



BIODIVERSITY
REPORT
2011/12



BIODIVERSITY REPORT 2011/12



We are committed to drafting
regular, transparent reports
on the performance
in promoting biodiversity.

We are counting on you to help
us do even better.

Send your suggestions to
sustentabilidade@edp.pt

BIODIVERSITY POLICY

With the implementation of its Biodiversity Policy, EDP is contributing to the world's objective of reducing biodiversity loss due to human activity.

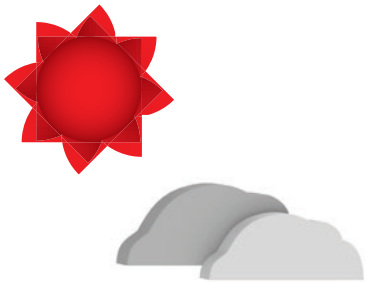
In particular, EDP:

- Is aware of the sensitivity of natural ecosystems and of the pressures that these are subject to, as well as of the intrinsic value of the initiatives aimed at protecting biodiversity;
- Has significant experience in minimising the impact on biodiversity resulting from its activities;
- Wants to have an even more active role in the conservation of biodiversity and its promotion.

EDP deems biodiversity to be integrated in the management of its companies. The objective is to achieve an overall positive impact on biodiversity.

To that end, EDP is committed to:

1. Integrate the biodiversity impact assessment in all phases of its activities: project design, construction, operation and dismantlement of its energy generation and distribution infrastructures;
2. Minimise any negative impact on biodiversity arising from its activities, and promote positive impacts. When any negative impact cannot be prevented, EDP will implement consensual compensation measures, which allows the achievement of a globally positive biodiversity balance sheet;
3. Contribute to broadening scientific knowledge on the different aspects of biodiversity, in particular by supporting institutions selected in a transparent manner and in accordance with superior technical capability criteria;
4. Strengthen dialogue and partnerships on biodiversity issues with public or private entities;
5. Regularly and transparently report on its performance in relation to biodiversity, under the revision of independent bodies, and promote regular consultation to the different stakeholders, on this issue.



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THE COMPANY

EDP – Energias de Portugal S.A. operates in the energy sector as a generator, distributor and supplier of electricity and a distributor and supplier of gas.

It is the world's third largest wind power operator. It is present in 13 countries and has more than 11 million customers and 12,000 employees worldwide. On 31 December 2011, EDP had an installed capacity of 23.2 GW and had produced around 58.4T Wh, 63% of which came from renewable energy.



WORLD'S
THIRD
LARGEST
**WIND POWER
OPERATOR**



IT IS
PRESENT
IN

13



COUNTRIES



EDP

IN A BIODIVERSE
WORLD

Loss of biodiversity is a growing international concern and a relevant issue for academia, local communities and NGOs. Given the importance of the subject, EDP has published periodic reports detailing ongoing initiatives. They are available on:

www.edp.pt/sustainability/publications

 Biodiversity Hotspots where EDP operates

 Biodiversity Hotspots

- * MW EBITDA
- ** Includes hydroelectric, wind, biomass and waste

See on: www.edp.pt/sustainability/biodiversity

- EDP generation centres in RAMSAR Sites
- The species of fauna potentially threatened by EDP generation centres

FRANCE BELGIUM UK		FIGURES
55	Employees	
363	Installed wind power (MW)*	
705	Net wind generation (GWh)	
100%	Generation from renewable sources**	
0	MW under construction	

BIODIVERSITY	
Environmental Costs	
1,691	Investment (€ thousand)
28	Spent (€ thousand)
2.5	Wind farms in classified areas (ha)

POLAND ROMANIA ITALY		FIGURES
65	Employees	
475	Installed wind power (MW)*	
621	Net wind generation (GWh)	
100	MW under construction	

BIODIVERSITY	
Environmental Costs	
1,125	Investment (€ thousand)
161	Spent (€ thousand)
0.1	Wind farms in classified areas (ha)



USA CANADA		FIGURES
260	Employees	
3,422	Installed wind power (MW)*	
9,330	Net wind generation (GWh)	
100%	Generation from renewable sources**	
215	MW under construction	

BIODIVERSITY	
Environmental Costs	
5,060	Investment (€ thousand)
9	Spent (€ thousand)

(1) Includes figures from EDP Renewables in Portugal
(2) Includes figures from EDP Renewables in Spain

FIGURES	PORTUGAL	BIODIVERSITY
Employees	7,252	27,573
Electricity and gas customers	6,325,085	18,273
Installed capacity (MW)*	10,992	
Net generation (GWh)	24,364	
Generation from renewable sources**	51%	3,426
MW under construction	2,899	3,456
Distribution of electricity (GWh)	46,508	74
Distribution of gas (GWh)	7,138	8,650
		830
		18
		Substations
		Environmental Costs ⁽¹⁾
		Investment (€ thousand)
		Costs (€ thousand)
		In classified areas
		Area flooded by reservoirs (ha)
		Installed hydroelectric capacity (ha)
		Wind farms (ha)
		Overhead high and medium voltage lines (km)
		Underground high and medium voltage lines (km)
		Substations

