

# Environmental Report 2011



RED ELÉCTRICA DE ESPAÑA

# Presentation

Electricity has become a basic resource for everyday life. The technological development of its new uses makes it possible for it to not only be ever more present in our day-to-day routines but also to better adapt to the needs of developed societies. Furthermore, thanks to its versatility, the diversity of primary energy sources and technologies that can be used to produce it, electricity represents the fundamental pillar for moving towards a more sustainable energy model, based on security of supply, efficiency and respect for the environment.

Red Eléctrica, as operators and managers of the transmission grid, is successfully contributing to making this goal a reality. During 2011, we continued to invest in the development of electricity infrastructures, making them compatible, as far as possible, with their surroundings, and implemented new technical solutions regarding system operation that enable us to take fuller advantage of renewable energies and manage the electricity system more efficiently.

Our commitment towards achieving a more sustainable energy future that will contribute in the fight against climate change was reinforced in 2011 with the adoption of the Climate Change Strategy and the definition of its action plan. In accordance with this strategy, we have set the target of reducing 20% of the emissions derived from our activities by 2020. In order to do this, we have already begun work to carry out the emissions inventory and to define its calculation methodology, and we have performed an initial analysis of indirect emissions. In 2011, it is worth noting that, thanks to the "The Red Eléctrica Forest" project, we have succeeded in offsetting 32% of our direct emissions by planting trees, contributing at the same time to the recovery of degraded natural areas.

Red Eléctrica carries out numerous actions in order to mitigate as far as possible the undesired impacts of its facilities on the environment, therefore each of our actions has a study of an environmental nature associated to it. Moreover, we collaborate with the government administrations and other interested parties in the designation of the locations and routes of less environmental impact for our infrastructures, and we implement the preventive and corrective measures necessary to minimize their possible effects on their surroundings. In 2011, 100% of the infrastructure construction works were subjected to a thorough environmental supervision in order to ensure and confirm that all the actions were performed in compliance with the environmental criteria established.

The conservation of biodiversity is another priority area where Red Eléctrica proactively works. The main objective in this field is, on one hand, to further collaboration with prestigious institutions and organisations in order to back common interest initiatives focused on the conservation and improvement of biodiversity and, on the other hand, to promote environmental projects in local communities aimed at preserving ecosystems and indigenous species.



In 2011, we participated in numerous projects especially focused on the conservation of birdlife and which in the majority of the cases were carried out under the framework of the Company's Sustainability Laboratory. Additionally, noteworthy is the approval of the Forestry Management Policy which sets out the commitment of the Company towards biodiversity conservation and the prevention and fight against forest fires.

Additionally, during 2011, we continued to implement several measures aimed at reducing consumption of basic resources and increasing energy efficiency. In this respect, water consumption per employee in the work centres has been reduced by almost 39% with regards to 2010, paper consumption per employee by 5% and fuel consumption of fleet vehicles by 27%. In addition, we implemented energy efficiency measures in the construction of new maintenance buildings and also obtained the Energy Management System Certification for the buildings that make up the Head Office, according to standard EN 16001.

Finally, within the field of R&D&i, we continued working in collaboration with institutions and organisations on projects for the protection of flora and birdlife, as well as in the prevention of forest fires. Amongst other actions, noteworthy is the project for drafting a bird collision risk map, whose aim is to develop a model to assess the probability of birds colliding with high voltage transmission lines and the project for creating a simulation model regarding the growth of forest masses to prevent possible incidents involving high voltage lines, with the aim of ensuring that the minimum safety distance between the trees and the lines is maintained.

In short, respect for the natural environment, conservation of biodiversity, taking maximum advantage of renewable energy, control of contaminating emissions or improving energy efficiency continue to be the key elements that underpin our commitment to contribute to ensuring that the electricity of today and that of the future be safe, efficient and environmentally sustainable.

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# 1

## Who is Red Eléctrica

We are responsible for the technical management of the Spanish electricity system. We are the owners of the Spanish high voltage electricity transmission grid and the only company in Spain specialised in the activity of electrical energy transmission.

As operator of the Spanish electricity system (peninsular and extra-peninsular), our main function is to guarantee the continuity and security of the electricity supply and the correct co-ordination of the generation and transmission system. This is achieved by working in cooperation with the operators and agents of the Iberian Market for electrical energy, under the principles of transparency, objectivity and independence.

As manager of the transmission grid, we perform our function as sole transmission agent guaranteeing the expansion and development of the facilities, carrying out their maintenance and improvement following homogeneous and coherent criteria; and managing the flow of electricity between exterior systems which is carried out using the Spanish electricity transmission grid. We provide the operator of any other interconnected grid with sufficient information in order to guarantee a secure functioning and we also guarantee access to the grid by third parties under a regime of equality.

Our transmission infrastructure comprises of electricity control systems which manage and supervise the operation of the system, a circuit of 40,133 kilometres of high voltage transmission lines and 4,854 substation bays with a transformer capacity of 74,920 MVA.



Evolution of the facilities		2009	2010	2011
Lines	<b>Kilometers of circuit</b>	<b>34,750</b>	<b>38,395</b>	<b>40,133</b>
	400 kV	17,977	18,765	19,622
	220 kV and less	16,773	19,630	20,511
Substations	<b>Number of bays</b>	<b>3,385</b>	<b>4,607</b>	<b>4,854</b>
	400 kV	1,114	1,185	1,241
	220 kV and less	2,271	3,422	3,613
	<b>Transformer capacity (MVA)</b>	<b>65,797</b>	<b>72,220</b>	<b>74,920</b>

(\*) Data for the last three years revised and updated in 2011.

All the activities we carry out are done so in accordance with a strict environmental policy, from a perspective of an ethical commitment towards society, integrating environmental protection into our business management with the objective of continually creating value. In order to do this, we have an Environmental Management System in accordance with the UNE-EN ISO 14.001:2004 standard certified in May 1999 and which has been registered in the EU Eco-Management and Audit Scheme (EMAS) under registration number ES-SB-000013 since October 2001.

We are the first business group in the Spanish energy sector to hold the comprehensive triple certification: quality, environmental and occupational health and safety for all its companies.



We count upon an Environmental department which in December 2011 was comprised of 17 professionals, with widely varying educational backgrounds and who are experts in environmental matters and actively support all the organisational units in the performance of their daily activities. Additionally, the different territorial areas count on 19 technical professionals whose function is to control, on-site, all the environmental aspects which every Red Eléctrica facility undergoes during each phase: planning, construction and maintenance.



Respect for the environment, contributing to habitat conservation, correct waste management and minimising the consumption of natural resources is the responsibility of all our employees and collaborators in the execution of our daily activities.

The determined effort of Red Eléctrica to become a responsible, efficient and sustainable business model has been recognised by the main sustainability rating agencies. During this year, we have obtained recognition from the main sustainability indexes due to the results obtained within the environmental, social, economic and corporate governance scopes. Noteworthy amongst these are the following:

- ◆ Red Eléctrica continues to renew its presence in the Dow Jones Sustainability Index (DJSI) which it has done since 2005. In 2011, the rating obtained was 76 out of 100, comfortably above the energy sector average (58 points). The DJSI Indexes evaluate social, environmental and economic management through more than fifty general and specific criteria for each sector. In the environmental scope the Company scored 69 points, with the sector average being 51 and 63 points the highest score in the sector worldwide.



- ◆ In 2011, Red Eléctrica won the award for business excellence in the category "Taking responsibility for a sustainable future", as part of the awards given annually by EFQM to the best European companies for the adoption of the most advanced management systems and business practices. This was the first time the company presented its candidacy for the awards which are considered as the maximum exponent of European business excellence. In addition, as a result of this evaluation, Red Eléctrica improved its own national scores reaching 650 points.



More information at [www.ree.es](http://www.ree.es), Corporate Responsibility section



# 2 Environmental Policy\*

\* Fourth Edition approved by the Chairman's Office in October 2010.

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 responsibilities and functions.

The principles of our environmental policy are as follows:

- ◆ 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.
- ◆ Seek **leadership** in environmental matters in all the companies of the Group within their scope of activity.
- ◆ 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.
- ◆ Guarantee **continual improvement**, the **prevention of contamination** and the **principle of precaution**, according to the objectives and capacities of the 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 which is compatible with its surroundings**.
- ◆ Drive the conservation of **biological diversity** through active collaboration on those initiatives which help reduce their loss.
- ◆ Adopt a clear commitment in the fight against **climate change**, promoting energy efficiency as a fundamental pillar.
- ◆ Develop and provide ongoing actions regarding **training, awareness and motivation** concerning environmental protection.
- ◆ Maintain means and channels of **communication** for informing and communicating with all interested parties regarding environmental related activities whilst promoting **collaboration frameworks** with stakeholder groups.
- ◆ Consider environmental requirements as one of the criteria in the selection and evaluation of **suppliers**.



# 3 Indicators

By way of introduction, the following is a numerical representation of the information that is deemed most relevant, and which is detailed throughout this Environmental Report.

## Key indicators

### Electricity consumption at Head Office

	2009	2010	2011	
<b>A</b> MWh consumed	8,388	8,456	8,603	
<b>B</b> N° employees at Head Office	1,148	1,190	1,133	
<b>Indicator A/B</b>	<b>7.31</b>	<b>7.11</b>	<b>7.59</b>	

Data revised with respect to that published in 2010

### Fuel consumption of vehicles

	2009	2010	2011	
<b>A</b> GJ consumed	33,500	23,366*	21,612	
<b>B</b> Total N° of employees	1,886	1,944	1,943	
<b>Indicator A/B</b>	<b>17.76</b>	<b>12.02</b>	<b>11.12</b>	

(\*) Data revised with respect to that published in 2010

**Paper consumption**

	2009	2010	2011	
<b>A</b> Tonnes (t) consumed	86.091	71.044	67.563	
<b>B</b> Total N° of employees	1,886	1,944	1,943	
<b>Indicator A/B</b>	<b>0.046</b>	<b>0.036</b>	<b>0.035</b>	

**Water consumption at Head Office**

	2009	2010	2011	
<b>A</b> m <sup>3</sup> consumed	22,508	18,083	17,969	
<b>B</b> N° of employees at Head Office	854	888	813	
<b>Indicator A/B</b>	<b>26.36</b>	<b>20.36</b>	<b>22.20</b>	

**Hazardous waste**

	2009	2010	2011	
<b>A</b> Tonnes (t) of hazardous waste generated	1,149.305	2,744.814	2,016.763	
<b>B</b> Total N° of employees	1,886	1,944	1,943	
<b>Indicator A/B</b>	<b>0.61</b>	<b>1.41</b>	<b>1.04</b>	

**Direct greenhouse gas emissions**

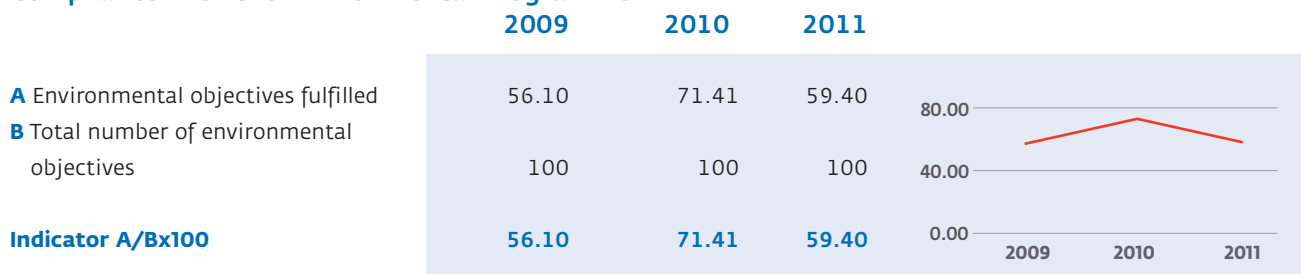
	SF <sub>6</sub>			CO <sub>2</sub>		
	2009	2010	2011	2009	2010	2011
<b>A</b> Tonnes (t) of CO <sub>2</sub> equivalent	65,764.28	61,500.50	66,741.00	2,437.00	1,717(*)	1,583
<b>B</b> Total N° of employees	1,886	1,944	1,943	1,886	1,944	1,943
<b>Indicator A/B</b>	<b>34.8697</b>	<b>31.6361</b>	<b>34.3495</b>	<b>1.2922</b>	<b>0.8821</b>	<b>0.8147</b>

(\*) Data revised with respect to that published in 2010.

(1) The calculation of this indicator considers direct emissions derived from the activities that are: emissions from SF<sub>6</sub> gas leaks and the emissions derived from the use of fleet vehicles.

## Environmental performance indicators regarding activities

### Compliance with the Environmental Programme



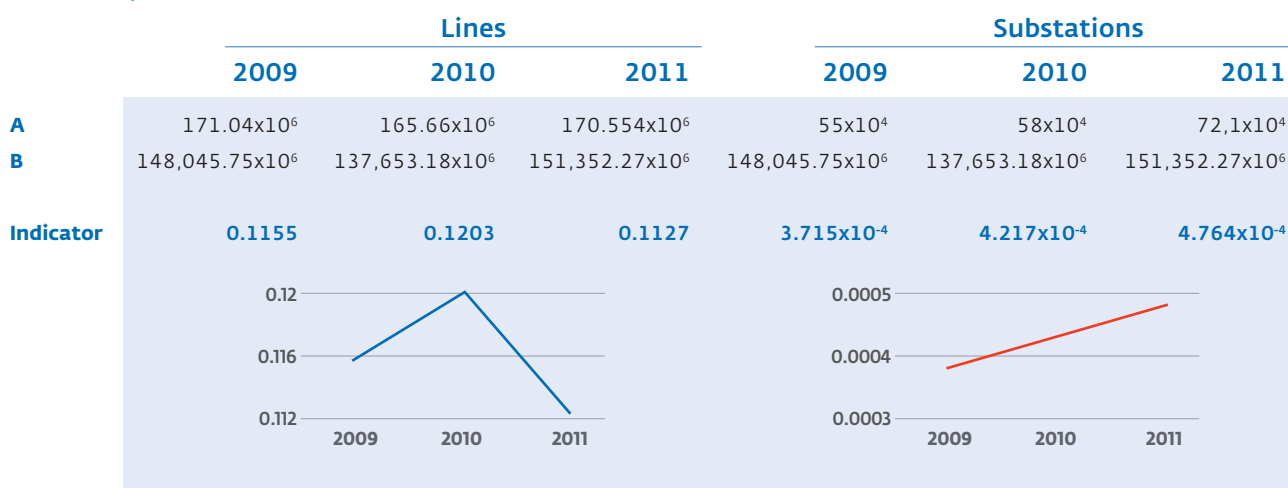
### Biodiversity: Area of land occupied

**A** Area of land in Red Natura occupied by lines (m<sup>2</sup>)

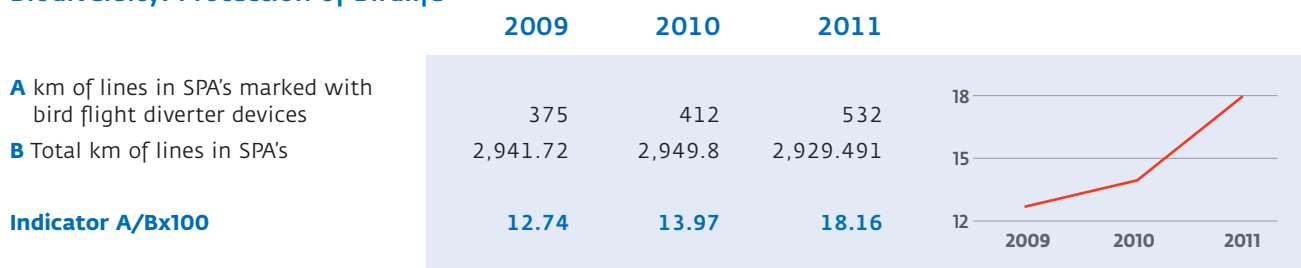
**A** Area of land in Red Natura occupied by substations (m<sup>2</sup>)

**B** Total area of Red Natura (m<sup>2</sup>)

**Indicator A/Bx100**



### Biodiversity: Protection of Birdlife



The objective of the indicator is not the marking of 100% of the lines that cross SPA's (Special Protection Areas) as not all bird species present in these areas are susceptible to colliding with the cables. At this moment the elaboration of an indicator that better reflects the marking is being worked on (for its calculation the areas in which species at risk of collision exist will be taken into account, whether they are in SPA's or not).

## Biodiversity: Impact of facilities

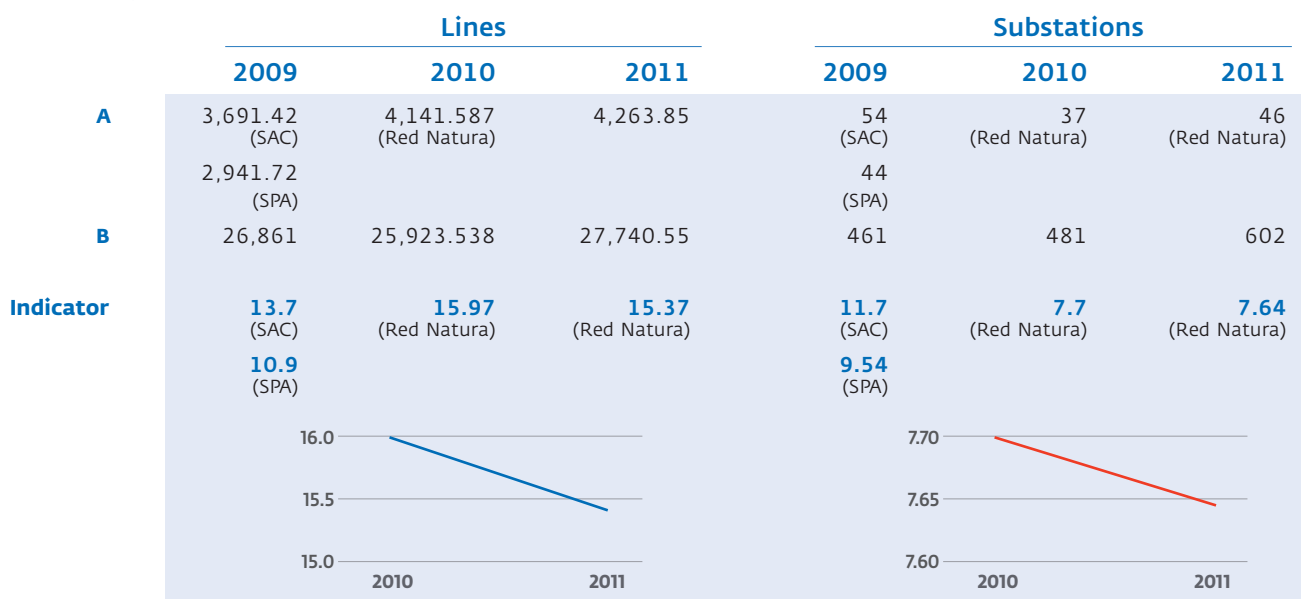
**A** km of line in Red Natura

Nº of substations in Red Natura

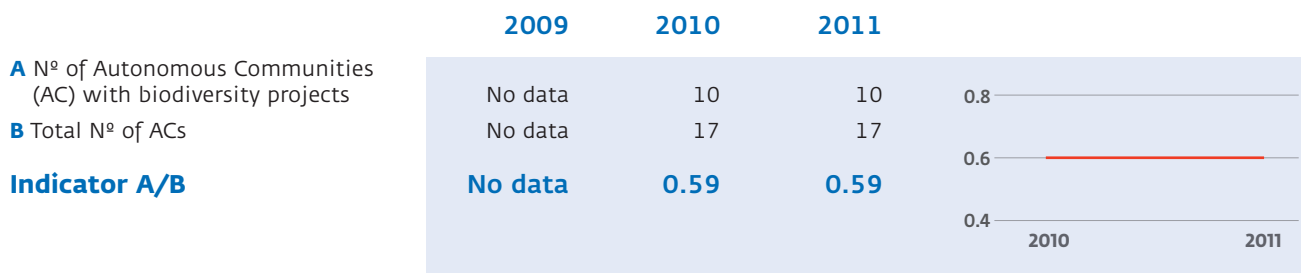
**B** Total km of line

Total Nº of substations

### Indicator A/Bx100



## Biodiversity/Relations with interested parties



## Emissions

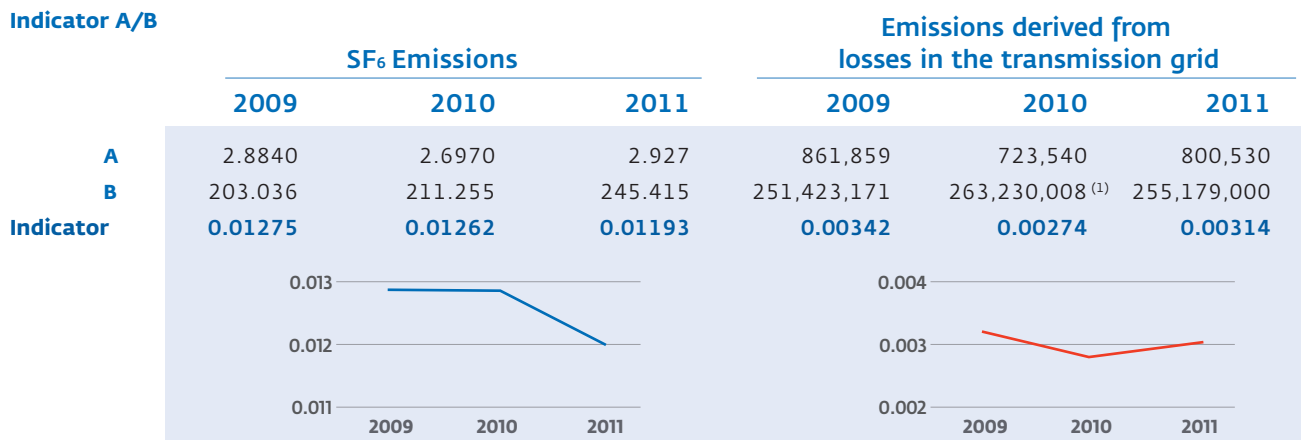
**A** SF<sub>6</sub> emissions (t) <sup>(\*)</sup>

Indirect emissions derived from losses in the transmission grid (tonnes of CO<sub>2</sub> equivalent)

**B** SF<sub>6</sub> installed (t)

MWh transported

### Indicator A/B



The most representative emissions related to the activity are the SF<sub>6</sub> emissions (direct) and the emissions derived from the losses in the transmission grid.

