saturated or used ion exchange resins <sup>86</sup>	-	-	6.9	0
Large volume waste	-	-	1.1	0
<b>Total</b>	<b>3,334.4</b>	<b>1,855.5</b>	<b>1,850.2</b>	<b>1,521.1</b>
<b>Total without metallic waste <sup>87</sup></b>	<b>1,857.5</b>	<b>1,522.4</b>	<b>1,688.5</b>	<b>1,311.0</b>

<sup>82</sup> The management of toner and ink corresponds to the company that supplies and services the printer. Only units purchased directly by Red Eléctrica are taken into account.

<sup>83</sup> This item is not taken into consideration in the calculation of the total non-hazardous waste. This value is not significant due to the fact that the greater part of this waste is incorporated into the land or given to landowners. The table includes exclusively that waste delivered to a waste management company.

<sup>84</sup> This waste item was incorrectly accounted for in previous years in the hazardous waste section.

<sup>85</sup> New waste item included in 2016, in 2018 no waste was generated.

<sup>86</sup> New waste item included in 2017, in 2018 no waste was generated.

<sup>87</sup> Change in the process of accounting for scrap metal since 2016 due to adjustments in the process of collecting and recording the information.



Hazardous waste	Quantities managed (t)			
	2015	2016	2017	2018
Used oil	172.389	256.227	657.673	425.054
Oils with PCBs <sup>88</sup>	0	0	0	0
Oil/water mixture	418.5	721.8	182.4	233.1
Diesel/water mixture	0.00	9.90	0.00	1.24
Transformers and equipment with PCBs <sup>89</sup>	3.9	10.5	12.6	11.3
Hazardous electrical and electronic waste: equipment containing oil	275.5	539.9	2,745.4	1,577.5
Hazardous electrical and electronic waste: Other	119.5	236.8	31.0	0.97
Nickel-cadmium accumulators	33.4	15.6	54.1	24.5
Lead batteries	0.7	1.0	0.5	4.4
Earth impregnated with hydrocarbons	144.9	204.8	264.6	702.2
Containers that have contained hazardous substances	5.6	7.4	4.6	8.5

<sup>88</sup> Once the elimination/decontamination plan for transformers, equipment and oil containing PCBs was completed in 2010, the amounts that are now generated are caused by the removal of old sealed equipment that is contaminated at the end of its useful life. In 2018, 11,268 Kg of equipment contaminated with PCBs was managed.

<sup>89</sup> See previous note.



Absorbent materials, filtering materials, cleaning rags/cloths and protective clothing contaminated with hazardous substances	2.8	5.6	29.9	8.3
Non-halogenated solvents	0.0	0.0	10.1	0.0
Halogenated solvents (kg)	0 kg	7 kg	0 kg	0 kg
Water-based cleaning liquids (kg)	59 kg	0 kg	0 kg	0 kg
Paint waste	1.7	0.9	0.2	0.6
Insulation material (with or without asbestos)	0.3	3.3	12.1	1.7
Laboratory chemical products containing hazardous substances	1.0	0.4	0.8	0.5
Gases in pressurised containers <sup>90</sup>	3.1	10.6	3.8	9.4
Anti-freeze containing hazardous substances (kg)	43 kg	573 kg	20 kg	0 kg
Florescent tubes	0.5	0.7	0.9	0.92
Batteries (kg)	92 kg	39 kg	33 kg	1 kg
Fuel oil and diesel	0.0	0.0	0.0	0.7

<sup>90</sup> The handling of used SF<sub>6</sub> gas that is out of specification, consisting of the regeneration of gas for reuse, takes place outside Spain. This means that 0.30% of total hazardous waste has been transported internationally.



Oil-filled cable (hydrocarbon) <sup>91</sup>	0.00	0.00	91.37	0.00
Waste coming from adhesives and sealants containing organic solvents or other hazardous substances <sup>92</sup>	0.0	0.3	0.0	0.0
Metal contaminated with hazardous substances Includes contaminated cables <sup>93</sup>	0.0	9.3	0.0	26.0
<b>Total (t)</b>	<b>1,183.9</b>	<b>2,035.6</b>	<b>4,102.1</b>	<b>3,036.9</b>

<sup>91</sup> New waste item introduced in 2017. Included in 2018 in the category 'Metal contaminated with hazardous substances Includes contaminated cables'.

<sup>92</sup> New waste item included in 2016.

<sup>93</sup> Includes contaminated cables in 2018.