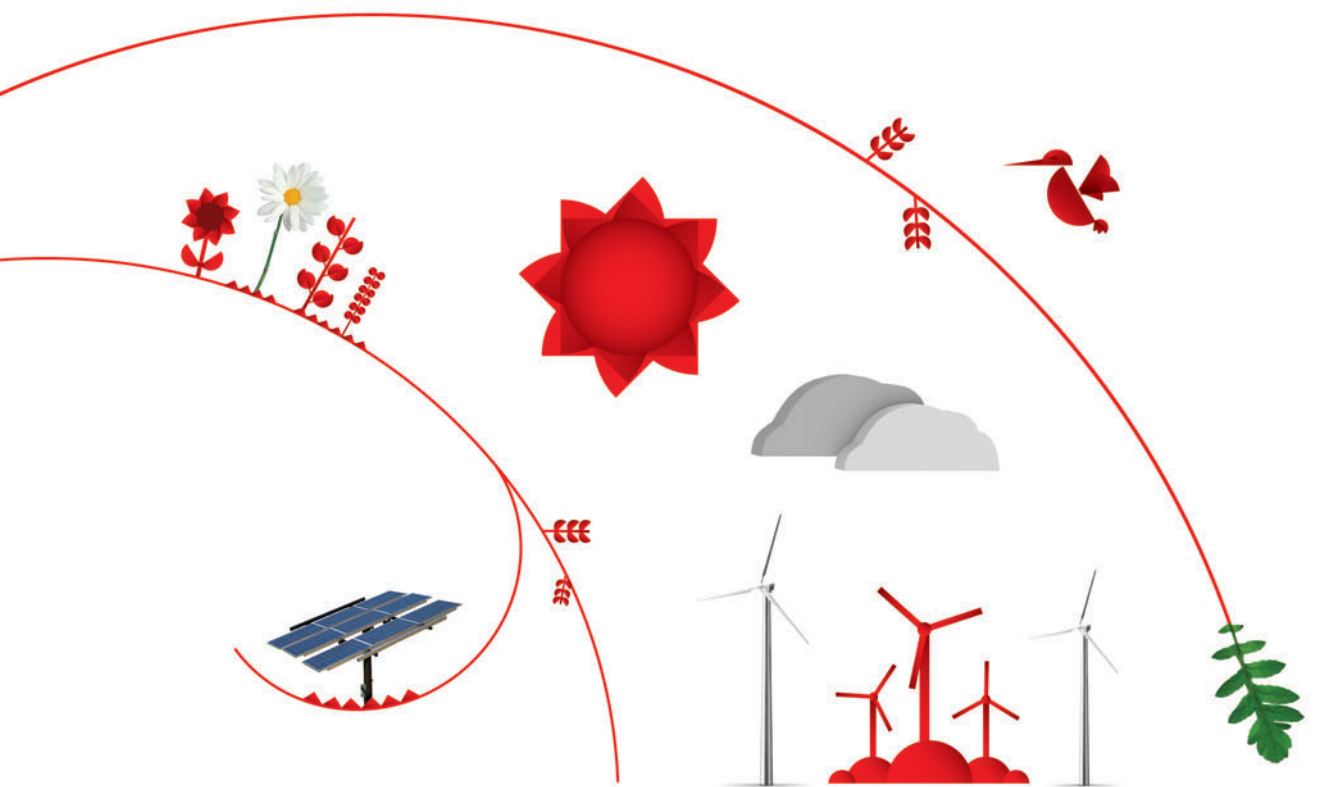
FIGURES	SPAIN	BIODIVERSITY
Employees	2,038	4,774
Electricity and gas customers	1,803,403	7,500
Installed capacity (MW)*	6,087	
Net generation (GWh)	15,331	
Generation from renewable sources**	37%	260
MW under construction	57	260
Distribution of electricity (GWh)	9,517	28.4
Distribution of gas (GWh)	48,447	630
		35
		9
		Substations
		Environmental Costs ⁽²⁾
		Investment (€ thousand)
		Costs (€ thousand)
		In classified areas
		Area flooded by reservoirs (ha)
		Installed hydroelectric capacity (ha)
		Wind farms (ha)
		Overhead high and medium voltage lines (km)
		Underground high and medium voltage lines (km)
		Substations



FIGURES	BRAZIL	BIODIVERSITY
Employees	2,635	7,964
Electricity customers	2,831,651	3,264
Installed capacity (MW)*	1,874	
Net generation (GWh)	8,043	
Generation from renewable sources**	100%	876
MW under construction	743	14,411
Distribution of electricity (GWh)	24,544	0
		4,024
		10
		12
		Substations
		Environmental Costs
		Investment (€ thousand)
		Costs (€ thousand)
		Habitats being restored (ha)
		Permanent preservation areas (ha)
		In classified areas
		Area flooded by reservoirs (ha)
		Overhead high and medium voltage lines (km)
		Underground high and medium voltage lines (km)
		Substations