(\*) In order to evaluate the SF<sub>6</sub>, en relación con el total de gas SF<sub>6</sub> gas emissions in relation to the total SF<sub>6</sub> gas installed, it has been considered more appropriate to use the tonne unit of SF<sub>6</sub> emissions instead of calculating them in tonnes of CO<sub>2</sub> equivalent.

(1) Data revised with respect to that published in 2010.



## Environmental costs

**A** Environmental investment  
**B** Total investment

Environmental expenditure  
 Total expenditure

Indicator A/Bx100

	Environmental investment			Environmental expenditure		
	2009	2010	2011	2009	2010	2011
<b>A</b>	4,427,759.53	6,277,588.17	7,027,748.50	13,651,980.44	18,866,104.90	20,306,267.75
<b>B</b>	734,766,000	2,286,488,000	818,944,000	639,328,000	725,556,000	829,576,000
<b>Indicator</b>	<b>0.60</b>	<b>0.27</b>	<b>0.86</b>	<b>2.13</b>	<b>2.60</b>	<b>2.45</b>

**A** Environmental R&D&i expenditure  
**B** Total expenditure in R&D&i

Indicator A/Bx100

	Environmental R&D&i expenditure		
	2009	2010	2011
<b>A</b>	600,471.56	618,489	383,981
<b>B</b>	6,780,278	5,020,000	7,217,687.96
<b>Indicator</b>	<b>8.85</b>	<b>12.30</b>	<b>5.32</b>

— Environmental investment  
 — Environmental expenditure  
 — Environmental R&D&i expenditure

## Training and awareness

	2009	2010	2011
<b>A</b> N° of employees who received environmental training	247	48	37
<b>B</b> N° of employees	1,604	1,560	1,641
<b>Indicator A/Bx100</b>	<b>15.39</b>	<b>3.07</b>	<b>2.25</b>

## Accidental spillage of hydrocarbons

	2009	2010	2011
<b>A</b> N° of accidents involving oil or fuel spillages from in-service machinery and equipment	13	18	22
<b>B</b> Total N° of accidents	27	27	27
<b>Indicator A/Bx100</b>	<b>48.15</b>	<b>66.66</b>	<b>81.48</b>



## 4 Objectives

The Environmental Programme of Red Eléctrica contains the set of environmental improvements which we intend to carry out throughout the term of one year. This Programme describes the environmental objectives which may be annual or multi-year, and includes the goals throughout the year for achieving each of these objectives.

Due to the degree of complexity of the activity carried out by Red Eléctrica, the geographical distribution and the multiplicity of actions, the Environmental Programme defines objectives which are directly linked to the improvement of environmental aspects and other objectives which contribute to environmental improvement of the processes. In the various sections of this Report, information is provided as to how environmental issues are associated to the various activities, as well as the contribution of the objectives to environmental improvement.

The total fulfilment of the Environmental Programme is the sum of the fulfilment of the different objectives.

The contribution of each objective to the environmental programme is weighted according to its importance based on a total of 100 points.

To achieve each objective, a set of goals are defined. The fulfilment of each objective is the sum of the fulfilment of the goals which are foreseen to be carried out during the year.

The global fulfilment of the Environmental Programme 2011 was 59.4%, representing a decrease of 12 percentage points with respect to last year.

The following is a table which summarises the objectives addressed during 2011 indicating the contribution of each one of them to the Programme and their level of fulfilment for the year.

## Environmental programme 2011

### Responsible environmental investment

Aspect group/ Associated processes	Objectives	Character/ term	Weighting	Fulfilment	%	Page <sup>(1)</sup>
<b>Scope of environmental improvement:</b>						
<b>Preventing the environment from being affected</b>						
Presence of facilities	Incorporation of landscape integration criteria into the design of new substations	Multi-year (2011-2013)	5	5	100	21
Construction process	Implementation of environmental certificate regarding construction	Multi-year (2011-2012)	12	10	83.33	29

### Climate change, energy efficiency and the saving of resources

Aspect group/ Associated processes	Objectives	Character/ term	Weighting	Fulfilment	%	Page <sup>(1)</sup>
<b>Scope of environmental improvement:</b>						
<b>Reduction of greenhouse gas emissions</b>						
Emissions	Conducting an emissions inventory of Red Eléctrica. Definition of specific objectives and the calculation methodology for their monitoring	Multi-year (2011-2013)	12	10.4	86.67	39
	Reduction of SF <sub>6</sub> gas emissions	Multi-year (2011-2013)	10	2	20	40
	Integration of renewable energies up to 20% of consumption in work centres (2010-2020)	Multi-year (2011-2013)	5	0	0	44
<b>Scope of environmental improvement:</b>						
<b>Activities regarding significant environmental aspects</b>						
Energy efficiency	20% reduction in energy consumption by 2020	Multi-year (2011-2013)	10	4	40	45
	10% reduction in the consumption of natural resources (2010-2020)	Multi-year (2011-2013)	4	2	50	48

### Biodiversity

Aspect group/ Associated processes	Objectives	Character/ term	Weighting	Fulfilment	%	Page <sup>(1)</sup>
<b>Scope of environmental improvement:</b>						
<b>Preventing the environment from being affected</b>						
Biodiversity	Bird-collision risk map	Multi-year (2011-2013)	7	7	100	63
	Establish 17 actions regarding biodiversity in the 17 Autonomous Communities	Multi-year (2011-2013)	7	7	100	37
	Establish agreements to prevent and fight forest fires	Multi-year (2011-2013)	3	0	0	35



## Environmental aspect improvement of transmission grid facilities

Aspect group/ Associated processes	Objectives	Character/ term	Weighting	Fulfilment	%	Page <sup>(1)</sup>
<b>Scope of environmental improvement:</b>						
<b>Preventing the environment from being affected</b>						
Maintenance process	Incorporation of Red Eléctrica's environmental criteria in the maintenance process of electricity line corridors (in existence at 31/12/10)	Multi-year (2011-2013)	10	10	100	35
	Reduce the risks of the existing facilities on birdlife	Multi-year (2011-2013)	5	0	0	37

## Improvement of relations with interested parties

Aspect group/ Associated processes	Objectives	Character/ term	Weighting	Fulfilment	%	Page <sup>(1)</sup>
<b>Scope of environmental improvement:</b>						
<b>Activities regarding other aspects</b>						
Communication / Awareness	Design a new format for the environmental section on the corporate webpage	Annual	5	2	40	67
Suppliers	Integration of environmental criteria in the qualifying process for suppliers of Red Eléctrica	Multi-year (2011-2013)	5	0	0	74
<b>Total fulfilment</b>			<b>100</b>	<b>59.4</b>		

(1) In the various chapters of this report – pages indicated in the right-hand column of the table – reference is made to each objective and its level of fulfilment.

All multi-year objectives shall be continued in 2012 with the exception of the following:

- ◆ "Integration of renewable energies up to 20% of consumption in work centres (2010-2020)". In 2011, the relevant information that would have allowed the definition of the model to be implemented in 1 building was unavailable. Given the difficulties, options shall continue to be explored to incorporate renewable energy in the facilities for own use, but not as an environmental objective.
- ◆ "Integration of environmental criteria in the qualifying process for suppliers of Red Eléctrica". In 2011, work was carried out on the definition of the qualification phase questionnaires linked to providers who perform activities associated with works. The monitoring phase shall be developed in 2012 for the whole of Red Eléctrica which is why it has been considered more appropriate for this objective to be integrated into the line of work already undertaken by the unit responsible.

# 5 Environmental Activities

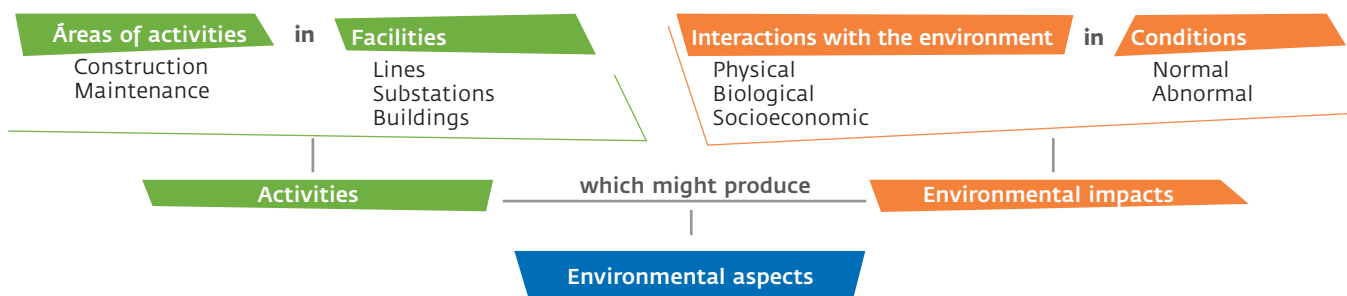
We work with the commitment to integrate environmental protection in the execution of our day to day tasks and activities.

During **the planning phase** we perform environmental studies on all our facilities and define alternatives, which are technically and economically feasible and have the least possible impact on the environment and society.

During the **construction phase** we conduct comprehensive environmental monitoring of all the works being executed, both for new facilities as well as for modifications to existing ones.

During the **maintenance phase** we systematically carry out periodic reviews and audits on the facilities in service which allow us to define and implement preventive and corrective measures, detect potential environmental incidents and verify the effectiveness of the measures put in place during the construction phase.

In all the planning and construction activities, as well as the maintenance activities, conducted on facilities in service, we identify and assess the direct and indirect environmental aspects that could interact with the environment, and which could lead to any type of negative impact, both under normal and abnormal operating conditions.



## 5.1. Environmental activities regarding facilities in the planning phase

### 5.1.1 Planning

The development of the electricity transmission grid is essential to fulfil the European Union 20-20-20 objectives. The planned infrastructure is essential for the integration of new renewable energy, the commissioning of the high speed train lines, improved efficiency of the electricity system and to take full advantage of the existing renewable energy (thanks to grid meshing and international interconnections) and the electrification of the Spanish energy system, which facilitates the utilisation of renewable energy in a greater number of uses.

During 2011, work continued on the analysis of the environmental feasibility of the Electricity Planning 2012-2020 proposal. As a result, those projects deemed unviable have not been included in the planning proposal presented to the former Ministry of Industry, Energy and Tourism.

Red Eléctrica has collaborated with the Ministry of Industry, Energy and Tourism in the process of Strategic Environmental Assessment for the new planning 2012-2020 (Energy planning in the gas and electricity sectors). At present, the Environmental Report is being drafted (Ministry of Industry, Energy and Tourism and Ministry of Agriculture, Food and Environment) and questions which have since arisen are in the process of being responded to.

In addition, in 2011, work continued on the calculation of indicators that allow the evaluation of environmental effects (positive and negative) derived from the execution of the Infrastructures Planning 2008-2016.

Similarly, Red Eléctrica collaborates with several Autonomous Communities in the development of Regional Electricity Infrastructure Plans that allow the planning of the electricity sector to be configured within the territory by means of reserving those corridors necessary for its development.

### 5.1.2 Project

During 2011, environmental permitting proceedings for **30 projects** were begun:

Proceedings initiated	2008	2009	2010	2011
Initial document	116	33	13	17
Environmental document	52	29	14	13
<b>Total initiated</b>	<b>168</b>	<b>62</b>	<b>27</b>	<b>30</b>

The evolution of the conclusion of the environmental processing of the projects for new facilities in the last four years is as follows:

Completed proceedings	2008	2009	2010	2011
Positive Environmental Impact Declaration	6	12	15	15
Administrative Resolution	5	22	17	6
<b>Total</b>	<b>11</b>	<b>34</b>	<b>32</b>	<b>21</b>

Environmental authorisation has been obtained for the following **28 proceedings**:

### Positive Environmental Impact Declaration <sup>(1)</sup>

- ◆ 220 kV Villares del Saz-Olmedilla line
- ◆ Cardiel 220 kV substation  
Cardiel line-Mequinenza-Monzón line
- ◆ Bernat 220 kV substation
- ◆ Torremendo 400/220 kV substation  
Torremendo line-Escombreras-Rocamora line
- ◆ San Serván 400/220 kV substation  
400 kV Almaraz-San Serván line  
400 kV San Serván-Brovaes line  
400 kV Brovaes-Guillena line
- ◆ Ramis 400 kV substation  
Santa Llogaia 400/25 kV substation (ADIF)  
400 kV Bescanó-Ramis-Santa Llogaia line
- ◆ 220 kV San Serván-Mérida line
- ◆ 220 kV María-Plaza line
- ◆ 400 kV Puebla de Guzman-F. Portuguesa line
- ◆ Godelleta 220 kV substation
- ◆ Godelleta 400 kV substation  
400 kV Godelleta line-Catadau-Requena line  
400 kV Godelleta line-Cofrentes-La Eliana line
- ◆ 400 kV Baza-Caparacena line
- ◆ 220 kV Godelleta line-Catadau-Torrente line
- ◆ Salzadella 400 kV substation  
400 kV Salzadella line-La Plana-Vandellós line
- ◆ Platea 400 kV line  
400 kV Mezquita-Platea line

### Environmental Resolution <sup>(2)</sup>

- ◆ Illora 220 kV substation (ADIF)  
220 kV Illora line-Atarfe-Tajo de la Encantada line  
220 kV Illora line-Caparacena-Tajo de la Encantada line
- ◆ Repowering of 220 kV Aceca-Picón line
- ◆ Casarrubios 220 kV substation  
220 kV Casarrubios line-Majadahonda-Talavera line
- ◆ Modification of 400 kV Mudarra-San Sebastián de los Reyes section of line (132-146)
- ◆ Modification of 400 kV Valdecaballeros-Guadame line (170-179)
- ◆ Enlargement of Moralets 220 kV substation

### Projects exempt from regulated environmental permitting proceedings (after publishing consultation document)

- ◆ Modification of 220 kV José María Oriol-Cáceres line (93-96)
- ◆ Modification of 400 kV Mudarra-San Sebastián de los Reyes line (132-145)
- ◆ Modification of 220 kV Júndiz-Puentelarra line (298-300)
- ◆ Modification of 220 kV Hernani-Arkale line (4-7)
- ◆ Substitution of 100 metres of underground line of the Ibiza-Formentera 2 interconnection
- ◆ Repowering of 220 kV Aceca-Picón line
- ◆ Repowering of 220 kV Coslada-Loeches line

(1) Authorisation resulting from the complete process of the Environmental Impact Assessment (Environmental Impact Study).

(2) Authorisation resulting from the permitting proceeding of an Environmental Document (Environmental Impact Study summary).



The number of Environmental Impact Studies finalised during the year was 39.

	2008	2009	2010	2011
<b>Finalised Environmental Impact Studies</b>	14	33	36	39

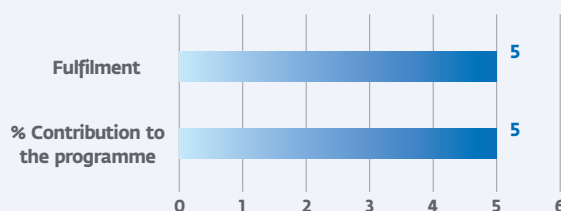
At year end, **154 proceedings** are at some stage or other of the environmental permitting phase.

## Objectives associated with a responsible environmental investment (project planning phase)

### OBJECTIVE 1 Incorporation of landscape integration in the design of new substations

% Fulfilment: 100

**01.1** Engineering and design of 8 "standard" buildings



Committed to achieving an environmentally responsible investment in the new facilities of Red Eléctrica, since 2010 work has taken place to establish standard criteria to enable a better integration between substation buildings and features of the local landscape in accordance with the geographical areas where these can be located. During 2011, the design of 8 "standard" buildings for integration into the landscape was completed and the first model in the Balearic Islands which may be applied to new substations will be implemented as of 2012.

For 2012, the engineering and landscape integration of 5 substations is planned.



## 5.2. Environmental activities in facilities under construction

We carry out environmental monitoring of the construction of new electricity lines and substations as well as renovations, upgrading and enlargements of those facilities already in service. This supervision consists mainly of checking the application of preventive and corrective measures defined in the project, verifying their effectiveness and defining new measures, if considered necessary, based on the results obtained.

In 2011, facilities in the construction phase were: 50 substations and 1,320.58 km of line.

Following the line of work began in 2008, reinforcement of the environmental supervision has continued regarding construction activities with the aim of ensuring the suitable fulfilment of the environmental requirements and verifying the effectiveness of the implemented preventive and corrective measures.

The greatest effort has been made regarding the supervision of new lines and substations, increasing the contracting of companies specialised in works supervision, which provide field support for the Red Eléctrica technician.

Throughout the year, environmental supervision was carried out on 100% of the construction works in substations and 95% of the works regarding lines (this % also considers works regarding modifications of existing lines). The environmental supervision contracted whose objective to intensify the control and monitoring, covered 66% of works underway.

Environmental supervision (new facilities)	2009	2010	2011
<b>Substations</b>			
Total number of works supervised	36	45	50
Permanent environmental supervision (contracted)	7	23	33
Permanent environmental supervision %	19.44	51	66
<b>Lines</b>			
Total works supervised (km)	990.05	1,534.8	1,248.8
Permanent environmental supervision (contracted) (km)	607.83	1,437.7	824.7
Permanent environmental supervision %	61.39	93.7	66

### Environmental aspects in the construction of facilities

Activities regarding the construction of new lines and substations susceptible to generating environmental aspects are the following:

#### Activities that generate environmental aspects

- ◆ Storage and transfer of oils and fuels
- ◆ Storage and management of waste
- ◆ Work camps (substations)
- ◆ Land compacting
- ◆ Clearing, pruning and felling
- ◆ Excavation and landfill works
- ◆ Concreting and cleaning of containers
- ◆ Hanging/laying of conductor and grounding cables (lines)
- ◆ Equipment assembly (substations)
- ◆ Use of machinery

The environmental aspects which are significant in the construction of new lines and substations are those detailed in the following table:

Significant environmental aspects in the construction of lines and substations	Environmental aspect susceptible to impact	Impact
Affecting fauna <sup>(1)</sup>	Biological	Altering population behaviour
Affecting flora	Biological	Eliminating vegetation
Affecting soil	Physical	Possible modification of physical characteristics of soil, erosion etc.
Affecting historical and cultural heritage	Socioeconomic	Potential landscaping impact, affecting patrimonial sites, crops, etc.
Risk of fire <sup>(1)</sup>	Physical/Biological/Socioeconomic	Potential degradation
Risk of oil and fuel spillage during use of machinery <sup>(1)</sup>	Physical	Potential contamination of soil and water sources
Risk of oil and fuel spillage during storage and transfer of oils and fuels <sup>(1)</sup>	Physical	Potential contamination of soil and water sources
Risk of oil spillage during assembly of equipment <sup>(1)</sup>	Physical	Potential contamination of soil and water sources
Risk of affecting water during land movements <sup>(1)</sup>	Physical	Potential contamination of soil and water sources
Risk of affecting birdlife <sup>(1)</sup>	Biological	Potential collisions
Non-hazardous waste	Physical	Generation of waste
Hazardous waste	Physical	Generation of waste

*(1) Significant aspects in less than 50% of works.*

### Noteworthy preventive and corrective measures in construction

As in previous years, we have applied preventive and corrective measures regarding new lines and substations trying to reduce the effect that the construction of the installation might cause to the environment.