## Total quantities managed by waste management type (tonnes)

Non-hazardous waste	Quantities managed (t) by waste management type					Type of management <sup>94</sup>
	Re-use	Recycling Composting Anaerobic Digestion	Regeneration	Valuation	Elimination	
Septic tank sludge		709.0				100% Composting / Filtering / Recycling (Composting 62% / Anaerobic Digestion 38%)
Metallic waste not contaminated with hazardous substances		210.1				Recycling 100%
Inert waste		384.90			171.04	Recycling 69.23% Elimination to landfill sites 30.77%
Paper and cardboard		21.455				Recycling 100%
Toner and printer inks (kg)		0.012				Recycling 100%
Wood		15.10			0.09	Recycling 99.41% Elimination 0.59%
Vegetable waste						Recycling 99.62% Re-use 0.38%
Non-hazardous electrical and electronic waste		1.42				Recycling 100%
Plastics		7.4				Recycling 100%
Glass (kg)						
Vegetable cooking oils						
Alkaline batteries - Non-Mercury (kg)		0.011			0.026	Recycling 29.72% Elimination 70.28%
Silica gel and other inorganic chemicals				0.220	0.306	Energy valuation 41.82% Elimination 58.18%
Absorbent and filtering materials						
Saturated or used ion exchange resins						
Large volume waste						
%	0	88.714	0	0.014	11.272	
t	0	1,349.467	0	0.220	171.463	

<sup>94</sup> Default procedure for contractors responsible for the management of hazardous waste. The total amount of hazardous waste destined for recycling is estimated at 49.10%.



Hazardous waste	Quantities managed (t) by waste type					Type of management <sup>95</sup>
	Re-use	Recycling Composting Anaerobic Digestion	Regeneration	Valuation	Elimination	
Used oil			425.044		10.000	Regeneration 99.99% Elimination 0.01%
Oils with PCBs <sup>96</sup>						Regeneration 47.43% Re-use 6.37% Elimination 46.20%
Oil/water mixture	14.840		110.556		107.718	Regeneration 73% Recycling 27%
Diesel/water mixture				1.240		Valuation 100%
Transformers and equipment with PCBs <sup>97</sup>		9.750			1.518	Recycling 86.53% Elimination 13.47%
Hazardous electrical and electronic waste: equipment containing oil	1.387				190.504	Recycling 87.93% Elimination 12.07%
Hazardous electrical and electronic waste: Other		0.97				Recycling 100%
Nickel-cadmium accumulators		24.264			0.010	Recycling 99.96% Elimination 0.04%
Lead batteries		4.388			0.050	Recycling 98.88% Elimination 1.12%
Earth impregnated with hydrocarbons		19.373			682.863	Recycling 2.75% Elimination 97.25%
Containers that have contained hazardous substances		8.510			0.037	Recycling 99.57% Elimination 0.43%

<sup>95</sup> Default procedure for contractors responsible for the management of hazardous waste. The total amount of hazardous waste destined for recycling is estimated at 49.10%.

<sup>96</sup> Once the elimination/decontamination plan for transformers, equipment and oil containing PCBs was completed in 2010, the amounts that are now generated are caused by the removal of old sealed equipment that is contaminated at the end of its useful life. In 2018, 11,268 Kg of equipment contaminated with PCBs.

<sup>97</sup> See previous note.



Absorbent materials, filtering materials, cleaning rags/cloths and protective clothing contaminated with hazardous substances				7.413	0.917	Valuation 89% Elimination 11%
Non-halogenated solvents						
Halogenated solvents (kg)						
Water-based cleaning liquids (kg)						
Paint waste		0.216			0.377	Valuation 36.42% Elimination 63.58%
Insulation material (with or without asbestos)					1.757	Elimination 100%
Laboratory chemical products containing hazardous substances		0.494			0.016	Recycling 96.87% Elimination 3.13%
Gases in pressurised containers <sup>98</sup>		9.396			0.018	Recycling 99.81% Elimination 0.19%
Anti-freeze containing hazardous substances (kg)						
Florescent tubes		0.772			0.154	Recycling 83.37% Elimination 16.63%
Batteries (kg)				1 kg		Valuation 100%
Fuel oil and diesel				0.669		Valuation 100%

<sup>98</sup> The handling of used SF<sub>6</sub> gas that is out of specification, consisting of the regeneration of gas for reuse, takes place outside Spain. This means that 0.30% of total hazardous waste has been transported internationally.



Oil-filled cable (hydrocarbon)						
Waste coming from adhesives and sealants containing organic solvents or other hazardous substances						
Metal contaminated with hazardous substances Includes contaminated cables		26.0				Recycled or recovery of metals 100%
%	0.49	49.10	17.64	0.31	32.47	
t	14.840	1,491.163	535.600	9.323	985.949	

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