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BIODIVERSITY FOR EDP



1. BIODIVERSITY FOR EDP

1.1 OVERVIEW

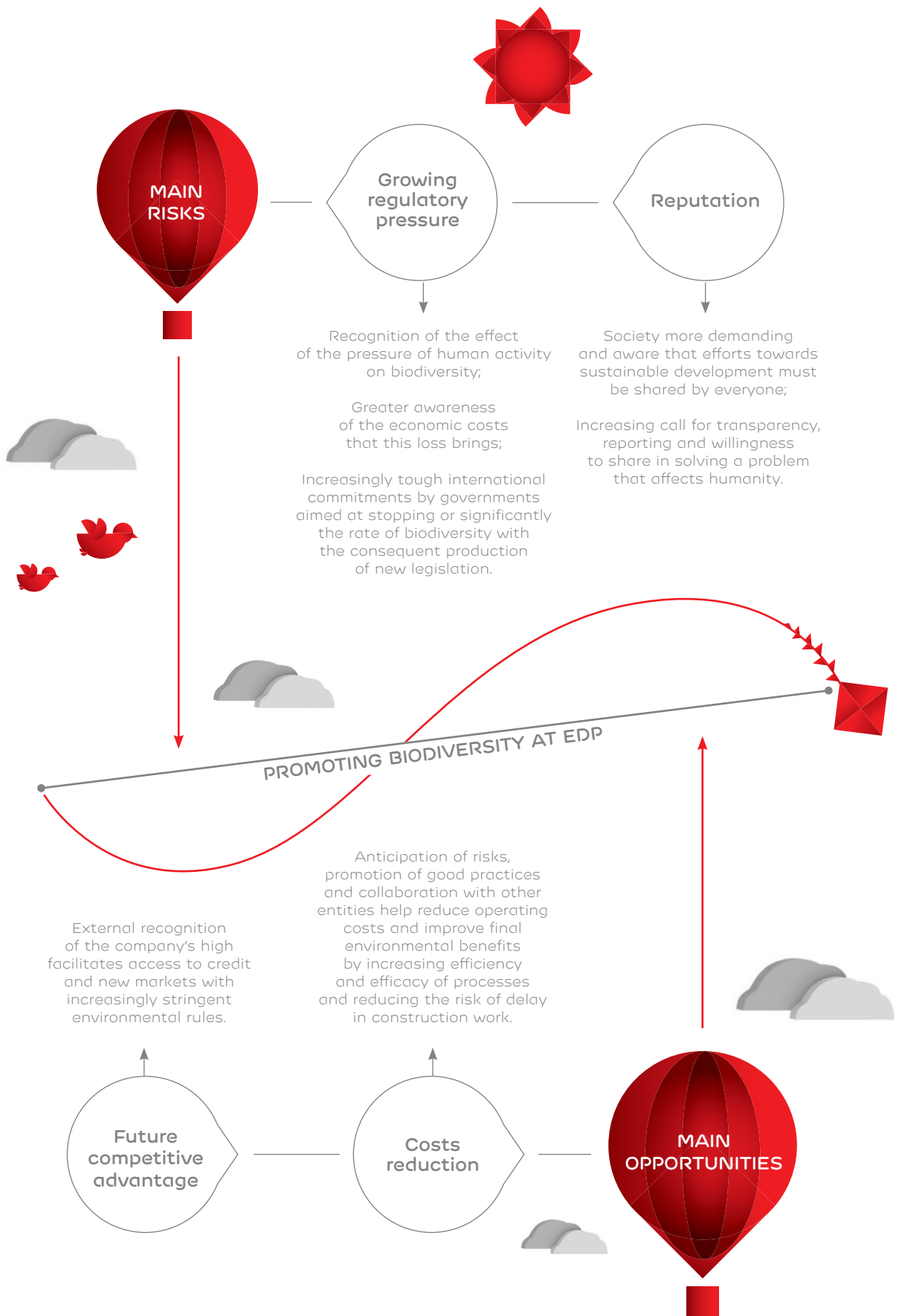
Protecting and reducing losses of biodiversity are considered all over the world to be one of the priority issues to be considered on the road to sustainable development⁽¹⁾. This aspect became even more relevant at EDP when, along with the publication of the **Millennium Ecosystem Assessment**⁽²⁾, the company established a future strategy of growth based on renewable energy, especially wind and hydroelectric power, the latter being acknowledged as significantly affecting biodiversity.

EDP's Biodiversity Policy recognises the importance of promoting effective management of impacts on biodiversity, where the risk associated with regulatory pressure and our reputation is growing but also where the opportunity to optimise our operating costs is real. This enables us to improve the efficiency of compensation and minimisation measures and achieve future competitive advantages from the experience gained and used in the meantime.

An in-house group-wide analysis found that the most significant risk to the company in the management of impacts on biodiversity occurred essentially in the planning and construction phase. The operating phase poses a risk of less than 5% at generation facilities, calculated on the basis of location, current and/or future regulatory pressure and existing environmental management systems.

(1) The Regeneration Roadmap. "Global Expert Perspectives on the state of Sustainable development". Sustainability and Globescan. Rio de Janeiro, June 15,2012

(2) <http://www.millenniumassessment.org/en/index.html>



1.2 EDP'S STRATEGIC AGENDA

EDP's 2012-2015 Business Plan aims at the strategic reinforcement of wind power in new markets and substantial investment in hydroelectric energy, which are expected to represent 73% of installed capacity in 2015. In this context, management of impacts on biodiversity focuses on studying and minimising them and promoting offsets. These impacts are associated basically with hydroelectric and wind generation and are much lower in thermoelectric generation.

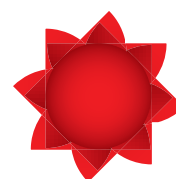
1.3 GOALS AND TARGETS

Following the publication of its biodiversity policy, EDP defined a series of initiatives to be undertaken by 2015 as part of its management strategy, including periodic reporting of its performance, as in this report.

In order to facilitate an understanding of the way in which EDP plans to contribute to international targets, its initiatives have been aligned with the targets defined in the Strategic Plan for Biodiversity 2011-2020, set out in the Convention on Biological Diversity in Aichi, Japan.