In general, we undertake to carry out all the preventive and corrective measures set out in the Environmental Impact Studies and we assume as requirements those new measures that are included in the Environmental Impact Declarations.

In addition we have put in place the necessary measures to avoid or reduce potential impacts that can be detected during the course of work being carried out, although not having been contemplated in prior phases.

### Preventive Measures

- ◆ Storage of topsoil
- ◆ Hoisting of towers with boom crane/helicopter
- ◆ Hanging of lines by hand/helicopter
- ◆ Installation of bird-saving spirals
- ◆ Archaeological survey
- ◆ Relocating of nests
- ◆ Biological stoppages
- ◆ Signage/markings off of habitats
- ◆ Increasing height of towers

### Corrective measures

- ◆ Landscaping actions
- ◆ Relocating of flora species
- ◆ Regeneration of pathways
- ◆ Forest repopulation
- ◆ Restoration of slopes by use of hydrosowing and topsoil

Below the most noteworthy preventive and corrective measures carried out during 2011 are detailed:

## Protection of flora and fauna

### Protection of flora: Preventative and corrective measures

#### Modification of the project design during works

**400 kV Trives – Aparecida line** Increasing the height of towers 29 and 30 to avoid wooded areas with oaks.

#### Relocation of specimens

**400 kV Tabernas substation** Healthy olive tree specimens present on the plot.

**220 kV Galapagar substation (phase shifter)** Transplanting of 20 Holm Oaks on the existing property, enlargement area and phase shifter area of the substation.

#### Marking and protection of habitats and areas containing protected species

**400 kV Trives – Aparecida line** Marking of forest stands with lush vegetation and marking of protected areas.

**220 kV Benhadux-Tabernas line** Location and marking of the populations of catalogued flora (*Maytenus senegalensis*, *Salsola papillosa* and *Euzomodendron bourgeanum*) so as to not be affected in the locating of towers and the opening of new access routes (1-36, 39-41, 5-9, 22, 23, 49-51, 59-61).

**220 kV Fuendetodos-María line** Surveying and marking of accesses and main areas of flora within habitats.

**400 kV Tabernas substation** Prior study of the existence or non-existence of species in habitat 6220\* for its subsequent location and marking. Did not affect any species as none were found.

#### Hoisting with a boom crane

**400 kV Trives-Aparecida line** Hoisting by boom crane in the areas with some type of protection to minimise the opening of access routes.

**400 kV Penagos-Güeñes line** Disassembly by boom crane of towers affected by a Supreme Court Judgment, to avoid damage to the surrounding flora with the removal of the tower.

**220 kV Fuendetodos-María line** Hoisting of 19 towers by boom crane to minimise the impact on surrounding flora.

#### Hanging by helicopter

**400 kV Trives-Aparecida line** Hanging of the cable in spans between sections 1, 2 and 3.

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**Manual hanging**

<b>400 kV Trives-Aparecida line</b>	Section 4
<b>400 kV Brazatortas-Manzanares line</b>	In highland areas

**Use of special techniques in order to carry out works**

<b>Morvedre-Santa Ponça line (Interconnection). Submarine cable</b>	Opening of the trench, using a special trenching method, which minimises effects on the Posidonia ( <i>Posidonia sp</i> ) Laying of cable through horizontal directional drilling. A specialised technique used in the bay of Santa Ponsa to minimise the impact on posidonia ( <i>Posidonia sp</i> ) and Cymodocea ( <i>Cymodocea sp</i> )
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**Construction by helicopter**

<b>220 kV Benahadux-Tabernas line</b>	Construction of 8 towers using a helicopter (earthworks, civil works, assembly) to prevent excessively long and steep openings in areas with the presence of species of flora in danger of extinction
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**Accompanying measures**

<b>400 kV Penagos-Güeñes line</b>	Fencing off and reforestation in the Robledal de Remendón in the Parque Natural de Armañón
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(\*) These environmental improvement measures are not related to the potential or real effects of the facilities, but are related to an improvement in the biodiversity in the vicinity of these facilities.

**Protection of fauna: Corrective and preventive measures****Special prior studies**

<b>Tabernas 400 kV substation Hueneja-Litoral line</b>	Ornithological survey prior to works with field visits to determine the presence or absence of birds. In this case we found no bird nest or bird which may be affected during the construction of the line
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**Biological stoppages**

<b>Tabernas 400 kV substation Hueneja-Litoral line</b>	Stoppage during the breeding season
<b>220 kV Benahadux-Tabernas line</b>	Two Bonelli's Eagle nests were located near towers 8 to 11, so there were no works carried out on these towers during the breeding season
<b>220kV Calamocha-Mezquita line</b>	Restricted works from March 1 to July 31 due to the presence of vultures
<b>220 kV Fuendetodos-María line</b>	Restricted work from February 1 to July 31 due to presence of cliff-nesting birds of prey
<b>400 kV Penagos-Güeñes line</b>	Restricted works from February 15 to August 15 due to the presence of vultures

**Relocation of specimens**

<b>Morvedre-Santa Ponça line (Interconnection). Submarine cable</b>	1. Detailed inventory of planned future routes. 2. Identification and mapping of the noble pen shell ( <i>Pinna nobilis</i> ). 3. Definition of potential areas for correct relocating. 4. Relocating of specimens. 5. Monitoring
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### Special measures for the protection of species

<b>Morvedre-Santa Ponça line (Interconnection). Submarine cable</b>	In order to avoid collisions by cetacea (whale, dolphins and porpoises) courses have been held regarding the various cetacea that may be found during cable laying and preventive measures to be taken. The cataloguing of sightings and their analysis thereof
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During 2011, 528 km of line has been marked, with 429 km corresponding to newly constructed line

## Socioeconomic measures and the landscape

### Protection measures of the socioeconomic environment

#### Special measures

<b>400 kV Cerrato substation</b>	Piles of stones were collected and gathered from the plots close to the substation to be used in the construction of the elevation platform. Topsoil was added to the plots where the removal of stones represented a decrease in the volume of the soil. (The soil from the material processed through a crusher installed at the substation). The measure is extremely positive for farmers in the area as it improves the conditions of the plots. In addition the removal of piles of stones prevents the overpopulation of rabbits (who live amongst the stones)
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#### Noise pollution studies

<b>Santa Ponça converter station</b>	Studies in the converter station to assess the noise levels produced during the construction phase. It was not necessary to apply special measures as no legal limits were exceeded
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#### Works stoppage for fishing and tourism activities

<b>Submarine cable Santa</b>	Stoppage of works April 15 to October 15 in the beach area to avoid interference with tourism and local fishing in the Santa Ponça bay
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### Landscape restoration

#### Substations under construction

<b>Bescanó 400/220 kV substation</b>	Restoration of the slopes of the substation and planted areas in the area of the substation. Hydrosowing 4,000 m <sup>2</sup> and planting of approximately 5300 plants
<b>Santiz 220 KV substation</b>	Restoration of the slopes of the substation. Installing coconut meshing on an embankment and three-dimensional mesh and applying hydrosowing and some planted areas
<b>Torrente 400 kV substation</b>	Installation of three-dimensional mesh on interior and exterior slopes of the substation. Installation of a weed suppressant meshed fabric, coloured gravel and drip irrigation. Planting of olive trees and shrubs
<b>Carril 400 kV substation</b>	Installation of three-dimensional mesh on interior slopes and coconut meshing on exterior slopes of the substation

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<b>Aguayo 400/220 kV substation</b>	Planting vegetable screening on both sides of the substation
<b>Udalla 400 kV substation</b>	Planting vegetable screening and obscuring a concrete wall with climbing plants
<b>Valldurgnet 220 kV</b>	Dry stone walling and adaptation and landscaping of slope
<b>Lines under construction</b>	
<b>400 kV Salas-Grado line</b>	<p><b>Tower 13:</b> Installation of a concrete slab at the entrance to the farm</p> <p><b>Towers 15, 16 and 17:</b> Repair of a stone bridge</p> <p><b>Access corridor from Nava to towers 18, 19 and 20:</b> reconstruction of stone walls</p> <p><b>Tower 20:</b> Piping of irrigation system, contouring of slopes and restoration of the geotechnical area of the tower</p> <p><b>Tower 26:</b> Opening of a forest trail to bypass the platforms of the towers which had occupied the previous trail</p> <p><b>Tower 28:</b> Contribution to the restoration of soil on rocky land where the tower stands</p> <p><b>Tower 29:</b> Restoration of embankments opening a zigzagged access route on sloped meadows</p> <p><b>Towers 31 and 32:</b> Restoration of embankments and areas occupied by towers located on steep hillsides</p> <p><b>Tower 33:</b> Restoration of forest tracks by the addition of aggregate between the villages of Rubial and Alvaré</p> <p><b>Tower 41:</b> Access restored with the addition of aggregate and the opening of water culverts</p>
<b>400 kV Soto-Penagos line</b>	<p><b>Tower 10v:</b> Concreting of a local track with the incorporation of drainage channels</p> <p><b>Access road to highland area between Fresnedo and Picu Llanza:</b> Repaired the concrete in the first section of the access road, on the second section the surface was levelled and water culverts were made</p> <p><b>Tower 26ov:</b> Extended a concrete slab in the entrance to a dwelling and a stone wall was repaired</p> <p><b>Tower 14Si:</b> Topsoil was added to the meadow used for gathering stones and it was sowed. New enclosures for the entire property were constructed and a protective channel was constructed using geotextile and stone at the base of the breakwater wall</p> <p><b>Access roads to towers 1 and 2 of Nava:</b> Surface repaired eliminating ruts, constructing water culverts and extending coarse aggregate up to the town of Solano</p> <p><b>Tower 13Na:</b> The original rocky surroundings of a tower have been restored by adding a layer of soil</p> <p><b>Tower 21Na:</b> Construction of water culverts with stone and geotextile and the recovery of the lands topography</p> <p><b>Pista de acceso apoyos 26Na a 29 Na en Ceceda:</b> Extension of the aggregate base with fine sandy surface material and compacting</p>

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<b>400 kV Trives-Aparecida line</b>	The restoration of accesses and platforms is being carried out after the completion of civil works. Later in the other work phases if effects are produced their resolution then takes places. Amongst the most outstanding restoration work carried out, noteworthy is the work on the terraced towers 32, 33 and 35 as well as the accesses built for towers 36 and 37
<b>400 kV Penagos-Güeñes line</b>	Contribution of topsoil and planting + hydrosowing to prevent erosion of a sloped area (4 towers and 7 accesses)
<b>220 kV Benahadux-Tabernas line</b>	We carried out an Environmental and Landscape Restoration project prior to the commencement of work in the areas affected by the construction of new access roads and tower platforms
<b>220 kV Jalón-Los Vientos line</b>	Contribution of topsoil and hydrosowing to prevent erosion of a sloped area. Restoration of work areas for 10 towers

## Archaeological heritage

During 2011, archaeological supervision was carried out during works involving the construction of 25 lines (with permanent presence of an archaeologist during the earth movement phase in 22 of these, in the complete section of line, or in a part thereof), and in 7 substations (with permanent presence of an archaeologist during the earth movement phase in 4 of these).

As special actions the following are noteworthy:

### Protection of archaeological – ethnological heritage

<b>400 kV Salas-Grado line</b>	Archaeological supervision during civil works and the opening of accesses. The works affect the Camino Real de La Mesa, an inventoried and protected path, whereby special measures must be applied for its use (surface protection). Also trenches and machine-gun posts of the Civil War were found, which have been inventoried by the archaeologist and have been cordoned off for their protection during the works
<b>220 kV Arenas de San Juan substation</b>	During the archaeological supervision, 12 silos and a plantation were discovered, probably from a vineyard. As for the silos, these were circular-shaped pits, with an average depth 0.40 m reaching in some cases 0.70 m, and in which ceramic and lithic ceramic material was documented as well as animal bone remains. Taking into account the results obtained during the excavation, it was concluded that they were storage silos that were silted up, probably during the Late Bronze or Early Iron age. The silos were dug and the works continued

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### Land-submarine interconnection of the 250 kV direct current electricity link between the Spanish peninsula and Majorca

An archaeological sampling and test-pit excavation was carried out by professional divers and archaeologists, in accordance with the criteria set out by the General Directorate of Patrimony. At an archaeological level, the results of the aforementioned test-pits and sampling was negative as the original seabed, that may contribute to the cultural heritage, is located well below the depth foreseen for the project and will not be affected by the project works required.

The archaeological excavation has allowed the process of formation of the sedimentary deposit of the area affected by the project to be documented. The non-existence of archaeological remains in the area and the fact that marine deposits existing prior to the construction of the port are not affected has been confirmed.

### 400 kV Litoral-El Palmar line

Restoration works were performed on the walls discovered in 1999 of the prehistoric site of Barranco de la Viuda (Lorca, Murcia)

(\*) Not related to the potential or actual impact of the facility, but the actions are directed to improving the heritage of the surrounding areas of the facilities.

In addition, Red Eléctrica carries out **paleontological monitoring** in the areas in which the existence of such deposits/remains are foreseen. This year, the supervision for the 220 kV Jalón-Los Vientos line has been completed.

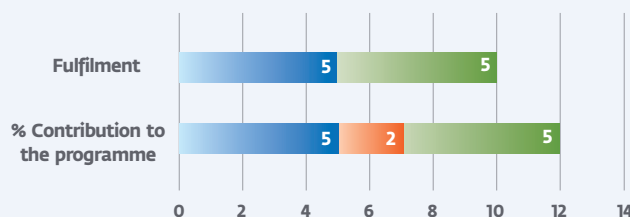
## Objectives associated with a responsible environmental investment (construction phase)

### OBJECTIVE 2

#### Implementation of the environmental certificate regarding construction

% Fulfilment: 83.33

- 02.1** Drafting and revision of all pending documentation: Specifications, programmes of inspection points, waste documentation
- 02.2** Communication with contractors: Written information, training and awareness
- 02.3** Implementation of the certificate: Application of the certificate to 100% of the projects contracted as of the third quarter



To intensify the integration of environmental criteria in the construction of new facilities, the environmental certificate regarding construction has been implemented. Since the first quarter of 2011, the associated documentation has been included in the request for tenders, a channel by which suppliers have been informed. The formal communication and the corresponding training for contractors is pending.

The objective will continue in 2012 with the verification of its implementation.

## 5.3 Environmental activities in facilities in service

The objective of the transmission grid is to connect the generation points to the areas of consumption, which means that the facilities are distributed countrywide.

To ensure their correct operation these assets 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 they are located. It is therefore necessary to be aware of both the existing natural values as well as those elements of the activity that can impede it from being able to act in the most respectful way possible.

Similarly, in its role as transmission agent and electricity system operator Red Eléctrica is oriented towards developing a more sustainable energy model, contributing to reaching the European 20-20-20 objectives, through the integration of renewable energies (developing the transmission grid needed 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 undertaken to work on reducing its own emissions of greenhouse gases.

These activities take place within the overall framework of strategies that allow the environmental variable to be integrated internally into all works and contemplate participation and awareness amongst stakeholder groups.

The majority of the activities carried out are done so under brand names, created to raise awareness and promote these initiatives to society and includes their participation:

- ◆ **Red Eléctrica eficiente:** This brand distinguishes all those actions that promote a better use of energy and resources. Encompassed within the framework of this brand are not only demand-side management initiatives and other technical projects related directly to its activity as operator of the electricity system, but also measures for the reduction of basic consumptions in the daily activities and the carrying out of different awareness and communication campaigns.
- ◆ **The Sustainability Laboratory:** A strategic tool whose objective is to establish a design and development space for sustainable projects based on dialogue and permanent collaboration with local communities. The aim of this collaboration is to secure a better conciliation between the interests of the social and environmental agents with the permanent presence of the company in the territory. Conciliation is carried out by means of the development of programmes and projects that promote sustainability and strengthen the integration of the company and the benefit to society.

Throughout this section 5.3, the environmental aspects that generate the actions in each of the environmental lines to be considered in the maintenance phase shall be addressed:

- ◆ Conservation of biodiversity
- ◆ Climate change and energy efficiency
- ◆ Saving natural resources
- ◆ Improvement of the environmental aspects in the transmission grid facilities
- ◆ Improvement in relations with interested parties

## Environmental Policy

### Environmental strategies

#### Biodiversity

##### Principles:

- ◆ Integrate conservation and the sustainable use of biological diversity into the strategic plan of the Company.
- ◆ Establish mechanisms that assure the protection and conservation of environmental values in the activities carried out by the Company, especially in sensitive natural environments.
- ◆ Promote a framework for communication and collaboration with stakeholder groups, heightening the visibility of the commitment of the company towards the conservation of biodiversity.
- ◆ Strengthening recognition on behalf of institutions and the select national and international sustainability indexes.
- ◆ Contribute and strengthen the involvement in research, education and awareness projects regarding the conservation of biological diversity.

##### Objective:

- ◆ Define the criteria and action guidelines that ensure compliance with current regulations at all the stages of activity and their coordination with the Environmental Assessment of any new electricity lines.
- ◆ Improve communication and collaboration with stakeholder groups to: streamline administrative procedures, establish action criteria, enhance biodiversity conservation and the prevention and fight against forest fires and convey the strict need to comply with the requirements of the Regulations and current legislation.
- ◆ To promote participation in research, training and awareness projects in preventing and fighting forest fires.

#### Forestry strategy

#### Climate change

##### Principles:

- ◆ Integration of renewable energies.
- ◆ Backing for energy efficiency at all levels: Red Eléctrica eficiente.
- ◆ Reduction of greenhouse gas emissions.
- ◆ Protection of forested areas.
- ◆ Development of projects for adapting to climate change.
- ◆ Extending the commitment to interested parties.

## Environmental lines of action (maintenance)

### Conservation of biodiversity

- ◆ Conservation of flora
- ◆ Prevention of forest fires
- ◆ Protection of fauna
- ◆ Development of R&D&i projects
- ◆ Training, communication and social involvement

**Red Eléctrica brands**

**Sustainability Laboratory**

### Climate change and energy efficiency

- ◆ Inventory and monitoring of emissions
- ◆ Research and new technologies
- ◆ Implementation of energy efficiency measures
- ◆ Control of electricity consumption

**Sustainability Laboratory**

**Red Eléctrica eficiente**

### Saving of resources

- ◆ Control of water consumption
- ◆ Control of paper consumption
- ◆ Control of vehicle fuel consumption

**Red Eléctrica eficiente**

### Improvement in the environmental aspects of the transmission grid

- ◆ Landscape conservation
- ◆ Sustainable maintenance of facilities
- ◆ Prevention of contamination

### Improvement in relations with interested parties/stakeholder groups

- ◆ Training and awareness
- ◆ Managing enquiries and claims
- ◆ Dissemination of information
- ◆ Collaboration agreements
- ◆ Forums and working groups

**Sustainability Laboratory**

**Red Eléctrica eficiente**



### 5.3.1 Environmental aspects of facilities in service

Below the activities carried out in facilities in service that can generate an environmental aspect are identified:

#### Activities generating environmental aspects

- ◆ Presence of the building
- ◆ Presence of the line
- ◆ Presence of the substation
- ◆ Transmission and transformation of energy
- ◆ Maintenance of substation gardens and switchyards
- ◆ Maintenance of electricity line safety corridors
- ◆ Maintenance of electricity line towers
- ◆ Use of machinery in the maintenance of electricity lines
- ◆ Use and maintenance of equipment:
  - ◆ Electricity generator units
  - ◆ Fuel tanks
  - ◆ Evaporation condensers
  - ◆ Climate control equipment
  - ◆ Intensity and capacity transformers
  - ◆ Power transformers
  - ◆ Auxiliary transformers
  - ◆ Oil collection pits
  - ◆ Equipment with sulphur hexafluoride
- ◆ Decanting of oil for the maintenance of machinery
- ◆ Stockpile and/or storage of contaminating material
- ◆ Office related activities

#### Aspect groups

##### Direct

- ◆ Biodiversity
- ◆ Consumptions
- ◆ Emissions
- ◆ Facilities
- ◆ Waste
- ◆ Spillages/discharges

##### Accidental

- ◆ Collisions
- ◆ Accidental emissions
- ◆ Explosions
- ◆ Leaks and spillages of hydrocarbons
- ◆ Leaks and spillages of hazardous substances
- ◆ Fire

##### Indirect

- ◆ Interested parties
- ◆ Indirect emissions

The evaluation of aspects is conducted annually. In 2011, this assessment included for the first time the newly acquired insular facilities, the effects considered as two new regional offices, the Balearic Islands and the Canary Islands.

Regarding the evaluation carried out on the environmental aspects during the year, those which proved most **significant** are the following:

Significant environmental aspects <sup>(1)</sup>	Environmental aspect susceptible to impact	Impact
<b>Clearing, pruning and felling</b>	Biological	Elimination of flora
<b>Emissions of greenhouse effect gases (SF<sub>6</sub>)</b>	Physical	Atmospheric contamination
<b>Hazardous waste:</b> Equipment contaminated with PCB free oil Oil-water mixture Soil contaminated with hydrocarbons	Physical	Waste generation
<b>Leaks or spillages from machines containing a small volume of oil</b>	Physical	Potential contamination of soil and water sources
<b>Birdlife collisions</b>	Biological	Potential effect on species



Significant environmental aspects occasionally detected <sup>(2)</sup>	Environmental aspect susceptible to impact	Impact
<b>Non hazardous waste: rubble/inert</b>	Physical	Waste generation
<b>Hazardous waste:</b> Hydraulic oil from auxiliary generator units Anti-freeze from auxiliary generator units Electrical and electronic apparatus with hazardous components	Physical	Waste generation
<b>Accidental emission of SF<sub>6</sub></b>	Physical	Potential effect on the atmosphere
<b>Leaks or spillages from power transformers</b>	Physical	Potential contamination of soil and water sources
<b>Fires in lines</b>	Biological/Physical	Potential effect on species and soil
<b>Fires in substations</b>	Biological/Physical	Potential effect on species and soil

(1) Significant aspects in the maintenance phase or in the majority of the regional offices (territorial distribution of facilities) and work centres.  
(2) Significant aspects in less than three regional offices.

Throughout the various sections of this chapter 5.3, the environmental activities carried out during the year are described, as well as the level of fulfilment of the improvement objectives established associated to the aspects of this phase of the activity.

### 5.3.2 Conservation of biodiversity

In line with the Biodiversity Strategy approved in 2010 that defined the guidelines and performance criteria to be followed by the Company so that the conservation of biodiversity is integrated into Red Eléctrica's strategy, the work plan for the next four years in this area includes a number of both direct actions on biodiversity as well as dissemination and collaboration.

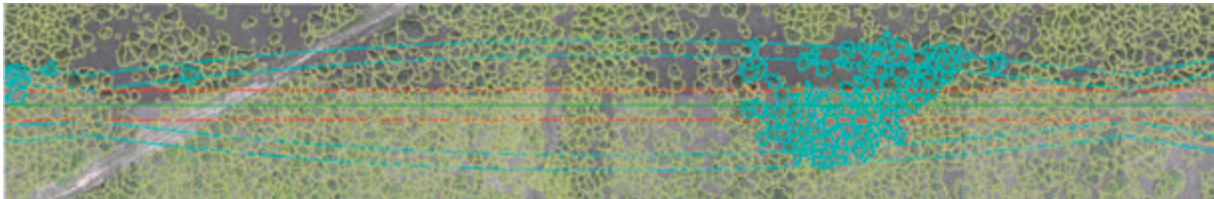
#### Actions regarding forestry management

- ◆ The drafting of the **Forestry Management Policy** which has established the criteria and milestones to be fulfilled to assure the commitment of Red Eléctrica in the conservation of biodiversity and the prevention and fight against forest fires. Its objectives are:
  - ◆ Define the criteria and guidelines for action, from the planning/project phase to the maintenance phase, to ensure compliance with Royal Decree 223/2008 15 February that regulates the minimum distances between conductors of an electricity line and wooded areas throughout the life cycle of the line, or in its case that of Decree 3151/1968 28 November, which approves the Regulation of High Voltage Electricity Lines, and their coordination with the Environmental Assessment of projects.

- ◆ Improve communication and collaboration with stakeholder groups:
  - ◆ Streamline administrative procedures.
  - ◆ Establish the environmental criteria of the actions.
  - ◆ Raise the profile of the commitment of Red Eléctrica regarding biodiversity conservation and the prevention and fight against forest fires.
  - ◆ Communicate the strict need to comply with the requirements of the Regulations and current legislation.
- ◆ Promote participation in research, training and awareness projects in the prevention and fight against forest fires.

### Predictive maintenance

- ◆ Detailed studies of flora collected through remote sensing data (optical and LIDAR (Laser Imaging Detection and Ranging)) of the existing lines that cross forested areas.



- ◆ Periodic revision and inspection of existing facilities.
  - ◆ Intensive - on foot (critical points)
  - ◆ Normal - on foot (2/8 of the facilities)
  - ◆ Intensive - from the air (1/8 of the facilities)
  - ◆ Normal - from the air (5/8 of the facilities)

### Preventive maintenance

- ◆ Preventive tree surgery (clearing land, timely pruning and felling) in which the environmental criteria to follow are:
  - ◆ Compliance with safety distances
  - ◆ Comply with environmental conditions of the administrative authorisations (periods to carry out the work, etc.)
  - ◆ To carry out the activity with the least possible impact
    - ◆ Respecting bushland
    - ◆ Respecting small and slow growing tree species
    - ◆ Carrying out pruning of protected species
    - ◆ Replanting of degraded areas
    - ◆ Reject the use of chemical methods for treating safety corridors

### Vulcano Project\*

Carried out in collaboration with Iberdrola, ADIF and INECO. It began at the end of 2008 and was finalised in July 2011. The project developed a fire risk assessment methodology of electricity lines and railway networks with their surroundings during their life cycle.

More information at [www.proyectovulcano.es](http://www.proyectovulcano.es)

\* Project included in the Sustainability Laboratory.



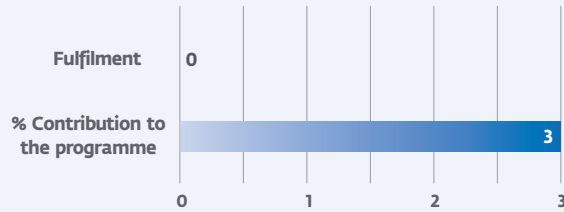
## Objectives for the reduction of potential forest fire risks

### OBJECTIVE 10

#### Establish agreements for the prevention and fight against forest fires

% Fulfilment: 0

- 10.1** Establish 1 agreement for the prevention and fight against forest fires



In 2011, no specific agreement to prevent and fight forest fires was established, so it did not reach the critical level expected.

The objective will continue in 2012 with the signing of 5 agreements.

### OBJECTIVE 11

#### Incorporate Red Eléctrica's environmental criteria in the process for the maintenance of electricity line corridors (in existence at 31/12/2010)

% Fulfilment: 100

- 11.1** Define and standardise the environmental criteria in the process for the maintenance of electricity line corridors
- 11.2** Include the environmental variables associated to the maintenance of corridors within the corporate geographical information system
- 11.3** Reduce the risk of fire in electricity line corridors: Draft the document for risk methodology, implementation and the development of indicators



Red Eléctrica's forestry policies have been defined as per the information in the prior paragraphs.

The objective, originally foreseen for maintenance, was extended during the year to all phases, including planning and construction. Similarly, it identified new areas of responsibility and created a working group for its implementation.

One of the conclusions of this working group was the need to conduct a forestry inventory of Red Eléctrica's installations from the information obtained via remote sensing (optical and LIDAR flights) to be carried out in forthcoming years.

The objective will continue in 2012, with this new working criteria in order to implement the Policy.

## Actions for the conservation of fauna

There are many ongoing projects dedicated to the conservation of fauna, especially focused on birdlife, therefore, the detailed information is available at the following webpage of Red Eléctrica:

[www.ree.es/medio\\_ambiente/biodiversidad.asp](http://www.ree.es/medio_ambiente/biodiversidad.asp)



- ◆ **Reintroduction of Bonelli's Eagle (*Hieraetus fasciatus*) on the island of Majorca:** Duration 2011-2014. Collaboration: Government of the Balearic Islands. ✨
- ◆ **Programme for the reintroduction of the Black vulture (*Aegypius monachus*) in Catalonia:** Duration 2008-2012. Collaboration: Obra Social Caixa Catalunya, Government of Catalonia, Government of Extremadura (Los Hornos recuperation centre), TRENCA and GREFA. ✨
- ◆ **Improvement of Steppe bird habitats in Andalusia:** Duration 2008-2012. Collaboration: Doñana Biological Station(CSIC), Fundación Gyapaetus and Finca la Noruela. ✨
- ◆ **Use of electricity towers as biodiversity catalysts in Andalusia:** Duration 2008-2012. Collaboration: Doñana Biological Station (CSIC), Fundación Gyapaetus. ✨
- ◆ **Project LIFE+ Conservation and management in special protection areas for Steppe birds in Andalusia:** Duration 2010-2013. Collaboration Government of Andalusia, ASAJA, COAG, UPA, The association municipalities of Valle del Guadiato, SEO, EGMASA, DAP. ENDESA and Fundación Enresa. ✨
- ◆ **Support programme for mountain agriculture with activities to improve the habitat of the Brown bear and the Cantabrian Capercaillie, compatible with the rural development of the Parque Natural de Redes (Asturias):** Duration 2009-2012. Collaboration of FAPAS (Fund for the protection of wild animals). ✨
- ◆ **Study of the state of the population of the Stone-curlew (*Burhinus oedicephalus distinctus*) on the island of Gran Canaria and threats to its conservation (2010-2012):** Duration: 2010-2012. Collaboration Government of the Canary Islands and Inter-island council of Gran Canaria. ✨
- ◆ **Census of the Houbara Bustard population (*Chlamydotis undulata*) on the islands of Fuerteventura and Lanzarote in its pre-reproductive, reproductive and post-reproductive phases:** Project duration: 2011-2012. Collaboration: Government of the Canary Islands, the Inter-island council of Fuerteventura, the Inter-island council of Lanzarote and GREFA. ✨
- ◆ **Installation of an aviary for White Stork (*Ciconia ciconia*) in GREFA installations:** Duration of the project: 2011. Collaboration: GREFA. ✨
- ◆ **Installation of nesting boxes for Soprano Pipistrelle bats (*Pipistrellus pygmaeus*):** in the Parque Natural del Turia in Valencia. Project duration: 2010-2011. Collaboration Government of Catalonia. ✨
- ◆ **Installation of a platform for the Osprey (*Pandion haliaetus*) in an electricity line tower in Andalusia:** Duration of the project: 2011. Collaboration: Government of Andalusia and Fundación Migres

✨ *Project included in the Sustainability Laboratory.*

- ◆ **Installation of nesting boxes for Common Kestrels (*Falco tinnunculus*) in electricity substations in Catalonia.** During 2010 and with the collaboration of GREFA four nesting boxes were installed to improve the nesting of this species in the Viladecans substation in Catalonia with a highly successful level of occupation
- ◆ **Centre for Migration and Global Change:** Duration: 2011-indefinite. Collaboration: Government of Andalusia, Cadiz Council, Cadiz, Cordoba and Seville universities, Tarifa and Algeciras council, Ministry of Defence and Fundación Migres.

During 2011, 528 km of line have been marked with bird flight diverters of which 99 km corresponded to lines which were in service.

Objectives to reduce possible risks of the facilities on birdlife

#### OBJECTIVE 9

##### Establish 17 activities regarding biodiversity in the 17 Autonomous Communities

% Fulfilment: 100

- 9.1** Establish a collaboration framework with the competent entities regarding biodiversity in 3 Autonomous Communities



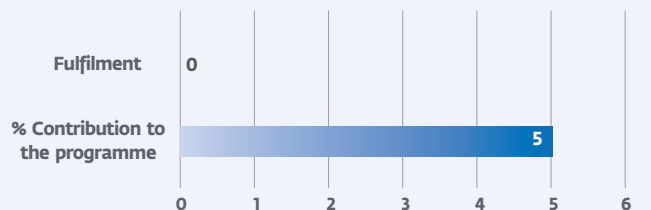
In 2011, agreements regarding biodiversity were signed with the competent entities: Andalusia, Balearic Islands and Valencia. The objective will continue in 2012 to establish agreements with three other Autonomous Communities.

#### OBJECTIVE 12

##### Reduce the possible risk of existing facilities on birdlife

% Fulfilment: 0

- 12.1** Plan for the adaptation of lines: adaptation of connection points to prevent electrocution (25%)



As part of the plan for the adaptation of lines, we identified the electricity line towers located in: the Balearic Islands (Priority areas, SPAs and IBAs (Important Bird Areas)) and the Canary Islands (SPAc and IBAc). The areas chosen are those indicated by the Administration.

The objective will continue in 2012 integrated into objective nº 8 to reduce the possible risk of existing facilities on birdlife. Specifically, this goal is expected to obtain information on the characteristics of the Islands' electricity towers both for insular lines as well as connection lines on the Spanish peninsula to establish whether they require an adaptation plan.

In addition to the activities indicated, in matters regarding biodiversity a large number of R&D&i projects are underway associated with the protection of birdlife and flora (see Chapter 6).

### 5.3.3 Climate change and energy efficiency

In May 2011 the Climate Change Strategy of Red Eléctrica was approved, which aims to formalise the strategy followed by the Company in this area, describe the main lines of work and establish an action plan which sets out the objectives to be achieved. The first version of the Action Plan was validated in January 2012.

In said strategy, the activities of Red Eléctrica are classified in three main groups: those related to the business (development of the electricity transmission grid, system operation and demand-side management), those related to reducing the carbon footprint of Red Eléctrica and those of participation in initiatives related to climate change.

In this chapter we develop on those related to the operation and maintenance of the transmission grid.

#### Emissions inventory

The emissions inventory of greenhouse gases of Red Eléctrica in the last three years has been as follows:

#### Greenhouse gas emissions

(t CO<sub>2</sub> equivalent)\*

	2009	2010	2011
SF <sub>6</sub> emissions <sup>(1)</sup>	65,764	61,500	66,741 <sup>(8)</sup>
Emissions associated to the use of auxiliary generator units <sup>(2)</sup>	sd	27	21
Emissions associated to the use of fleet vehicles	2,437	1,690 <sup>(6)</sup>	1,563 <sup>(9)</sup>
<b>Total direct emissions (SCOPE 1)</b>	<b>68,201</b>	<b>63,217</b>	<b>68,325</b>
Emissions associated to electrical energy consumption <sup>(3)</sup>	3,881	3,654 <sup>(7)</sup>	4,265 <sup>(10)</sup>
Emissions derived from losses in transmission <sup>(4)</sup>	861,859	723,540	800,530 <sup>(11)</sup>
<b>Total indirect emissions (SCOPE 2)</b>	<b>865,740</b>	<b>727,194</b>	<b>804,795</b>
<b>Totals</b>	<b>933,941</b>	<b>790,411</b>	<b>873,120</b>
Emissions compensated for by planting trees <sup>(5)</sup>	-2,430	-30,900	-21,960

(\* The inventory has been conducted using the GHG protocol as a base.

(1) Taking GWP to 100 years: 22,800 (Source IPPC, Intergovernmental Panel on Climate Change: 4th assessment report).

(2) Calculated for the first time in 2010. This does represent significant emissions. (The auxiliary generator units work in emergency conditions).

(3) The peninsular emission factor calculated by REE is used that takes into account the generation mix of every year and associates to each generation technology an emission factor in agreement with the values set out in the Renewable Energies Plan in Spain 2005-2010.

(4) These losses are related to the location of the generation points in relation to those of consumption, with the amount of energy demanded in the year, with the generation mix of the year (percentage of each generation technology in the total energy generated), international exchanges and the shape of the demand curve. Virtually none of these factors are controllable by REE, so therefore it is very difficult to reduce them. Nevertheless, REE works to identify and improve those aspects in which it can have an influence on its management. Nonetheless, we consider it relevant to provide this data although in the case of emissions associated with the consumption of electrical energy, CO<sub>2</sub> is not emitted during REE's activities as it takes place in the different electricity generation points. In order to calculate the losses in CO<sub>2</sub> an emission factor calculated by REE is used.

(5) During the whole life-cycle of the tree. The equivalent used: 1 tree = 300 kg of CO<sub>2</sub> during its life. The calculation is solely for orientation purposes as only the newly planted trees are considered and not the rest of the protection and improvement works of the existing flora.

(6) Value corrected with respect to that indicated in the 2010 report.

(7) As of 2010, the emissions derived from the consumption of energy in the main regional offices' work centres are included. This data was not included in the last fiscal year. For this reason the data differs from that published in the 2010 report.

(8) The net emissions of SF<sub>6</sub> increase due to the commissioning of new facilities, but the emission ratio, as one can see throughout this chapter, is reduced.

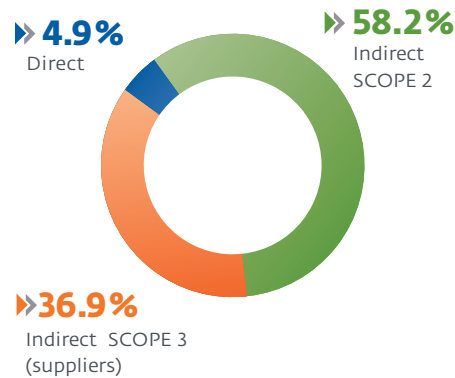
(9) In 2010, 5,888,712 km was covered and in 2011 this total was 7,017,999 km.

(10) In spite of the reduction of electricity consumption, emissions have increased, as in 2011 the emission factor is greater than that in 2010, mainly due to the increase in the contribution of coal in the generation mix (increasing from 8% to 15%) and to the reduction of hydroelectricity (reducing from 16% to 11%).

(11) The increase of the emissions is due to the increase of the emission factor.



In 2011, work began on the calculation of other indirect emissions (SCOPE 3) having made a study of the carbon footprint associated with the value chain (suppliers of goods and services). (See Chapter 9)



### Projects for the offsetting of emissions

**El Bosque de REE ("The Red Eléctrica Forest"):** Started in 2009 and of an ongoing nature, the objective of this project is twofold: to offset emissions from Red Eléctrica by the planting of trees and contributing to the conservation of a natural area rich in biodiversity or recuperation of a degraded natural area.\*

In 2011, the project involved the restoration of the highlands of Cinchado and Pilar de la Brama in the Parque Natural de Los Alcornocales (Cadiz). 144 hectares of the highlands have been restored with the planting of 73,200 oaks (*Quercus suber*) and 2,000 olive trees (*Olea europea*).

### Objectives associated to the emissions inventory

**OBJECTIVE 3**  
**Conduct an inventory of emissions of Red Eléctrica.**  
**Define the specific objectives and the methodology for its calculation and its monitoring.**  
 % Fulfilment: 86.67

<p><b>3.1</b> Emissions inventory: Definition of the methodology for the prior calculation of emissions. Commencement of the analysis of indirect emissions (mainly suppliers)</p> <p><b>3.2</b> Methodology to calculate the CO<sub>2</sub> not emitted into the atmosphere due to the transmission grid. Definition and possible applications</p> <p><b>3.3</b> Definition of the reduction objectives and the methodology for its calculation and its monitoring</p>	<table border="1"> <thead> <tr> <th>Sub-objective</th> <th>Fulfilment</th> <th>% Contribution to the programme</th> </tr> </thead> <tbody> <tr> <td>3.1</td> <td>4</td> <td>4</td> </tr> <tr> <td>3.2</td> <td>3,6</td> <td>4</td> </tr> <tr> <td>3.3</td> <td>2,8</td> <td>4</td> </tr> </tbody> </table>	Sub-objective	Fulfilment	% Contribution to the programme	3.1	4	4	3.2	3,6	4	3.3	2,8	4
Sub-objective	Fulfilment	% Contribution to the programme											
3.1	4	4											
3.2	3,6	4											
3.3	2,8	4											

The methodology for prior calculation of emissions has been defined and an initial analysis of indirect emissions is currently being carried out and the first part will be presented in January 2012.

The methodology for calculating the CO<sub>2</sub> not emitted into the atmosphere due to the transmission grid is considered 100% unfulfilled due to delays in their approval until early 2012.