AICHI TARGETS*	EDP'S GOALS	
	INVENTORY BIODIVERSITY AROUND GENERATION INFRASTRUCTURES	
	Implement the Environmental Responsibility Law	Page 19
	MINIMISE IMPACTS ON BIODIVERSITY AT OPERATING PLANTS	
11 12	Increase the number of hydroelectric plants that release an ecological flow or improve it	Page 20
05	Improve passage of migratory species to and from upstream of plants	Page 21-22
04	Increase installed capacity with EMAS registration	www.edp.pt/sustainability/environment/environmental-management
	GUARANTEE MINIMISATION AND/OR OFFSETTING MEASURES FOR ENDANGERED SPECIES OF FAUNA AFFECTED BY THE COMPANY'S ACTIVITIES	
04	Define and monitor effectiveness indicators of ongoing projects	Page 21-22
12	Improve methods for identifying affected species	www.edp.pt/sustainability/environment/biodiversity/impacts-on-biodiversity
11	Improve the ecological value of the compensatory measures associated with new power plants	Page 26-28
19	IMPLEMENT EDP BIODIVERSITY CHAIR	Page 39

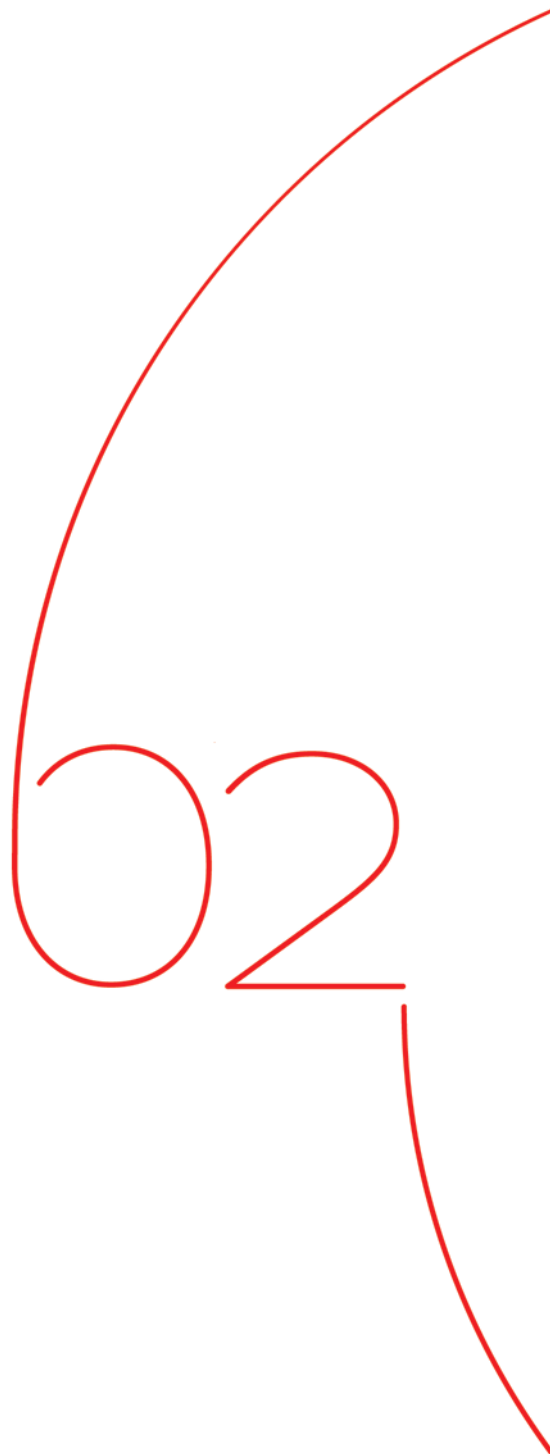
*EDP's 2012-2015
Business Plan aims
at the strategic
reinforcement of wind
power in new markets
and substantial
investment in
hydroelectric energy.*