\* Project included in the Sustainability Laboratory.

The objective will continue in 2012 with the definition of a model for the collating of emission data, conducting a pilot emissions inventory in a regional area, the definition of a methodology for identifying and offsetting emissions associated with institutional events of Red Eléctrica and the initial calculation of emissions of the supplier chain.

### SF<sub>6</sub> emissions

In 2008, Red Eléctrica signed a **Voluntary Agreement with the Ministry of the Environment to reduce the sulphur hexafluoride (SF<sub>6</sub>) emissions in the electricity sector**, together with the Electrical Manufacturers Association (SERCOBE) and the Spanish Electricity Industry Association (UNESA).

To monitor compliance, annual meetings are held between the signatories in which information is also shared about progress within this area.

#### Management of SF<sub>6</sub>

	2009	2010	2011
SF <sub>6</sub> installed (kg)	203,036	211,255	245,415
Emissions of equipment in service (kg) <sup>(1)</sup>	2,590	2,667	2,850
Average emission rate (%)	1.275	1.262	1.161
Emissions derived from accidents (kg)	294	30	76.5
Total emissions (kg)	2,884	2,697	2,927

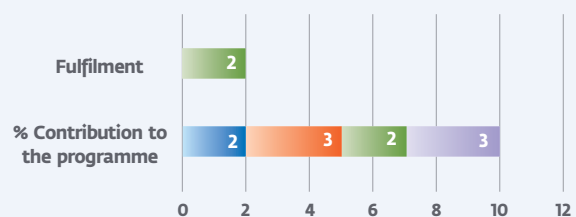
(1) For the calculation of leaks different emission factors have been applied depending on the age of the equipment installed.

### Objectives for the reduction of SF<sub>6</sub> emissions

#### OBJECTIVE 4 Reduction of SF<sub>6</sub> emissions

% Fulfilment: 20

- 4.1** Inventory of SF<sub>6</sub> emissions: Collating and analysis of data
- 4.2** Improvement in the comprehensive management of SF<sub>6</sub>: Implementation of the procedure
- 4.3** Changing old equipment for more efficient models (6 pieces of measuring equipment and 2 pieces of control equipment)
- 4.4** Training of the entire workforce: training of specialist technicians, substation maintenance technicians and environmental technicians (100)



Three of the four goals did not reach the critical level. As the process of data collation had not begun, the SF<sub>6</sub> emissions inventory could not be conducted (the inventory currently conducted is based on the application of emission factors, work is being carried out to conduct an inventory based on the data measured). Similarly, pending is not only the implementation of a comprehensive management procedure of the gas but also the training of staff.

Old equipment identified has been replaced with more efficient models. During 2011, the following was acquired: 8 pieces of multi-parameter measuring equipment, 6 pieces of control equipment



containing small amounts of SF6, 2 pieces of control equipment containing a medium quantity and 1 piece of control equipment containing a large quantity.

The objective will continue in 2012 with the introduction of the SF6 handling procedure so as to, amongst other things, achieve the highest possible amount of gas recycled and thus avoid managing reusable gas as waste, with the savings of emissions that this entails, as it will prevent the need to incinerate the gas; the replacement of old equipment with more efficient models and the accreditation of Red Eléctrica as a trainer (training company and evaluator regarding SF6) and training employees in the use of gas.

## Energy efficiency

### Research and new technologies \*

In the field of research and new technologies, the goal is to develop new ideas for achieving a more efficient use of energy, coupled in numerous occasions to the development of new technologies:

#### ◆ Projects associated with the electric vehicle:

- ◆ **Adherence to the Memorandum for the promotion of the electric vehicle**, spearheaded by the Ministry of Industry, Tourism and Trade and endorsed by more than 40 institutions.
  - ◆ **Proyecto VERDE (Green Project)**. Initiative, in conjunction with SEAT, for the development of a prototype electric vehicle which would allow an efficient integration of electricity into the grid (regarding active demand-side management).
  - ◆ **DOMOCELL Project**. Creation of a charging system in communal car parking garages that allows not only vehicle charging to be managed, but also the possibility of reintroducing energy back into the grid by means of the electricity stored in the batteries (R&D project).
  - ◆ **VLPGO Association (Very Large Power Grid Operator Operators)**. Studies the effects of these vehicles on electricity systems.
  - ◆ **REVE Project (Wind power Control through Electric Vehicles)**. Analyses the technical and economic aspects derived from the contribution of all electric vehicles in use to guaranteeing the evacuation of wind power energy.
  - ◆ **MERGE Project (Mobile Energy Resources in Grids of Electricity)**. Evaluates the impact of electric vehicles on European electricity systems, in particular, those related to grid planning and operation, as well as to the electricity markets.
- ◆ **ADM (Active Demand-Side Management)**: Red Eléctrica promotes from the electricity sector, strategies for demand-side management aimed at meeting the objectives of efficiency acquired by member countries of the European Union. The works are aimed at achieving a more balanced demand throughout the different times of year, with greater flexibility to achieve better integration of renewable energies, improving system efficiency, in order that the electricity system evolves into a "smart grid". To this end, during 2011 we worked on the following areas:
- ◆ **Monitoring of industrial demand and the service sector**: the system launched in 2009 allows Red Eléctrica to have hourly information of more than 35% of the total demand which makes it possible to have a fairly accurate approximation of the behaviour of the activity of different sectors. With the information obtained it is possible to recommend and evaluate management actions specific to the demand of each sector.

\* Projects included in "Red Eléctrica eficiente".



- ◆ **The electric vehicle:** during 2011, REE developed a simulator of the impact on the demand curve of the charging of electric vehicles, combining the experience gained from the numerous electric vehicle projects in which the company participates with their knowledge of the demand curve.
- ◆ **Participation in technology platforms:** Red Eléctrica is part of the Spanish Technology Platform on Energy Efficiency, a joint initiative with the Ministry of Science and Innovation, the major energy and technology companies and various institutions and research centres. The main objective of the platform is "to enhance the capabilities and R&D&i of all technologies" related to energy efficiency.
- ◆ **Participation in international working groups:** Red Eléctrica leads the "Flexilwatts" working groups and co-leads the working group "Storage" that aim to explore the possibilities of introducing greater demand flexibility and storage respectively.

### Implementation of energy efficiency measures ❁

Within the scope of the implementation of measures, contemplated are the initiatives geared towards the quest for an improvement in facilities and processes of Red Eléctrica in order to achieve a more efficient consumption of energy in the workplace:

#### ◆ Actions carried out in work centres:

- ◆ **Energy specification:** edition of the document on the criteria for energy efficiency in maintenance work centres. Includes aspects relative to design, housing, carpentry, lighting, climate control, renewable energy, mobility and the use of water.
- ◆ **Implementation of energy management systems** to provide instantaneous and cumulative values of electricity and water consumption that help determine possible measures to make savings. During the period 2011-2015, energy management systems will be installed in the buildings of existing work centres. Newly constructed buildings will be equipped with these systems. In 2011, energy management systems were installed in 12 existing work centres.
- ◆ **Energy Audit Plan:** In 2011, audits were conducted on 4 buildings. During the period 2012-2015 all Red Eléctrica work centres will be audited.
- ◆ **Newly constructed buildings:** classified under the brand "Red Eléctrica eficiente" in which measures have been implemented in 4 of them, focused on:
  - ◆ Electricity: use of natural light and incorporating lighting systems according to occupation and regulating it to optimise the use of natural light.
  - ◆ Mobility: charging points for electric vehicles.
  - ◆ Insulation: conforming to the Technical Building Code.
  - ◆ Renewable energy: capture system, storage of low temperature solar energy for sanitary water heating.
  - ◆ Energy management systems: electricity and water consumption meters in real-time.

❁ Projects included in "Red Eléctrica eficiente".

- ◆ **Renovated buildings:** 4 work centres were renovated in which several energy efficiency measures were implemented related to:
  - ◆ Electricity: installation of LED bollard lighting or LED lamps to indicate access points, improved climate control system and regulating lighting near windows.
  - ◆ Insulation: metal-framed windows.
  - ◆ Renewable energy: installation of solar panels for sanitary hot water.
- ◆ **Energy certification in the Head Office:** As of 18.10.2011, Red Eléctrica has the Energy Management System Certificate in accordance with UNE 16001 for its Head Office.
- ◆ **Mobility:** In the car park at the Head Office a guidance system for vehicles was installed. This was to avoid unnecessary vehicle traffic via the internal roads of the facility thus reducing time by indicating free parking spaces. This system consists of bright LEDs (red/green) over each parking space indicating if it is free or not. A panel is located at the entrance to the car park indicating at all times the parking spaces available.
 

A bicycle parking area has been set up in the same car park. Similarly Red Eléctrica has also subsidised the purchase of electric bicycles by employees.
- ◆ **Actions carried out in substations:** In 2011, a comprehensive study of all energy-consuming equipment of an electricity substation was carried out, performing the analysis on three "standard" models: conventional 220 kV and 400 kV substations and 220 kV shielded substations. The energy consuming equipment in which improvements can be obtained are:
  - ◆ **Climate control equipment** in buildings, relay housings, communication rooms, control rooms and auxiliary system rooms, by incorporating equipment with an "A" energy rating and controlling start up and running times.
  - ◆ **Lighting**, of buildings and substation switchyards, through the installation of energy efficient lighting and control of operating times.
  - ◆ **Power transformers:** Analysis is taking place regarding the reduction of electricity consumption by auxiliary equipment (pumps and fans) and in the use of vegetable oils.
- ◆ **Actions carried out regarding corporate communication systems:**
  - ◆ **Renewal of monitors** from 17" to 23" with an associated energy saving of 7,208 kWh per year.
  - ◆ **Renewal of desktop and laptop computers** with an associated energy saving of 10,522 kWh per year.
  - ◆ **Replacement of physical servers for virtual servers:** action initiated in 2010 which improves the utilisation of hardware and reduces energy consumption. Similarly the storage and backup infrastructures were replaced by others whose design takes into account energy efficiency factors.
  - ◆ **IT management system platform for office PC users:** At the end of 2011, the implementation of an infrastructure for all work stations and office servers began. This will continue during 2012 with the implementation of these tools, which will measure the energy consumption of the whole of the end-user IT systems as well as the application of energy improvement policies.

## Control of electricity consumption in Red Eléctrica's facilities

Taking into account all Red Eléctrica's work centres, energy consumption in recent years has been the following:

	2010	2011
<b>Work centres (kWh)</b>	13,916,409 *	12,800,250

\* Data revised with respect to that published in 2010.

For the purposes of electricity consumption, work centres are considered as those buildings with an available historical data of 2 years:

- ◆ Head Office: 2 buildings
- ◆ Electricity Control Centre building (CECORE) - Tres Cantos: 1 building
- ◆ Regional Offices: 4 buildings
- ◆ Extra-peninsular electricity systems: 3 buildings
- ◆ Regional head offices' work centres: 6 buildings

Similarly it must be considered that work centres: Head Office, extra-peninsular systems (Balearic Islands and Canary Islands) and the Electricity Control Centre (CECOEL) are special cases as they have control centres located there, operating continually 24 hours a day 365 days a year and therefore have an increased energy consumption.

In general the measures taken to reduce consumption are being effective.

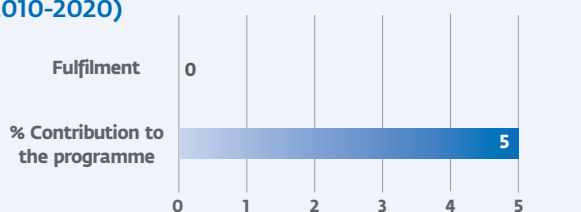
### Objectives associated with energy efficiency

#### OBJECTIVE 5

#### Up to 20% of the consumption of work centres covered by the integration of renewable energies (2010-2020)

% Fulfilment: 0

- 5.1** Installation of renewable energies:  
Definition of the model in 1 building



Four energy audits were conducted in 2011, which did not provide sufficient information from which to define a model for the integration of renewable energy, therefore it is considered that the critical level was not reached.

The objective will not continue in 2012 as part of the Environmental Programme however, options to incorporate these sources of energy generation in facilities shall still be explored, exclusively for the purpose of self consumption.

The objective will not continue in 2012 as part of the Environmental Programme however, options to incorporate these sources of energy generation in facilities shall still be explored, exclusively for the purpose of self consumption.

### OBJECTIVE 6 20% reduction in energy consumption by 2020

% Fulfilment: 40

- 6.1** Energy efficiency in substations: Analysis of consumption points in "standard" substations, carrying out of 4 energy audits, updating of internal regulation and implementation of a plan for measurements in non-critical equipment at 34 substations
- 6.2** Energy efficiency in substations: Adaptation of exterior lighting through the design and execution of the Energy Audit Plan, updating of internal regulation and implementation of a plan for measurements at 10 substations
- 6.3** Energy efficiency in buildings: Energy audit of 8 buildings and update of internal regulation
- 6.4** Sustainable Mobility Plan: drawing up implementation measures
- 6.5** Interlocutor Communication Plan: Updating of eco-advice, awareness days, processing of employee benefits in the acquisition of goods



During 2011, we conducted a detailed analysis of substation elements on which it is possible to take action to save resources, which concluded that the plans for energy efficiency measures should focus on: lighting, climate control and transformers.

The technical characteristics of the climate control equipment to be installed in buildings of substations and maintenance centres' buildings were defined. Not just that equipment being replaced but also those installed in new construction conform to these characteristics. However, to date no plan regarding energy efficiency measures or non-critical equipment or lighting has been set in motion.

With respect to buildings, 4 audits were conducted in those scheduled for refurbishment in 2012: San Sebastián de los Reyes; Rubí; Rocamora; D. Rodrigo.

Regarding communication matters messages regarding the saving of resources were updated and awareness days were held and employee benefits in the acquisition of goods were processed.

Finally, the Human Resources Department has postponed the Mobility Plan until 2013.

The objective will continue in 2012 with the definition and standardisation of the use of substation lighting, conducting energy audits in 5 work centres and the implementation of passive measures to reduce energy consumption in a work centre located in Andalusia.

### Operation of the electricity system

Red Eléctrica works to integrate the maximum production of renewable energy into the electricity system through CECRE (Control Centre for Renewable Energies). The centre was launched in 2006 so that this incorporation would be optimal and safe. Thanks to this control centre it is possible that a large proportion of the electricity demand can be covered with intermittent energy (e.g. wind power) without compromising the quality of supply. In 2011, the contribution of renewable energy to meet demand was 33%.

## Adapting to climate change

In accordance with one of the six principles of the Climate Change Strategy, Red Eléctrica has begun working on the project "Management of new climate risks in electricity transmission infrastructures". Its aim is to analyse the potential risks to the electricity infrastructure associated with changes in certain climatic parameters, identify modifications to be made to address these risks and assess the benefits that a proactive policy would represent as opposed to the application of reactive response measures. The works are being carried out with the consultant ERF and the Institut Cerdà. During 2011, the analysis has been carried out of key future scenarios and the identification of climatic parameters whose change could affect the design and maintenance of electricity infrastructures.

### 5.3.4 Saving of natural resources

In summary, the consumption of natural resources during 2011 was the following:

#### Water consumption

	2009	2010	2011
Head Office (m <sup>3</sup> )	22,508	18,083	17,969
Head Office (m <sup>3</sup> /employees)	26.36	20.36	22.10
Work Centres (m <sup>3</sup> ) *	38,761	53,159	48,631
Work Centres (m <sup>3</sup> /employees)	37.71	54.47	33.33

\* Data revised with respect to that published in 2010.

#### Withdrawal by source (%)

	2009	2010	2011
Cisterns	1.05	1.65	9.32
Wells	65.16	45.66	51.14
Municipal water mains	33.79	52.69	39.36

#### Water saving measures

- ◆ **Awareness campaign:** The communication campaign of 2011 "Red Eléctrica eficiente" has designed and edited 5 messages to raise the employees' awareness regarding the efficient use of resources. Throughout the year there have been reports/articles published on the intranet reinforcing these messages. Amongst them the message «Ciérrame» (Turn me off!) which is associated with practical advice regarding the efficient use of water in the office and at home.
- ◆ **Head Office:** In the last quarter of the year lawned areas of the Head Office were remodelled replacing them with indigenous plants and gravel, allowing water consumption previously necessary to irrigate the gardens to be reduced.
- ◆ **Collection of rainwater:** All new substations have a rainwater collection tank for the watering of gardens and as a fire protection system. In 2011, 0.19% of water was collected in this manner.
- ◆ **Newly constructed buildings:** installing dual-flush cisterns and aerator taps in 4 buildings classified under the brand "Red Eléctrica eficiente".

## Paper consumption

	2009	2010	2011
kg	86,091	71,043.8	67,563.21
kg/employee	46	36.55	34.77

During 2011 the consumption of printing paper fell 5%.

The table below shows the evolution of consumption of paper used in publications in the period 2009-2011.

	2009	2010	2011
kg	49,961	64,640	44,203
% FSC *	25	42	100

\* Ecologically certified paper in accordance with Forest Stewardship Council standards.

During 2011, the consumption of paper used in publications fell by 32%.

### Paper-saving measures

◆ **Awareness campaign:** The communication campaign of 2011 "Red Eléctrica eficiente" has designed and edited 5 messages to raise the employees' awareness regarding the efficient use of resources. Throughout the year there have been reports/articles published on the intranet reinforcing these messages. Amongst them the message «*Imprime lo imprescindible*» (Print only the essential!) which is associated with practical advice regarding the efficient use of paper.

◆ **Documentation archive regarding electricity infrastructures:** Documentation archive regarding electricity infrastructures (ADIR) is the new document system that replaces SGD that had been used to date.

- ◆ Currently managed 1,800,000 documents with their images.
- ◆ 700 Red Eléctrica users registered.
- ◆ 46 external companies.

The new system improves in line with the savings in the use of paper:

- ◆ Viewing and massive download of files.
- ◆ Consult plans/maps/blueprints in PDF.
- ◆ Consult plans/maps/blueprints, make requests and request deliveries from engineering through the external ADIR. (This avoids the need to send CD's and Excel documents to external companies).
- ◆ Sending links to documents to avoid paper copies between users.

Custody is only held over the Physical Archives of the Facility (AEF) the paper copy of the original documents must be preserved for legal regulations.

◆ **The Paperless Classroom:** This type of training, in which the classrooms are equipped with tablet PCs, has allowed the saving of 535 kg of paper in 2011.

Regarding the training of employees, a total of 72 courses of this type have been given with 732 attendees, which has saved approximately 75,000 sheets of paper.

The training given by Red Eléctrica to third parties has an estimated saving of approximately 32,000 sheets of paper.

## Fleet vehicle fuel consumption

	2009	2010	2011
Off-road vehicles/trucks (litres/100 km)	12.25	12.93*	10.08
Standard cars (litres/100 km)	8.33	8.70	6.33

\* Data revised with respect to that published in 2010.

### Mobility measures

- ◆ **Awareness campaign:** The communication campaign of 2011 "Red Eléctrica eficiente" has designed and edited 5 messages to raise the employees' awareness regarding the efficient use of resources. Throughout the year there have been reports/articles published on the intranet reinforcing these messages. Amongst them the message «*Comparte coche*» (Share a car!) which is associated with practical advice regarding the advantages of sharing a vehicle.
- ◆ **Company bus:** Red Eléctrica has company buses available to employees of the Head Office (Madrid) where 52% of the workforce is located to shuttle them to and from work. The use of a collective transportation method is estimated to have had a saving of 28,190 litres of fuel.
- ◆ **Training:** New employees and those whose work takes place in areas where the use of a vehicle is commonplace receive a safe driving course that includes concepts for efficient driving.
- ◆ **Videoconferencing:** The percentage of rooms that have this system of communication has gone from 56% to 73% in one year, and whose use has achieved an estimated savings of 7,027.44 litres of fuel.

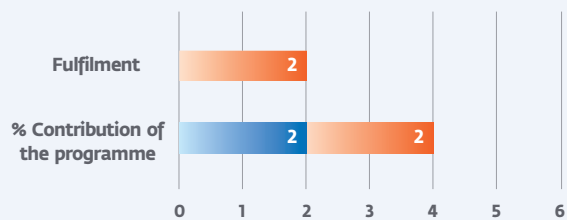
## Objectives geared towards the saving of natural resources

### OBJECTIVE 7

#### Reduction in the consumption of natural resources (2010-2020)

% Fulfilment: 50

- 7.1** Reduction and control in the consumption of water in the Head Office: Analysis in the consumption of water of cisterns and the adaptation of the garden
- 7.2** Reduction and control in the use of paper (printing): Implementation of software and computerised billing/payment process



Critical level not reached in the reduction and control of water consumption in the Head Office. It is expected that the consumption of irrigation water will be decreased after the work done to transform a portion of garden into outdoor parking. The analysis of using well water will be postponed due to its complexity.