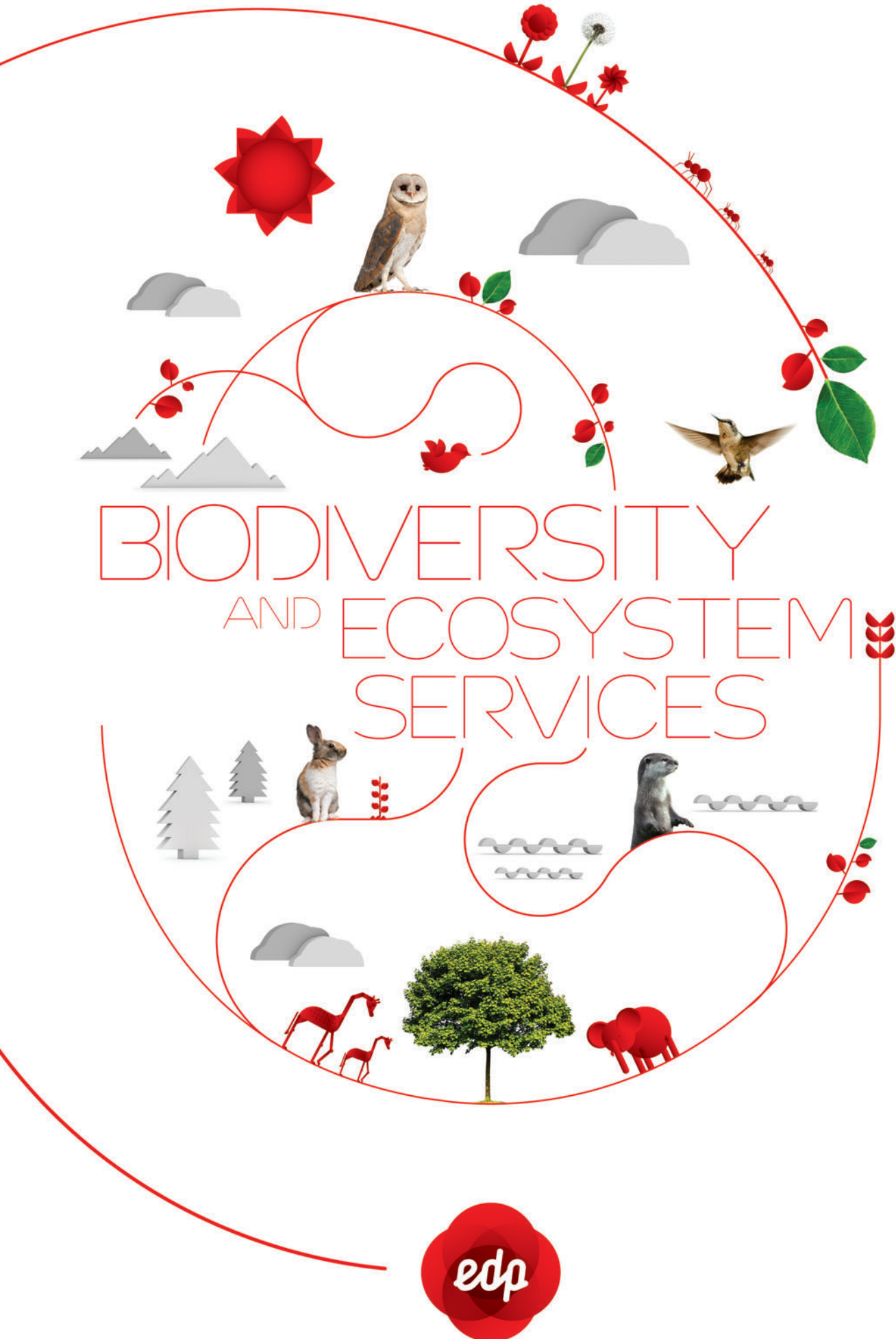


AICHI TARGETS*	EDP'S GOALS	
	FOSTER GOOD PRACTICES IN MANAGEMENT OF ELECTRICITY LINE PROTECTION STRIPS, ESPECIALLY IN AREAS OF HIGH ECOLOGICAL SENSITIVITY	
09	Complete the EDP Distribuição project supported by ERSE	Page 29
	Boost adaptation of the guide to the test of the Group's countries	All the countries already have vegetation management guides. Future versions can be improved if group companies share information.
	PROMOTE AN APPROACH BY ECOSYSTEM SERVICES WITHIN THE COMPANY	
	Develop the EVI Project - improve services in ecosystems at the Serra da Estrela waterfall	Page 23
01	Develop a corporate training module within EDP	Page 32
	PROMOTE AWARENESS ON THE SUBJECT OF BIODIVERSITY IN SOCIETY AS A WHOLE	
19	EDP Biodiversity Fund	Page 32-37
01	Biodiversity communication plan in new projects	Page 32
01	Initiatives to support society	Page 38-42

(*) Targets defined in the Strategic Plan for Biodiversity 2011-2020 set out in the Convention for Biological Diversity in Aichi, Japan in 2010 (www.cbd.int/doc/decisions/cop-10/full/cop-10-dec-en.pdf).

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BIODIVERSITY
AND ECOSYSTEM
SERVICES



2. BIODIVERSITY AND ECOSYSTEM SERVICES

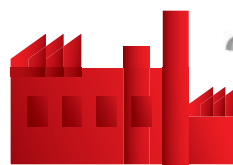
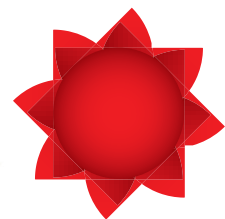
The high biodiversity loss rate today has been internationally recognised as being caused by human activity. The Millennium Ecosystem Assessment shows that this loss is directly related to the deterioration of the functions performed by different ecosystems as a result of the loss of a series of benefits that they offer to human beings (ecosystem services).

Addressing the issue of loss of biodiversity via ecosystem services is still an academic, controversial discussion. Nonetheless, managing companies' environmental dimension through the way in which their activities affect and are affected by the different services provided by ecosystems can facilitate the management and implementation of action plans that help foster biodiversity.

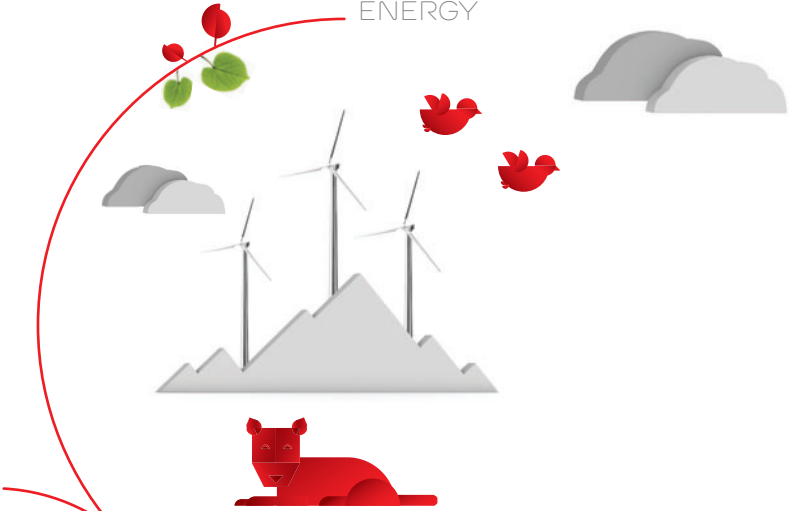
This year, although our performance report focuses on initiatives directly related to biodiversity, it also identifies the main ecosystem services that affect and are affected by EDP's activities. These are the areas that may constitute current and future environmental risks and opportunities to be considered.