Regarding the reduction and control of the use of paper, travel requests and some of the billing/payments have been computerised. In addition to that already implemented, the acquisition of software that includes criteria regarding the efficient use of paper and toner is pending.

The objective will continue in 2012 with a 20% reduction in water consumption in the Head Office and a 5% reduction in paper consumption compared to 2011.





### 5.3.5 Environmental improvement aspects in the facilities of the transmission grid

#### Actions for landscape conservation

During 2011, the following landscape restorations have taken place in facilities which are in service:

Substations	
<b>Ayora 400 kV</b>	Cleaning of materials detached from the slopes from the concrete gutter and the fitting of reinforced meshed netting and Trinter geotextile to stabilise the slope on the interior of the substation
<b>Arañuelo 400 kV</b>	Adaptation of slopes and landscape gardening in the entrance
<b>Brocales 400/220 kV</b>	Adaptation of slopes, cleaning of gutters and landscape gardening

#### Actions for an environmental improvement of facilities

This year the environmental maintenance technicians have carried out a total of 142 environmental supervision visits, including 100 substations different to those monitored since August 2008, when this activity was launched.

Currently 60% of the substations have been visited at least once in the last 4 years including those insular assets acquired at the end of 2010.



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

Those areas most frequently detected for improvement during this year through supervisions were:

- ◆ Validity of authorisations: Adaptation of septic tanks to the regulations regarding discharging; updating of the authorisations of waste production centres to the new Law.
- ◆ Tipping: the need for conditioning and/or septic tank emptying.
- ◆ Soils: adaptation of containment systems for leaks and spillages of hydrocarbons from power transformers and auxiliary equipment to standard criteria in Red Eléctrica, availability of absorbent material onsite and cleanup of soil with hydrocarbon spillages; conditioning of slopes.
- ◆ Waste: Conditioning of waste storage areas.

#### Actions related to noise pollution

During 2011, there have been no complaints or enquiries from stakeholder groups associated with noise pollution, therefore no type of noise measurements have been carried out in any facility.

## Actions related to electromagnetic fields

During 2011, at the request of interested parties measurements have been taken of the levels of electric and magnetic fields at:

- ◆ 400 kV-Villaviciosa Morata de Odon/Moral-Villaviciosa de Odon line, passing by the Xanadu Shopping Centre car park (municipality of Arroyomolinos).
- ◆ 220 kV Mercedes-Júndiz line: section between towers 317-318 and between the Mercedes substation and tower 317 (Vitoria).
- ◆ Prior to the modification of the location of a tower, measurements were carried out in the underground section nº. 173-174 of the 220 kV Arganda-Loeches line (Arganda del Rey).
- ◆ 400 kV Galapagar-Moral line: section 456-457 in the vicinity of the health centre (municipality of Galapagar).

The results of these measurements were correct and all came in below those values recommended by the European Union.

### 5.3.6 Improvement of the relations with interested parties

#### Actions regarding conservation of flora

- ◆ **Collaboration agreements:** Currently there are agreements signed with Andalusia, Castilla-La Mancha and Aragon. The objective for 2012 is to establish collaboration agreements for the prevention and fight against forest fires in Autonomous Communities where these have not been signed.
- ◆ **Training and awareness:** Work which began in 2008 continues in order to improve communication regarding electricity lines and the prevention and fight against forest fires with forestry agents, SEPRONA and Public Administration technical personnel responsible for the environment.

#### Actions regarding the socio-economic scope

- ◆ **Life+Reserva of campanarios de Azaba:** Promotion of biodiversity conservation in Red Natura de Campo de Azaba. Development of a social network for local community awareness.\*
- ◆ **Energy efficiency in the Raya del Duero:** Promoting energy efficiency in the municipalities of Zamora and Salamanca in the Raya del Duero.\*
- ◆ **Definition of a territorial Brand:** Proposal for territorial identity, expressed by a brand and its attributes, aims to strengthen social, territorial and economic cohesion within this scope and provide it with improved competitiveness regarding certain goods and services.\*
- ◆ **Course for the management and identification of wildlife:** Three theoretical and practical courses for the identification and management of wildlife designed for law enforcement agents, with the aim of forming a group specialised in the rescue and retrieval of injured fauna, minimising rescue response times.\*
- ◆ **Republishing and dissemination of G. Bernaldez works:** Republishing of the classic works of Professor González Bernáldez: "Ecología y Paisaje" and "Invitación a la ecología humana". And the subsequent distribution of the publication by post to a list of individuals and institutions.\*

\* Project included in the Sustainability Laboratory.



- ◆ **Publication of good practice bulletins:** Publication of 6 digital newsletters regarding Good Practices in sustainability in the Rural Environment, with the collaboration of REDR.\*
- ◆ **Promoting Corporate Social Responsibility in local action groups:** Translation and editing of the "Código de Gestión Sostenible" (Code of Sustainable Management) and a two-day informative session on "Development of sustainability reports according to GRI criteria", aimed at the Rural Development Groups of Catalonia, Aragon and the Balearic Islands. Organised by REDR.\*

### Actions regarding climate change

In 2011, REE has, by signing an agreement with the Junta de Andalucía (Government of Andalusia), adhered to the **Sistema Andaluz de Compensación de Emisiones** (SACE - Andalusian Emission Offsetting System), a voluntary framework through which companies undertake the commitment to audit, reduce and if necessary compensate for their emissions. The works associated with said commitments will be implemented as of 2012.

### Actions regarding energy efficiency

During 2011, a significant number of projects and initiatives were carried out (more detailed information – available only in Spanish – can be accessed on Red Eléctrica's website in the section [www.ree.es/ree\\_eficiente/iniciativas\\_proyectos.htm](http://www.ree.es/ree_eficiente/iniciativas_proyectos.htm). Of these projects and initiatives, the following are noteworthy:

- ◆ Red Eléctrica annually designs a communication campaign which has the 5th of March, World Energy Efficiency Day, as its cornerstone and is in keeping with the slogan **"Use energy wisely"**. This campaign is targeted towards its employees, and its objective is to serve as an informative mechanism to raise awareness concerning energy efficiency and sustainability: \*
  - ◆ Launching of five messages regarding efficiency: water, electricity consumption, and the efficient use of printers, computers and vehicles.
  - ◆ Publishing of reports/articles on the intranet of the Company to strengthen the aforementioned messages.
  - ◆ Installation of the electric vehicle stand at the Company's head office on World Energy Efficiency Day with the aim of informing employees of the role that the electric vehicle, as a new electricity consumer, can play as an ally of the electricity system in order to make its operation more efficient.
  - ◆ An electric vehicle made available to employees to test drive.  
[www.ree.es/operacion/vehiculo\\_electrico.asp](http://www.ree.es/operacion/vehiculo_electrico.asp)
  - ◆ Session for the dissemination of information regarding energy efficiency under the slogan "World Energy Efficiency Day: the role of the Digital Home", held at the digital home demo facilities of AMETIC (Association of ICT companies in Spain).
- ◆ **Conference "The ESC's as potential allies for the operation of the system"**. The goal of the conference was to present the need to promote the role of Energy Services Companies as key players in providing services to the electricity system through the aggregation of consumption with regard to electricity system operation.
- ◆ Within the scope of the electric vehicle, Red Eléctrica participated in the **GENERA 2011 Fair** and the Electric Vehicle Showroom in Valladolid where visitors could try out the simulator developed by Red Eléctrica that shows the impact of the electric vehicle on the electricity system.

\* Project included in the Sustainability Laboratory. \* Project included in "Red Eléctrica eficiente".



- ◆ To mark World Recycling Day (17 May) and to support the Madre Coraje Association initiative for the **recycling of domestic oil** for different purposes (manufacturing of soap and surpluses used as biodiesel to help marginalised areas of Peru), all employees were given a funnel which is adjustable to any plastic bottle for decanting and storing oil in a cleaner way so that it can subsequently be deposited in the designated recycling points.
- ◆ Red Eléctrica has joined, for the 4th consecutive year, the **European Mobility week**. This year under the slogan "Getting around efficiently," a photo contest regarding efficient transportation was organised with a prize of 2 electric bicycles going to the winners.
- ◆ **Project "Energy efficiency in the Raya"**. A total of 62 municipalities in the provinces of Zamora and Salamanca, members of the European Grouping of Territorial Cooperation Duero-Douro, in 2011 agreed to adhere to the Exterior Public Lighting Energy Efficiency Project aimed at renovating the exterior public lighting equipment for others with a more efficient consumption. Red Eléctrica collaborates by means of economic backing geared towards energy audits of exterior public lighting and participates in the energy efficiency of street lighting informative sessions through the communication of the benefits of this local project to the national electricity system.

Complete information on the association's website [www.duero-douro.com](http://www.duero-douro.com) \*

- ◆ **Interactive exhibition "A Highway Behind the Wall Socket"**: The exhibition counts on three exhibit areas that provide a journey from the physical principles of electricity to the role of the citizen as a protagonist in the electricity supply process. During 2011 it was located in three cities: Valladolid, Logroño and Granada. \*



\* Project included in "Red Eléctrica eficiente".

## 5.4 Waste

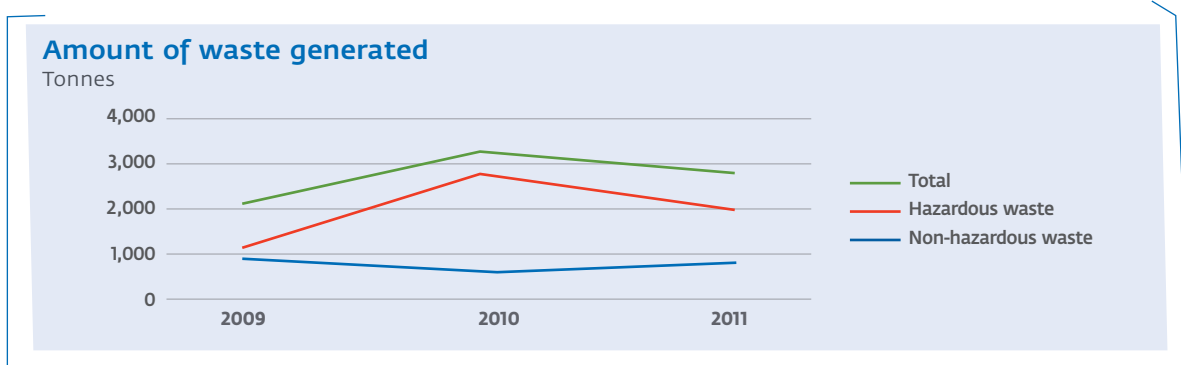
Both in maintenance activities and in the construction of new facilities different types of wastes are generated, these are separated, stored and managed in the most suitable way.

In the in-service facilities, wastes are basically generated by renovation and improvement activities, the execution of preventive and corrective maintenance programmes of machines, equipment and auxiliary services in substations, line maintenance, access corridors for towers and the management of accidents.

We attempt to reduce the amounts of waste we generate to the minimum. This is accomplished through the improvement of our processes and extending the useful life in those cases where it is viable, as is the case with the regeneration of transformer oil. However, due to the characteristics of our activity, it is very difficult to establish criteria or predict waste generation trends and therefore its minimisation.

In addition we work in order to ensure waste management is constantly improved, attempting to separate to the highest possible degree, searching for the best possible options amongst our suppliers and fostering best practices through training and awareness.

In general terms the amount of waste generated in 2011 decreased by more than 500 tonnes with respect to that of 2010.



With respect to **non-hazardous waste**, the most significant increases were due to:

- ◆ Improved management of sludge from septic tanks emptied as a result of the adaptation or replacement campaign launched in 2010 in order to adapt these assets to Red Eléctrica's standards and, in some cases, to the existing legislation.
- ◆ Increase in inert waste - primarily debris due to renovation and improvement works at facilities.
- ◆ Increase in paper and cardboard - due to the internal awareness campaign carried out to achieve the "paperless office" and the EFQM Excellence Award in which Red Eléctrica was a finalist this year.
- ◆ Increase in non-hazardous waste electrical and electronic equipment (WEEE) deemed obsolete and removed primarily from the regional offices in the Mediterranean basin.

The fundamental changes regarding **hazardous waste** were the following:

- ◆ Decrease in the insulating oil due to the fact that the equipment is handed over to the waste manager in one piece at the end of its useful life, in other words without a prior drainage of the oil contained.
- ◆ Decrease in the oil-water mix due to the increase in recent years of the number of containment systems for leaks and spillages for auxiliary and power transformers which have already been adapted to the standards of Red Eléctrica, and which do not require emptying prior to their adaptation. The origin of this oil-water mix results primarily from periodic maintenance.
- ◆ Decrease in transformers, equipment and oil with PCB's owing to the plan completed in 2010 for the elimination/decontamination of auxiliary and power transformers and equipment containing polychlorinated biphenyls (PCB). The quantities generated nowadays come from the removal of airtight equipment, manufactured before 2000, which ends up contaminated at the end of its useful life.
- ◆ Decrease in the amount of inorganic chemical products owing to the ongoing replacement of silica gel impregnated with cobalt chloride at the end of its useful life for silica gel not containing hazardous elements.
- ◆ Decrease in the amount of gases in pressurised containers owing to the campaign carried out in 2010 for the removal of SF<sub>6</sub> bottles not meeting current standards and that had been stored in facilities. This campaign was carried out prior to the implementation of the new process regarding the management of SF<sub>6</sub> gases.
- ◆ Increase, as in previous years, in electrical and electronic equipment with components of a hazardous nature: equipment containing oil as a result of the improvement and renovation of assets that include the replacement of switches and measurement transformers.
- ◆ Increase in soil contaminated with hydrocarbons, on one hand due to incidents that have occurred due to oil leaks in power transformers, or equipment with the subsequent spillage onto the ground which required its clean-up and restoration, and on the other hand due to adaptation works of containment systems for leaks and spillages in power transformers and auxiliary equipment.
- ◆ Increase in Ni-Cd accumulators, which as of the campaign launched in 2009 for the use of a Comprehensive Management System for their removal, along with the replacement plans due to the end of its useful life, which results in the immediate removal of said equipment without the need to store them onsite prior to their ultimate removal.
- ◆ Increase in material containing asbestos due to the conditioning/replacement of the existing roofs of old relay huts which were made of fibre cement cladding.
- ◆ Increase in absorbent material due to the renovation and improvement works at facilities and due to the supply of said material to those facilities not already possessing it and that is now being increasingly used by staff as a preventive measure during maintenance work.

In general the remaining waste is generated based on the periodic maintenance so its increase (lead-acid batteries, antifreeze, solvents, paints, etc..) or decrease relates to the planning of different jobs.

## Waste generated during maintenance activities

Non-hazardous waste	Quantities managed (t)			Indicator (t/total N° employees)		
	2009	2010	2011	2009	2010	2011
Septic tank sludge	230.000	371.410	413.236	1.2E-01	1.9E-01	2.1E-01
Scrap metal	312.226	no data <sup>(1)</sup>	no data <sup>(1)</sup>	1.7E-01	no data	no data
Inert waste	321.298	61.650 <sup>(2)</sup>	170.970	1.7E-01	3.2E-02	8.8E-02
Paper and cardboard	68.061	68.376	115.747	3.6E-02	3.5E-02	6.0E-02
Toner <sup>(3)</sup>	0.081	0.066	0.008	4.3E-05	3.4E-05	4.3E-06
Wood	12.129	14.760	30.460	6.4E-03	7.6E-03	1.6E-02
Vegetable waste <sup>(4)</sup>	6.550	34.030	24.940	3.5E-03	1.8E-02	1.3E-02
Non-hazardous electrical and electronic waste	2.965	35.251	46.413	1.6E-03	1.8E-02	2.4E-02
Plastics	2.245	1.152	3.107	1.2E-03	5.9E-04	1.6E-03
Glass	no data	no data	0.760	no data	no data	3.9E-04
Vegetable cooking oils	3.680	4.060	2.040	2.0E-03	2.1E-03	1.0E-03
Alkaline batteries- 'No Mercury' formula	0.000	0.000	0.028	0.0E+00	0.0E+00	1.4E-05
<b>Total</b>	<b>952.685</b>	<b>556.725 <sup>(2)</sup></b>	<b>782.769</b>	<b>5.1E-01</b>	<b>2.9E-01</b>	<b>4.0E-01</b>

(1) Data not available until the IT application for control and monitoring of scrap metal is implemented. Currently being implemented.

(2) Data updated with respect to 2010 as it now includes data regarding actions carried out during the last days of the year.

(3) Waste management of toner corresponds to the supplier and maintainer of the printers. Data shown corresponds to only those units purchased directly by Red Eléctrica.

(4) This was not taken into account in calculating the total non-hazardous waste. This is not a representative value, since most of this waste was delivered to the owner or incorporated into the ground. The table includes only the waste delivered to the waste management company.

Hazardous waste	Quantities managed (t)			Indicator (t/total N° employees)		
	2009	2010	2011	2009	2010	2011
Used oil	174.538	187.758	152.256	9.3E-02	9.7E-02	7.8E-02
Oils with PCBs	5.674	66.675	0	3.0E-03	3.4E-02	0.0E+00
Oil/water mix	60.140	533.863	240.673	3.2E-02	2.7E-01	1.2E-01
Diesel/water mix	0.000	2.120	0.705	0.0E+00	1.1E-03	3.6E-04
Transformers and equipment with PCBs	33.960	180.655	45.205	1.8E-02	9.3E-02	2.3E-02
Hazardous electrical and electronic waste: equipment containing oil		1,219.789	716.708	1.9E-01	6.3E-01	3.7E-01
Hazardous electrical and electronic waste: Other	355.317	12.579	78.487	5.3E-04	6.5E-03	4.0E-02
Nickel/cadmium accumulators	20.946	44.723	100.355	1.1E-02	2.3E-02	5.2E-02
Lead batteries	0.378	1.468	3.805	2.0E-04	7.6E-04	2.0E-03
Earth impregnated with hydrocarbons	480.322	478.864	648.138	2.5E-01	2.5E-01	3.3E-01
Recipients that have contained hazardous substances	9.251	5.785	8.217	4.9E-03	3.0E-03	4.2E-03

(continued on next page)

(continuation)

Hazardous waste	Quantities managed (t)			Indicator (t/total Nº employees)		
	2009	2010	2011	2009	2010	2011
Absorbent materials, filtering materials, cleaning rags/cloths and protective clothing contaminated with hazardous substances	5.980	2.728	16.630	3.2E-03	1.4E-03	8.6E-03
Silica gel and other inorganic chemical products	0.570	3.196	0.489	3.0E-04	1.6E-03	2.5E-04
Non-halogenated solvents	0.000	0.069	0.000	0.0E+00	3.5E-05	0.0E+00
Halogenated solvents	0.000	0.016	0.000	0.0E+00	8.2E-06	0.0E+00
Water-based cleaning liquids	0.000	0.000	0.114	0.0E+00	0.0E+00	5.9E-05
Paint waste	0.053	0.043	0.201	2.8E-05	2.2E-05	1.0E-04
Insulation material (with or without asbestos)	0.080	0.045	2.439	4.2E-05	2.3E-05	1.3E-03
Laboratory chemical products containing hazardous substances	0.420	0.050	0.437	2.2E-04	2.6E-05	2.2E-04
Gases in pressurised containers	0.762	4.078	0.126	4.0E-04	2.1E-03	6.5E-05
Waxes and used grease	0.000	0.009	0.000	0.0E+00	4.6E-06	0.0E+00
Anti-freeze containing hazardous substances	0.000	0.000	1.055	0.0E+00	0.0E+00	5.4E-04
Florescent tubes	0.818	0.297	0.702	4.3E-04	1.5E-04	3.6E-04
Batteries	0.095	0.005	0.021	5.0E-05	2.6E-06	1.1E-05
<b>Total</b>	<b>1,149.305</b>	<b>2,744.814</b>	<b>2,016.763</b>	<b>6.1E-01</b>	<b>1.4E+00</b>	<b>1.0E+00</b>

## Types of Management

Non-hazardous waste	
Septic tank sludge	Treatment/recycling
Scrap metal	Recycling
Inert waste	Controlled elimination
Paper and cardboard.	Recycling
Toner	Recycling
Wood	Recycling
Vegetable waste	Recycling
Non-hazardous electrical and electronic waste	Recycling
Plastics	Recycling
Glass	Recycling
Vegetable cooking oils	Regeneration
Alkaline batteries - 'No Mercury' formula	Recycling





<b>Residuos peligrosos</b>	
Used oil	Regeneration/Valuation
Oils with PCBs	Valuation/Controlled elimination
Oil/water mix	Valuation
Diesel/water mix	Valuation
Transformers and equipment with PCBs	Valuation/Controlled elimination
Hazardous electrical and electronic waste: equipment containing oil	Valuation
Hazardous electrical and electronic waste: Other	Valuation
Nickel/cadmium accumulators	Recycling
Lead batteries	Recycling
Earth impregnated with hydrocarbons	Controlled elimination
Recipients that have contained hazardous substances	Valuation
Absorbent materials, filtering materials, cleaning rags/cloths and protective clothing contaminated with hazardous substances	Valuation
Silica gel and other inorganic chemical products	Valuation
Non-halogenated solvents	Valuation
Halogenated solvents	Valuation
Water-based cleaning liquids	Valuation
Paint waste	Valuation
Insulation material (with or without asbestos)	Valuation/Controlled elimination
Laboratory chemical products containing hazardous substances	Valuation
Gases in pressurised containers	Valuation
Waxes and used grease	Valuation
Anti-freeze containing hazardous substances	Valuation
Florescent tubes	Recycling
Batteries	Controlled elimination

## Waste generated during construction activities

In the activities regarding the **construction** of new facilities or modifications to existing ones, waste is managed by the contractors. By means of the environmental specifications, the requirements regarding their separation, storage and final management are communicated. The fulfilment of the requirements is reviewed during the work supervision visits and through the control of the pertinent documentation.