EDP TYPES OF PRODUCTION

01 THERMOELECTRIC GENERATION



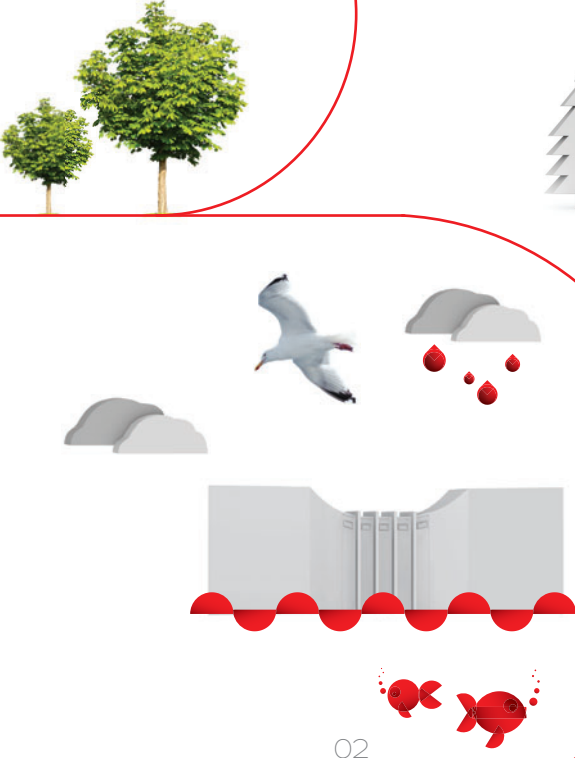
03
WIND
ENERGY



04
ELECTRICITY
DISTRIBUTION



02
HYDROELECTRIC
GENERATION



2.1 THERMOELECTRIC GENERATION

AIR REGULATION

The environment's ability to absorb, transform and disperse atmospheric pollutants.

This area is highly regulated in the European Union. EDP's strategy favours less polluting fuels, such as natural gas; Coal power stations have precipitators and denitrification and desulphurisation systems and the choice is to buy coal with lower sulphur content. This reduces acidifying gas emissions that cause acid rain.

CLIMATE REGULATION

Nature's ability to absorb CO₂.

Climate change worldwide is recognised as one of the main threat to loss of biodiversity. The electricity sector is one of those most affected by current and upcoming regulations. EDP's goal is to reduce specific CO₂ emissions by 70% by 2020 against 2008.



FRESH WATER CONSUMPTION

Nature's ability to provide fresh water.

Thermoelectric generation uses fresh water in the industrial process. It is taken from reservoirs or aquifers using artesian wells. EDP has been optimising water consumption in industrial processes, as shown in its environmental statements in EMAS records:

www.edp.pt/sustainability/environmental-management

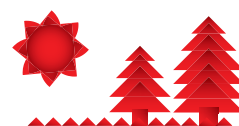
REGULATION AND PURIFICATION OF WATER

The ability of ecosystems to filter and decompose organic matter and assimilate and transform pollutants.

The quality of the water used in the industrial process influences its cost. Cooling water is released into an aquatic environment at a higher temperature than that of the ecosystem. The ecosystem's ability to disperse the water and lower its temperature can influence the operation. Exit water temperature is monitored and it is dispersed to minimise impacts on aquatic ecosystems.

ENVIRONMENTAL RESPONSIBILITY

IN SPAIN



EDP began preparations for the implementation of the Environmental Responsibility Directive in 2006. We held a series of internal clarification sessions in the different business units in order to incorporate the new directive in decision-making processes.

Since 2008

EDP has been a voluntary participant in the assessment of environmental risks of its infrastructure

2010

ERAs WERE CONDUCTED AT THE:

- Castejón and Soto de Ribera combined-cycle power stations
- La Barca Hydroelectric Power Station

2011

ENVIRONMENTAL RISK ANALYSIS:

- La Barca Hydroelectric Power Station
- Tanes Hydroelectric Power Station

Given the known difficulties in the appearance of insurable products (shortage of data, lack of experience, costs, etc), EDP has been a voluntary participant since 2008 in the assessment of environmental risks of its infrastructure in order to gain experience and help to improve and develop the national interpretative guides set out in the directive.

Financial guarantees were set up in 2009 so that the company can take environmental responsibility for preventive measures and the repair of damage caused to the environment, including biodiversity, water and soil, in anticipation of the new directive.

In Spain, HC Energía began an environmental risk analysis (ERA) based on documentation from the Spanish Ministry of the Environment and Rural and Marine Milieu. In 2010, ERAs were conducted at the Castejón and Soto de Ribera combined-cycle power stations and La Barca Hydroelectric Power Station. These analyses included an appraisal of environmental damage on the basis of the ecosystems affected by any damage for each risk scenario. The aim was to determine the basic status of habitats and establish practices for managing and minimising the risks necessary for preventing them from being affected in the operating phase and in a possible environmental emergency. These power stations used the autonomous communities' official fauna and flora inventories and other descriptive documents of places catalogued as places of community interest.

The environmental risk analysis of the La Barca and Tanes hydroelectric power stations was completed in 2011, utilising the methods used in previous surveys. The work included a field trip to check the quality of ecosystems in the vicinity of the power stations and characterised them on the basis of their ecosystem services as set out in the Millennium Ecosystem Assessment. This survey was conducted under an agreement with the Consejería de Medio Ambiente del Principado das Asturias, which chose the Tanes plant for a pilot study, as it is the main source of potable water for Asturias. The results will be shared with the Asturias Environmental Administration and may serve as a basis for future work.

An environmental risk analysis of the Sinova waste centre was completed in 2012.

The work made it possible to define the basic status of natural resources around facilities and a series of environmental accident scenarios, including determination of the environmental risk and an estimate of their consequences, and propose measures to minimise environmental risks.

FUEL OIL SPILL AT THE ABOÑO POWER STATION

In 2012, there was an accidental fuel oil leak at the Aboño thermoelectric power station caused by burst pipes in one of the plant's groups. In spite of rapid intervention by the emergency teams, who were able to recover most of the spill, an estimated 10 tonnes of fuel oil reached the sea from the Aboño Stream and hit beaches and rocky areas. Around 100 HC Energía volunteers worked on cleaning the beaches every day. The cleaning work took approximately 15 days, though other recovery activities lasted longer.

2.2 HYDROELECTRIC GENERATION

FRESH WATER

Rivers are the main sources of the fresh water needed for human activity and a series of ecosystems of high ecological diversity.

The construction of dams changes rivers' natural courses and alters the availability of water downstream, while increasing its availability upstream. A dam's water reserve is often also used for other purposes, such as recreation, human consumption and irrigation of farmland. Running water ecosystems disappear and make way for standing water, often of lower ecological value. A dam is also a barrier to the migration of some species of fish. EDP is undertaking initiatives to improve the ecological quality of watercourses, as shown on page 21.

CLIMATE REGULATION

Local and global influence of ecosystems on the climate.

The presence of reflecting pools can change the local climate by increasing the humidity of the air. In dry seasons, with low water levels in the reservoir, the average temperature may increase due to a lack of riverside flora. Climate change for EDP's new hydroelectric plants under construction was not considered significant. On a global scale, hydroelectric generation avoids the release of carbon dioxide into the atmosphere as it uses no fossil fuels, thereby helping to reduce the impact of climate change. These are recognised as one of the main threats to biodiversity.

REGULATION AND PURIFICATION OF WATER

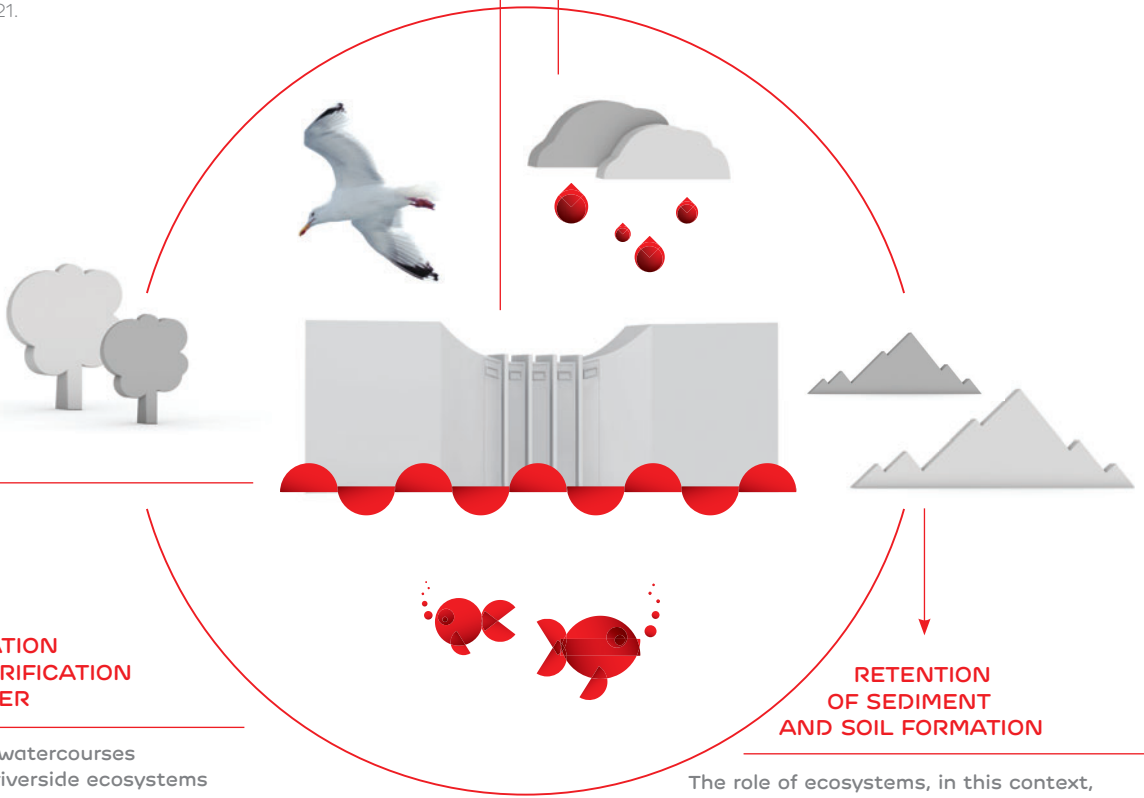
Running watercourses and the riverside ecosystems associated with them are more effective in filtering and purifying water.

Water held in a reservoir is often polluted by different human activities in the basin when it arrives and is concentrated in the reservoir. Increased retention time, low oxygenation capacity and potential growth of surface algae adversely affect water quality. EDP periodically monitors water quality in its reservoirs and aerates the flow released when necessary to minimise the impact downstream. Poor quality of the water flowing into the reservoir can also be harmful to the operation of the power plant and requires greater care when maintaining equipment.

RETENTION OF SEDIMENT AND SOIL FORMATION

The role of ecosystems, in this context, in retaining rock erosion and accumulating organic matter.

The submersion of land to fill a reservoir makes any soil use impossible. This can be difficult to offset in areas of low agricultural quality, for example. This service is important upstream of plants, as it reduces the risk of sedimentation of reservoirs, which reduces electricity potential. On the other hand, changes in water flows downstream from a plant negatively affect the balance of expectable natural sedimentation, especially in estuaries and coastal areas. EDP releases environmental flows at regulated intervals to reduce these impacts.