### Non-hazardous waste

- ◆ Excavation surpluses
- ◆ Concrete surpluses
- ◆ Flora/Forestry waste
- ◆ Paper and cardboard.
- ◆ Plastics
- ◆ Wood
- ◆ Scrap waste
- ◆ Solid urban waste
- ◆ Septic tank sludge

### Hazardous waste

- ◆ Paint waste
- ◆ Absorbent matter and cloths contaminated with hazardous substances
- ◆ Earth impregnated with hydrocarbons
- ◆ Containers that have contained hazardous substances



## 5.5 Environmental accidents

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. Thanks to the application of these measures, the consequences of the accidents which have occurred in our facilities have only been of minor importance.

Accidents occurred with an environmental impact over the last 3 years are detailed in the following table:

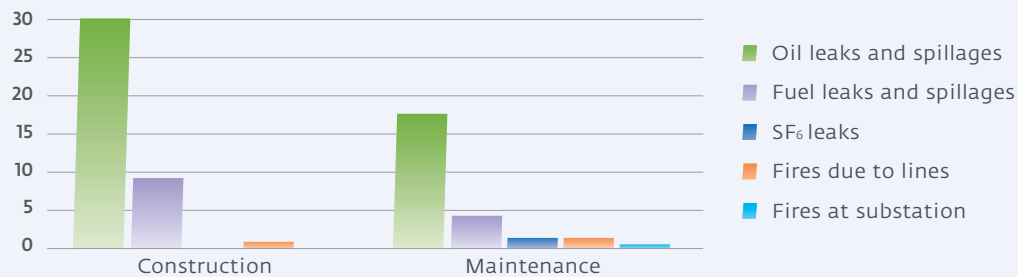
Accidents occurred	2009	2010	2011
<b>Accidents occurred during construction activities</b>	<b>3</b>	<b>4</b>	<b>40</b>
<b>Fires</b> due to line discharges	0	0	1
<b>Fires</b> resulting from a fault in substations	1	0	0
<b>Leaks and spillages</b> of oil due to error in the filling of transformers	0	0	0
<b>Leaks and spillages</b> of oil and hydrocarbons due to minor breakdowns during the use of machinery during construction works	2	4	39
<b>Accidents occurred during maintenance activities (*)</b>	<b>23</b>	<b>23</b>	<b>27</b>
<b>Fires</b> due to line discharges	2	0	2
<b>Fires</b> due to fault in substations	0	2	1
<b>Towers brought down</b> due to severe weather conditions	4	0	0
<b>Leaks and spillages of oil and hydrocarbons</b> during the use and maintenance of substation equipment	13	18	22
<b>Oil leaks</b> in lines	1	0	0
<b>Floods</b>	0	0	0
<b>SF<sub>6</sub> leaks</b> due to explosion of equipment or other accidents	3	3	2

(\*) Revised data. Birdlife collisions with in-service electricity lines are addressed separately from the data included.

### Accidents by phases in 2011

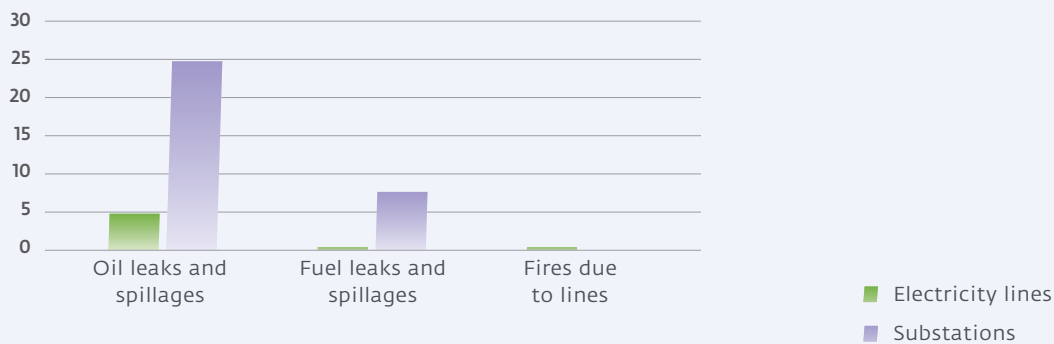
	Oil leaks and spillages	Fuel leaks and spillages	SF <sub>6</sub> leaks	Fires due to lines	Fires at substations	Total
Construction	30	9	0	1	0	40
Maintenance	18	4	2	2	1	27
<b>Total</b>	<b>48</b>	<b>13</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>67</b>

### Classification of accidents by phase 2011

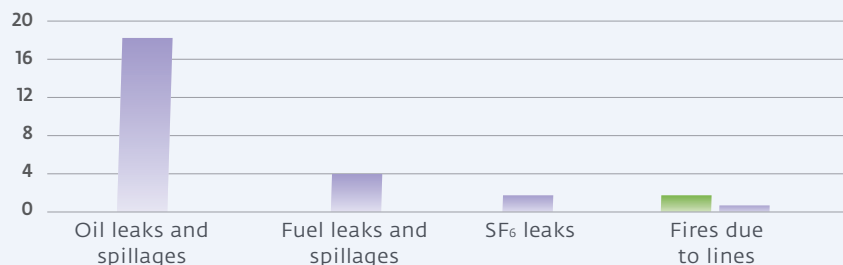


### Classification by type of facility 2011

#### Construction



#### Maintenance



All accidents identified, classified as incidents, were registered as minor and without significant impact on the environment.

Both in the construction and maintenance phase, the figures associated to hydrocarbon leaks and spillages at substations are noteworthy. These resulted from faults or breakages in power transformers and equipment, handling and decanting of oil or failures in the use of machinery. In the case of leaks in power transformers, which in no case exceeded 5 m<sup>3</sup>, the hydrocarbon containment systems functioned adequately and therefore controlled the spillage. In those cases where the soil was affected by the spillage, the area affected did not exceed 20 m<sup>2</sup>, except in one case.

As for birdlife collisions with electricity lines, at present no systematic monitoring of the lines is being carried out for the detection of collisions although the events detected are analysed in order to identify the lines that require marking.

In this sense, a comprehensive monitoring of the Castejón-Muruarte 400 kV line was carried out as part of the environmental monitoring of the facilities. 39 accidents due to collision were registered. Those birds affected are not under any birdlife protection measure, with the exception of 2 Golden Eagles (*Aquila chrysaetos*) a species classed as almost threatened according to IUCN Red List.

Additionally, the following collisions of catalogued species were registered at facilities in service:

- ◆ Almazán-Fuendetodos 400 kV line: two Great Bustard (*Otis tarda*) fatalities. Vulnerable species according to the IUCN Red List.
- ◆ Añover-Pinto 220 kV line: one Great Bustard (*Otis tarda*) fatality.
- ◆ 400 kV lines Pinar-Puerto de la Cruz / Puerto de la Cruz Arcos de la Frontera / Tarifa-Puerto de la Cruz 1 / Tarifa-Puerto de la Cruz 2: two Griffon Vulture (*Gyps fulvus*) fatalities, vulnerable species according to the national catalogue of threatened and near-threatened species in accordance with the IUCN Red List.
- ◆ Cabra-Guadame 400 kV line: one Little Bustard (*Tetrax tetrax*) fatality. Vulnerable species according to the national catalogue of threatened and near-threatened species in accordance with the IUCN Red List.
- ◆ Barranco Tirajana-Jinámar 200 kV line: one Stone-curlew (*Burhinus oedicanus*) fatality. Vulnerable species according to the national catalogue of threatened species.
- ◆ Cabra-Guadame 2 400 kV line: one Great Bustard (*Otis tarda*) injured.
- ◆ Cabra-Guadame 1 400 kV line: one Great Bustard (*Otis tarda*) injured.

Those lines where incidents detected involved Great Bustards have been included in the marking programme for lines under maintenance. In the case of injured birds, they are transferred to the Bird Recovery Centre (CREA).

The data regarding the environmental risk assessment carried out in 2010 as a part of Red Eléctrica's Integrated Risk Management system, has been updated. The result of which shows the following:

- ◆ No new environmental risks have been identified.
- ◆ No modifications have taken place regarding the assessment criteria.
- ◆ The report corresponding to 2011 has been prepared.





# 6 Research and development

In regard to research, development and innovation, we work with prestigious research teams and achieve objectives and results that add value to our business activities.

During 2011, the expenditure on R&D&i spearheaded by the Environmental Department reached 383,981 euros. This amount represents 5.32% of the total expenditure on R&D&i.

With the collaboration of all the areas involved, the following R&D&i projects were carried out:

## Prevention and fighting of forest fires and the protection of flora

- ◆ **“Modelling of the growth of forest masses” project.** The work is carried out in collaboration with Altran Technologies and the School of Engineering and Mountain Science of the Universidad Politécnica de Madrid. The project began in November 2010 and is expected to be completed in January 2013. The objective of the project is to obtain a forest growth simulation model to prevent possible incidents with high voltage lines, with the aim of being able to ensure that the safety distance between the trees and the lines is not exceeded. The project originates from the need to count on a tool to predict the necessity for tree surgery in the proximity of the high voltage overhead lines and therefore continue improving in matters related to the prevention and fighting of forest fires.

## Birdlife

- ◆ **Mapping of bird flight paths in Andalusia and Extremadura:** Carried out in collaboration with the Doñana Biological Station (CSIC), the Junta de Andalucía (Government of Andalusia), and Junta de Extremadura (Government of Extremadura). Began in September 2010, its conclusion is foreseen for 2014. Its objective is to identify and map the bird flight paths of those birds which are more prone to collide with electricity lines. The process involves identifying the areas and paths more frequented and used by birds in their daily displacement, which are those that are more highly associated to the potential risk of collision with the lines.

The project is divided into the following phases:

- ◆ Identification of focal species.
- ◆ Collation of relevant information.
- ◆ Analysis and processing of information compiled.
- ◆ Development of the prototype geographic information system.

The final product is a prototype geographic information system for the Autonomous Communities of Andalusia and Extremadura.

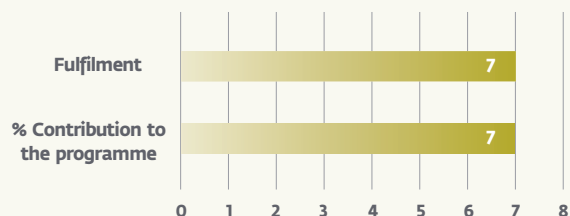
The project will be replicated throughout both the Spanish peninsula and the Canary & Balearic Islands. In 2012, the regions of Castilla-La Mancha, Castilla and Leon, Murcia, Valencia and the Canary Islands will be incorporated into the geographic information system.

- ◆ **Predictive model of risk areas for bird collisions with high voltage electricity lines in the Community of Valencia.** Conducted in collaboration with the University Miguel Hernández de Elche and the Government of Valencia. It began in 2011 and is expected to be completed in 2012. It is part of the Environmental Programme of both years. Its objective is the design and development of a model to assess the probability of collision of birds with power lines. So far, preliminary studies have been reviewed and the historical data regarding bird collision accidents has also been analysed; making it possible to make a selection of focal species and draft maps that show their areas of concentration, breeding and feeding as well as their main flight paths giving way to the identification of areas with high mortality and the drafting of a field methodology.

### OBJETIVE 8 Bird collision risk map

% Fulfilment: 100

#### 8.1 Bird collision risk map: Development of the model and field verification



The works are being carried out adequately under the new schedule established during the year. The project ends in March 2012.

It is proposed that the objective continue in 2012, integrated into Objective No. 12 as a single objective since both aim to reduce the risk of existing facilities on birds.

- ◆ **Design of a collision detector prototype system:** Carried out in collaboration with the Migres Foundation and the Research Foundation of the University of Seville. Began in September 2008, its finalisation has been extended to 2012. Its objective is the design of an impact detection device, to be installed on high voltage grounding cables and that would allow real-time detection of possible collisions transmitting this data to a PC and sending a signal to a mobile device in order to act swiftly. In this way, it would be possible to get to the area where the impact occurred, locate the bird concerned and if possible take it to a specialised bird recuperation centre. Currently, adjustments to the model are being carried out and it is foreseen to be installed in the first quarter of 2012 in Andalusia.
- ◆ **Testing a nesting and roosting deterrent model for the White Stork (*Ciconia ciconia*):** Project carried out in collaboration with Asistencias Técnicas CLAVE. The objective of the project is the design of a prototype device that deters White Storks from nesting and roosting on the electricity line towers. Until now, three different types of deterrent devices have been installed on 18 towers of two electricity lines located in Andalusia and Castilla-Leon. Monitoring of the effectiveness of the deterrent system was carried out and a proposal for its improvement has been presented. It is foreseen that the project will continue during 2012.





# 7 Training and awareness



We consider environmental training as strategic in order to create a team which is increasingly concerned about environmental protection. The training provided goes a step beyond the mere professional scope, with the aim of contributing to the improvement of environmental habits in the daily work and family life of every employee.

In 2011, **2.25%** of Red Eléctrica's staff received environmental training (in contrast to 3.07% in 2010) with a total of **3,926.25** hours of training (in contrast to 7,182 hours in 2010). The decrease in the number hours is due to the fact that environmental training in 2010 was much more specialised (rather lengthy courses) and in 2011 the training was more generalised.

## Environmental training areas

- ◆ Environmental Education, Sustainable Development and Corporate Responsibility
- ◆ The Environment and the Electricity Sector
- ◆ Iberian Flora and Fauna
- ◆ The Environment and Engineering
- ◆ Energy Efficiency and Environmental Responsibility
- ◆ The Handling of SF<sub>6</sub> gas
- ◆ Climate Change
- ◆ Environmental Acoustics
- ◆ Environmental Assessment and Urban Planning
- ◆ Renewable Energy
- ◆ The Management and Conservation of Natural Areas

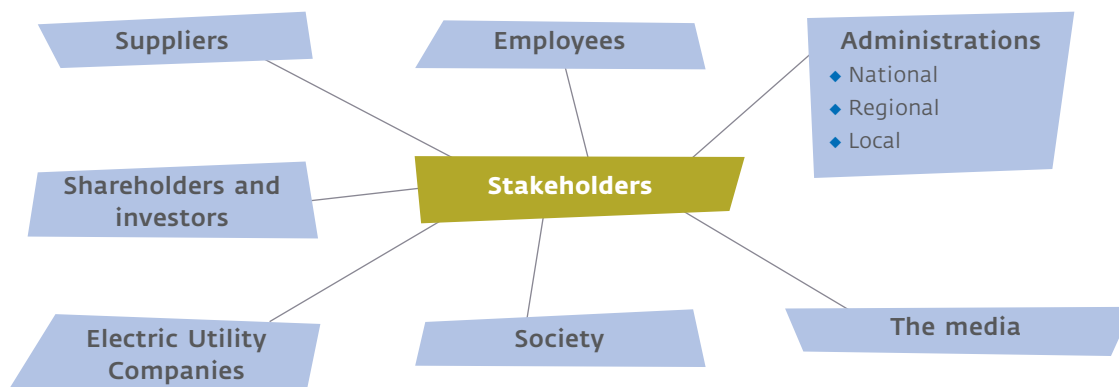


# 8

## Communication and relations with stakeholder groups



Conscious of the social interest in the activities we carry out, we provide constant information to, and maintain dialogue with, all stakeholders.



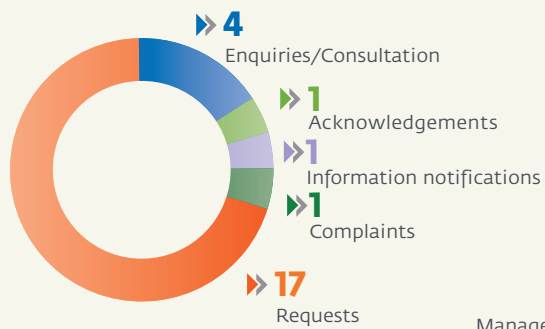
### 8.1 Stakeholder attention – enquiries and claims

We monitor and attend to all stakeholder enquiries and claims of an environmental nature which are sent to us by interested parties via electronic mail or the DÍGAME service (Stakeholder Attention Centre) specifically provided for this purpose on our website [www.ree.es](http://www.ree.es).

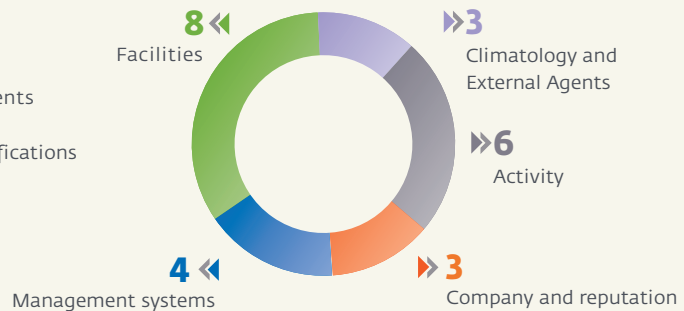
During 2011, the Environmental Department received 24 enquiries of an environmental nature through the DÍGAME service classified as follows:

### Enquiries of an environmental nature through the DÍGAME service

#### By category:



#### By typology:



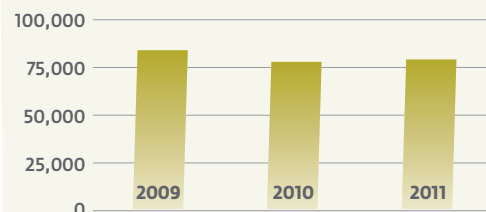
## 8.2 Dissemination of information

The number of registered visits to the environmental section of the corporate website ([www.ree.es](http://www.ree.es)) was 81,231 (as compared to 80,100 in 2010) and the number of publications distributed in e-format was 31,021 (as compared to 35,211 in 2010).

The main publications in 2011 were:

- ◆ Environmental Report 2010
- ◆ Corporate Responsibility Report 2010
- ◆ "Red Eléctrica backs the electric vehicle" leaflet
- ◆ "Smart consumption guide" pamphlet
- ◆ "The Red Eléctrica Forest" fold-out poster

#### Visits to the environmental section of the corporate website



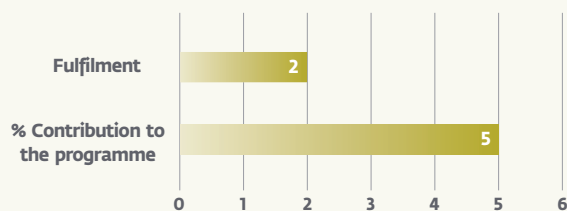
### Objectives for the improvement of relations with interested parties

#### OBJECTIVE 13

#### Objectives for the improvement of relations with interested parties

% Fulfilment: 40

#### 13.1 Design and modification of the environmental section of the corporate website



A new format was designed and will be published in 2012. Once the environmental work is concluded, this annual objective will not continue next year.

## 8.3 Collaboration agreements

Through collaboration agreements, we work with institutions to carry out R&D&i projects or activities related to the environment and sustainable development, of interest to both parties.

### Collaborations with the Public Administration

Public organisations/entities	Collaboration/Agreements
<b>Autonomous Government of Andalusia (Department of Environment)</b>	<ul style="list-style-type: none"> <li>◆ Life agreement for the conservation and management of special protection areas for Steppe birds in Andalusia.</li> <li>◆ Collaboration agreement for the prevention and fighting of forest fires.</li> <li>◆ Framework agreement. Development and maintenance of the electricity transmission grid.</li> <li>◆ "The Red Eléctrica Forest".</li> <li>◆ Collaboration agreement for the fight against climate change by means of voluntarily reducing the carbon footprint and adherence to the Andalusian system for offsetting of greenhouse gas emissions.</li> </ul>
<b>Autonomous Government of Castilla and León (Department of Environment)</b>	<ul style="list-style-type: none"> <li>◆ Framework Agreement</li> </ul>
<b>Autonomous Government of Aragón (Department of Environment)</b>	<ul style="list-style-type: none"> <li>◆ Collaboration agreement for the prevention and fighting of forest fires</li> </ul>
<b>Autonomous Government of the Balearic Islands (Department of Environment)</b>	<ul style="list-style-type: none"> <li>◆ Specific agreement. Reintroduction of Bonelli's Eagle in Majorca</li> </ul>
<b>Ministry of Industry and Employment of the Autonomous Government of Castilla-La Mancha</b>	<ul style="list-style-type: none"> <li>◆ Development of electricity infrastructures</li> </ul>
<b>Ministry of Environment and Rural Development of the Autonomous Government of Castilla-La Mancha</b>	<ul style="list-style-type: none"> <li>◆ Collaboration agreement for the prevention and fighting of forest fires</li> </ul>
<b>Ministry of Environment, Water, Urban development &amp; Housing of the Autonomous Government of Valencia</b>	<ul style="list-style-type: none"> <li>◆ Framework agreement. Coordination of actions, research studies and projects that contribute to improving the natural areas, habitats and wild flora species in the Community of Valencia</li> </ul>
<b>Autonomous Government of Catalonia (Department of Environment)</b>	<ul style="list-style-type: none"> <li>◆ Collaboration agreement for the definition of corridors and zones of least impact for locating future electricity facilities</li> </ul>
<b>Regional Government of Extremadura</b>	<ul style="list-style-type: none"> <li>◆ Regional Government of Extremadura associated with the transmission grid</li> </ul>

## Collaborations with research centres and universities

Organisations/Institutions	Collaborations/Agreements
<b>CSIC</b>	◆ Framework Agreement for Collaboration
<b>CSIC. Biological Station of Doñana</b>	◆ Testing of measures on electricity transmission lines to minimise the possible impact on pseudo-Steppe birdlife. Pilot project
<b>CSIC. Natural Science Museum (Canary Islands)</b>	◆ Advisory service for the census of the Houbara Bustard in Fuerteventura and Lanzarote
<b>University of La Laguna</b>	◆ Framework agreement for the development of joint action programmes in academic and research areas. University Master's regarding Renewable Energies
<b>University of Las Palmas de Gran Canaria</b>	◆ Research project "Study for the landscaping integration of substations"
<b>University Miquel Henández (Elche)</b>	◆ Predictive model of risk areas for bird collisions with high voltage electricity lines in the Community of Valencia

## Collaborations with other organisations

Organisations/Institutions	Collaborations/Agreements
<b>APIA (Asociación de Periodistas de Información Ambiental)</b>	◆ Environmental information
<b>FAPAS - Fund for the Protection of Wild Animals</b>	◆ Support programme for mountain agriculture. Conservation of the Brown Bear and the Wood Grouse
<b>Entorno Foundation</b>	◆ Agreement by which Red Eléctrica forms part of the companies that collaborate with the Entorno Foundation, Sustainable Development and Business
<b>Gypaetus Foundation</b>	◆ Project for the selection, creation and management of improved habitat areas for the Great Bustard and other Steppe species
<b>Migres Foundation</b>	◆ Bird collision detector on electricity lines. Pilot project. ◆ Framework Agreement for Collaboration for the execution of research, development and innovation projects and technical support within the environmental scope ◆ Collaboration Agreement between Red Eléctrica and the Migres Foundation
<b>Naturaleza y Hombre Foundation</b>	◆ Life Agreement. Conservation of biodiversity in the Campanarios de Azaba Nature Reserve
<b>GREFA - Group for the rehabilitation</b>	◆ Framework Agreement for Collaboration ◆ Reintroduction of the Black Vulture in Catalonia. ◆ Increasing of the Golden Eagle population in Galicia (to start in 2012) ◆ Census of the Houbara Bustard in Fuerteventura and Lanzarote
<b>Let's plant for the planet</b>	◆ Reforestation – Natural Park of Alcornocales
<b>SEO - Spanish Ornithological Society</b>	◆ Framework Agreement for Collaboration

## Collaborations with education and communication centres

Organisations/Institutions	Collaborations/Agreements
Association to the Red Life magazine	◆ Sponsoring of the Great Bustard and the Lesser Kestrel
Rural Studies Foundation	◆ Collaboration agreements
Naturalia XXI-REE	◆ Collaboration agreement
Informative session on electric mobility in the city	◆ Sponsorship
IX International Congress of environmental journalism	◆ Sponsorship
"2011 L'any mobilitat sostenible"	◆ Sponsorship
2011 The digital home	◆ Sponsorship
XI Spanish Congress-II Iberian Congress on environmental health	◆ Sponsorship
IV Meeting – Renewable energies	◆ Sponsorship
I Iberian Congress on wind energy	◆ Sponsorship
Convention on Climate Change and Urban Environment	◆ Sponsorship
IV Meeting – Natural Park of Alcornocales	◆ Sponsorship

## Participation in working groups

Working groups	Organised by
WG C3.04: "Communication strategies in sustainable development"	<b>CIGRÉ</b>
WG C3.08: "Internalisation of external cost for Power Lines"	
WG C3.09 : "Corridor Management"	
WG C3.12: "Methodologies for Greenhouse gas inventory and reporting for T&D utilities"	
Subgroup "Environmental Impact Evaluation"	<b>ENTSO-E</b>
Environmental committee	<b>AEC</b>
Sustainability Excellence Club	<b>Excellence Club</b>
Working group on electromagnetic fields	<b>UNESA</b>
Environmental working group on distribution	
Working group on climate change and energy. CO <sub>2</sub> action programme	<b>Entorno Foundation</b>
Working group: Demand-side management and climate change	<b>International Energy Agency</b>
Working group: Investigation of energy efficiency offers and associated branding strategies	
Working group: Standardisation of indicators for measuring energy efficiency	
Joint project on plug-in electric vehicles	<b>Very Large Power Grid Operators (VLPGO)</b>
Working group "Flexilwatts" (greater demand flexibility)	
Working group "Storage" (possibilities of storing energy)	

(continued on next page)

*(continuation)*

Working groups	Organised by
Working group: Spanish platform for energy efficiency	<b>Ministry of Science and Innovation</b>
Working group: Spanish platform for the digital home	<b>Multisectorial Association of Spanish Electronic and Communications Companies (ASIMELEC)</b>
Working group on Regional Electricity Infrastructure Corridors in Castilla La Mancha	<b>Community Governments of Castilla La Mancha</b>
Working group on Regional Electricity Infrastructure Corridors in Madrid	<b>Autonomous Community of Madrid</b>



# 9 Collaborators

We consider our suppliers and contractors to be an essential link in the development of our activities, and therefore our commitment to the environment extends to each and every one of them as an integral part of our work team.

Our collaborators also assume our commitment to respect the environment in their daily work. Proof of this is shown in the increase in the number of suppliers having an environmental management system in place, which is certified by an external entity or those who are in the process of implementing one.

During 2011, a total of 224 service suppliers contracted by Red Eléctrica and whose activity may generate a direct impact on the environment were identified.

Of these suppliers, 55% have a documented management system and/or certified by a third party. Most perform works related to construction activities, treatment of vegetation and maintenance of equipment in substations.

The evolution of the supplier behaviour regarding environmental matters over the last three years has been the following:

## Services suppliers' behaviour regarding environmental matters

	2009	2010	2011
Nº. of suppliers with an environmental qualification	115	151	224
% of suppliers with a certified environmental management system (UNE-EN ISO 14001:2004 or EMAS registered) divided by number of suppliers with qualification	50	55	55



## Supplier qualification and supervision

Suppliers of those products or services that may have associated environmental impacts need to undergo an environmental qualification process and subsequently during the execution of the services their work is monitored as follows:

### a) New supplier qualification phase:

Red Eléctrica designed a new supplier qualification process which was put into operation at the end of 2011 and that classifies the activities to be awarded in three levels: non-significant, significant and critical.

Suppliers who will carry out activities of a critical level shall be obliged to complete a questionnaire which will incorporate environmental conditioning factors which, if not met, would result in their non-eligibility in the qualification. They shall also be subject to a prior audit that may incorporate inspection points of an environmental nature that will condition their final rating.

### b) Execution phase of the contracted service:

All suppliers whose activities may represent an environmental risk must have civil responsibility insurance in force during the execution of the activity and shall explicitly include the civil responsibility liability guarantee due to contamination of or damage to the environment whilst performing the works.

Suppliers that perform activities linked to construction works while carrying out the execution of their work/activities are subject to environmental monitoring.

Additionally, the environmental certification is in the process of being implemented and that will the weighting of the environmental variable to be increased, penalising the execution of works with an economic sanction, if deemed necessary.

Finally, specific suppliers who carry out the treatment of vegetation shall be subject to the requirements that Red Eléctrica's forestry guide requires them to comply with.

### c) Monitoring phase of contracted services

Re-structuring of the supplier monitoring methodology is currently under way and is foreseen to begin in 2012.

## Supplier contribution to the carbon footprint

During 2011, a project was started to determine the carbon and water footprint associated to suppliers of goods and services. The first phase of the project consisted of the analyses of 1,379 companies which encompassed 100% of the products and services supplied to Red Eléctrica.



The most relevant conclusions of the first phase of works are as follows:

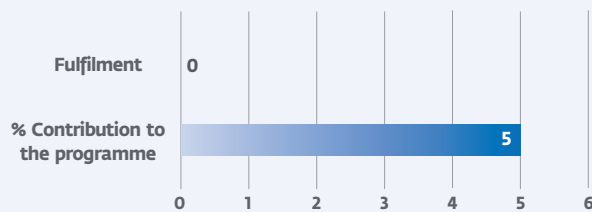
- ◆ The sectors that contribute most to the supplier carbon footprint are those involved in the manufacturing of equipment and components (53% of the footprint) and construction (41.5%).
- ◆ 90% of total supplier emissions are attributed to only 52 companies and of which 10 account for 70% (representing 61% of total expenditure on goods and services).
- ◆ Subsequent work to be performed as of 2012 will focus on these two areas and specifically on these 52 companies.
- ◆ The water consumption was approximately 30,200,000 m<sup>3</sup>, water being used directly by providers represents only 6% of the total (the rest is consumed in turn by their own suppliers).
- ◆ Construction activities and equipment manufacturing account for 88% of supplier water consumption and within these sectors just 5 companies account for 50% of this consumption.

## Objectives for the improvement of relations with interested parties

### OBJECTIVE 14 Integration of environmental criteria into the Red Eléctrica supplier qualification process

% Fulfilment: 0

**14.1** Identification of environmental criteria: analysis of supplies, drafting of questionnaires for 50% of relevant and critical suppliers, and definition of the monitoring process



In 2011, work was performed on the definition of the qualification phase questionnaires for suppliers engaged in activities related to construction works. The follow-up questionnaires that were defined only reached the comments stage.

In 2012, the objective will not be contemplated within the Environmental Programme as it will be integrated into the line of work of all Red Eléctrica.

# 10 Legal compliance evaluation

In order to identify and evaluate the relevant 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, autonomous and local regulations but also those obligations derived from the Environmental Impact Declaration and other administrative authorisations.

The evaluation of the annual legal compliance carried out is shown in the following tables:

Requirements not fulfilled	Actions carried out
<p><b>Waste:</b> In some demolition or renovation works that require it, the study regarding the waste management of construction and demolition is not included in the corresponding execution project.</p>	<p>Increase of the supervision regarding the project documentation by the units responsible.</p>
Requirements in process of being fulfilled	Actions carried out
<p><b>Waste:</b> Some centres that generate waste are either in the process of sending the corresponding communication to the Administration, in compliance with the new Waste Act in substitution of the authorisation procedure, or if the communication was sent, are waiting for the corresponding administrative resolution.</p>	<p>Meetings are being held with the various areas of the governments of the Autonomous Communities responsible for waste matters to learn more about how the new Waste Act is going to be applied.</p>
<p><b>Land:</b> The presentation of the preliminary reports regarding land being considered for new facilities (to be commissioned, or acquired within a period of under two years) is in progress, or in most Autonomous Communities they are awaiting resolution regarding the preliminary reports concerning land which were submitted in previous years.</p>	<p>Discussions are being held with the various areas of the governments of the Autonomous Communities to check on the status of proceedings and to see if they are making changes in reporting models.</p>
<p><b>Residual waters and water withdrawal:</b> There are wells and septic tanks pending legal permits or adaptation to the conditioning factors as required by the corresponding authorisations. In some cases, this circumstance signifies at the same time the fact of being in the process of complying with the requirements associated to the payment of the sanitation fee.</p>	<p><b>Residual waters:</b> A plan is in process for the replacement of leaking septic tanks for watertight ones at remotely-operated substations or where a reduced number of people reside. Also included is the adaptation of the septic tanks to the conditioning factors to conform to the corresponding authorisations at work centres which have a greater number of employees residing.</p> <p><b>Water withdrawal:</b> A plan is in process for the closure of wells and its replacement by water tanks as a water withdrawal source.</p>

# 11 Sanctions and fines

The following table details the type of infringement committed and the total cost of the same in sanctions requiring the payment of fines in the 2009-2011 period.

The data indicated in red refers to new data with regard to the previous years.

Infringement committed (euros)	2009	2010	2011
Lack of maintenance of vegetation	300	100	450.75 100
Unauthorised felling and pruning	720	1,001 66	16,875
Unauthorised construction of a path	500	-	-
Fire due to line discharge	-	4,804 8,118 1,001	-
Abandonment of material/potential fire risk	2,735 <sup>(1)</sup>	-	-
Unauthorised works in police area	90.15	-	-
Obstruction of water way	-	300	2,100
Activities with high probability of soil contamination	-	1,050 <sup>(2)</sup>	-
Archaeology	18,900	-	-
<b>Total Cost €</b>	<b>23,245.15</b>	<b>16,440</b>	<b>19,525.75</b>

(1) The amount corresponds to 2 cases.

(2) The amount corresponds to 5 cases.



# 12 Environmental expenditure

During 2011, **7,027,748.50** euros in environmental investments have been made in new facilities, equating to 0.86% of the total investments carried out in the transmission grid.

These investments correspond to the execution of Environmental Impact Studies of all projects, implementation of preventive and corrective measures, environmental supervision of electricity facilities under construction and the application of compensatory measures related to environmental aspects.

Similarly, during 2011 expenditure totalling **20,306,267.75** euros, was made in environmental protection and improvement, representing 2.45% of the total operating costs.

The evolution of environmental expenditure over the last three years can be seen in the following table:

**Environmental expenditure** (euros)

	2009	2010	2011
<b>INVESTMENTS</b>	<b>4,427,759.53</b>	<b>6,277,588.17</b>	<b>7,027,748.50</b>
Engineering and construction of facilities	4,427,759.53	6,277,588.17	7,027,748.50
<b>Expenditure</b>	<b>13,651,980.44</b>	<b>18,866,104.90</b>	<b>20,306,267.75</b>
Development of methodology and systems	10,028.00	325,885.50	45,085.71
Environmental studies and analyses	-	112,382.50	142,121.00
Environmental actions in facilities in service	11,666,852.73	16,079,833.74	18,183,847.34
Prevention of contamination	642,310.87	870,686.43	727,891.69
Protection of biodiversity/ landscaping/prevention of fires	10,439,651.12	13,969,816.55	15,851,286.25
Climate change	-	171,677.43	786,070.48
Energy efficiency and saving of resources	-	111,038.70	181,086.03
Waste reduction and management	584,890.74	956,614.63	637,512.89
<b>Research and development</b>	<b>600,471.56</b>	<b>618,488.95</b>	<b>319,172.00</b>
<b>Training and communication</b>	<b>281,765.68</b>	<b>575,263.95</b>	<b>416,752.75</b>
Environmental training and awareness programmes	38,941.00	18,782.47	27,743.46
Communication	242,824.68	556,481.48	389,009.29
<b>Environmental taxes and levies</b>	<b>17,084.47</b>	<b>18,139.04</b>	<b>23,185.72</b>
<b>Expenditure of personnel dedicated to environmental activities</b>	<b>1,075,778.00</b>	<b>1,136,111.22</b>	<b>1,176,103.23</b>

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:

<b>Percentage of investment and expenditure on the environment</b>		2009	2010	2011
% of investment on the environment	Environmental investment/total investment in the transmission grid	0.60	0.27	0.86
% of expenditure on the environment	Environmental expenditure/total operating costs	2.13	2.60	2.45

In addition to the costs indicated above, Red Eléctrica pays out a significant amount of money in environmental taxes due to the presence of our electricity transmission facilities in the Autonomous Communities of Catalonia and Extremadura.

	2009	2010	2011
<b>Environmental Taxes</b> (euros)	<b>1,088,964.30</b>	<b>1,097,240.05</b>	<b>1,454,552.02</b>

# 13 Frequency of the environmental impact declaration

This Environmental Report which is published annually acts as an Environmental Declaration and its purpose is to provide information to all stakeholders concerning Red Eléctrica's environmental behaviour regarding those activities carried out between January and December 2011.

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 certifies that the Red Eléctrica Environmental Declaration 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 Declaration will be presented and published during the first half of 2013.

# Glossary of terms

**BIRD-SAVING DEVICES OR "SPIRALS":** 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.

*(Own definition REE).*

**ELECTRIC FIELD:** In a point in space, the force exerted on a static load located at that point. Expressed in volts per metre (V/m).

*(50 Hz. Electrical and Magnetic fields REE and UNESA, 1998).*

**ENVIRONMENTAL ASPECT:** An element of the activities, products or services of an organisation having or which may have an impact on the environment.

*(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)).*

**ENVIRONMENTAL BEHAVIOUR INDICATOR:** Specific performance indicators providing information on an organisation's environmental behaviour.

*(Standard UNE-EN ISO 14031 Environmental management. General Guidelines).*

**ENVIRONMENTAL IMPACT:** 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.

*(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)).*

**ENVIRONMENTAL MANAGEMENT SYSTEM:** 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.

*(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)).*

**ENVIRONMENTAL OBJECTIVE:** 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.

*(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)).*

**ENVIRONMENTAL POLICY:** 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.

*(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)).*



**MAGNETIC FIELD:** 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 ( $\mu\text{T}$ ).

*(50 Hz. Electrical and Magnetic fields. REE and UNESA, 1998).*

**NESTING DETERRENT:** 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.

*(Own definition of REE).*

**RED NATURA 2000:** 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.

*(Law 42/2007 of 13 December, on Natural Heritage and Biodiversity).*

**SIGNIFICANT ENVIRONMENTAL ASPECT:** An environmental aspect that has, or which may have, a significant impact on the environment.

*(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)).*

**SPECIAL AREA OF CONSERVATION (SAC):** 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.

*(Directive 92/43/EC, of May 21, on the Conservation of Natural Habitats and Wild Fauna and Flora).*

**SPECIAL PROTECTION AREA (SPA) FOR BIRDLIFE:** 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.

**VISUAL SIMULATION:** 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.

*(Own definition REE).*

**WASTE:** Any substance or object belonging to any of the categories established in the appendix to the Waste Act, in which the owner disposes of or has the intention/obligation to dispose of. In all cases, the items listed in the European Waste Catalogue (EWC) will be classified as such.

*(Law 10/1998, 2 April, on Waste).*

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Avelino BRITO MARQUINA  
 Director General de AENOR

**AENOR** Asociación Española de Normalización y Certificación

Génova, 6. 28004 Madrid, España  
 Tel. 902 102 201 - www.aenores

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**AENOR**  
 Asociación Española de  
 Normalización y Certificación

Avelina BRITO MARQUINA  
 Directora General de AENOR

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[mambiente@ree.es](mailto:mambiente@ree.es)

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