IMPROVING ECOLOGICAL QUALITY OF WATERCOURSES IN PORTUGAL



Within the scope of the review of concessions for new hydroelectric power stations and the Water Framework Directive, EDP is currently undertaking initiatives aimed at:

1. Implementing ecological flow schemes and assessing their efficacy;
2. Increasing connectivity between rivers;
3. Assessing the ecological quality of aquatic ecosystems around its power plants.

2009

MONITORING PROGRAMMES:

- Touvedo
- Alto Lindoso
- Caldeirão

2011

ACTION PLAN:

- Touvedo Elevator

ASSESSING THE EFFICACY OF ECOLOGICAL FLOW SCHEMES

Ecological flow schemes are one of the mitigation measures used to preserve and maintain natural aquatic ecosystems, produce species of commercial or sport interest and conserve and maintain riverside ecosystems and aesthetic landscape features or other aspects of scientific or cultural interest.

In 2009, EDP began a series of monitoring programmes to assess the efficacy of the ecological flow scheme at the Touvedo, Alto Lindoso and Caldeirão hydroelectric plants. The effectiveness of the scheme is assessed over a period of at least seven years. The structural and functional quality of the river ecosystems is evaluated during this period.

This evaluation entails monitoring biological (fish, benthic macroinvertebrates and aquatic flora), hydromorphological (continuity of the river and morphological conditions) and physical and chemical (thermal conditions, oxygenation, salinity, acidification status and nutrients) quality.

INCREASING CONNECTIVITY (OR CONTINUUM) OF RIVERS

In Portugal there are many dams with fish transfer devices. There is, however, still a need to further scientific knowledge in order to improve the river continuum promoting movement, especially of migratory species.

Touvedo Elevator:

In 2011, EDP started an action plan to assess the efficacy of the Touvedo fish elevator located downstream of the Alto Lindoso Dam in the River Lima and define and implement any necessary measures to improve its operation while also maintaining the economic and financial balance of the concession contract.

A year-long monitoring programme used video recordings of the elevator and monthly fish sampling downstream from the dam to quantify the migrant population. In the next stage, useful measures will be defined and implemented to improve its operation, followed by another monitoring phase to assess its efficacy. The duration of the action plan is approximately 30 months.



Crestuma-Lever, Carrapatelo and Régua dams:

During the environmental impact assessment of the Foz-Tua Hydroelectric Plant (AHFT), an increase in river connectivity and migration of species along the Douro river to the AHFT was defined as a compensatory measure.

EDP began assessing the efficacy of boat floodgates for use by fish in 2011. An experimental sampling campaign was conducted in the Crestuma-Lever dam floodgate using gill nets and a creel. The results indicate good potential for the European eel (upstream migration), as 417 young eels were caught in a single night, including glass eels. The plan also entails the following activities: characterisation of the migratory fish community using a survey of local fishermen as the main source of information (preferably professionals) and available bibliographical sources for the dams and Douro Estuary. There will also be sequential sampling of upstream movement in the three floodgates, starting with Crestuma-Lever.

On the basis of the results, the sampling will later go on to the two upstream floodgates (Carrapatelo and Régua), preferably during the migration of the species in question.

EDP has also a set of initiatives of recovery, protection and valorization of priority habitats to compensate impacts of new hydroelectric power plants.

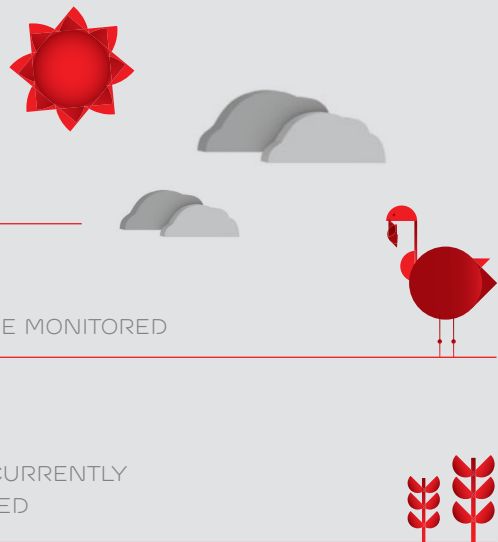
*Find out more on:
www.a-nossa-energia.edp.pt
novas barragens*

2011

5 PLANTS WHERE MONITORED

2012

8 PLANTS ARE CURRENTLY BEING MONITORED



ASSESSING ECOLOGICAL QUALITY OF AQUATIC ECOSYSTEMS

Ecological quality is assessed by monitoring the stretches of river around hydroelectric plants in order to obtain information on the status and evolution of their ecological quality. The current monitoring plans entail analysing physical and chemical parameters seasonally and biological (benthonic macroinvertebrates, fish, macrophytes and phytobenthos) and hydromorphological elements in the spring. Five plants were monitored in 2011 and another eight are currently being monitored in 2012.

VALUATION OF ECOSYSTEM SERVICES: PILOT CASE IN CASCATA DA SERRA DA ESTRELA

EDP is a member of the WBCSD (World Business Council for Sustainable Development) and part of the Ecosystem Focus Area Core Team.

In this team, EDP helped prepare the publication Corporate Ecosystem Valuation, which was used in a pilot case to assess the benefits of including the valuation of ecosystem services in business analyses and the way in which they can be useful in risk management and the development of new environmental markets as biodiversity offsets, for example.

80.3MW

INSTALLED POWER

7,200ha

AREA

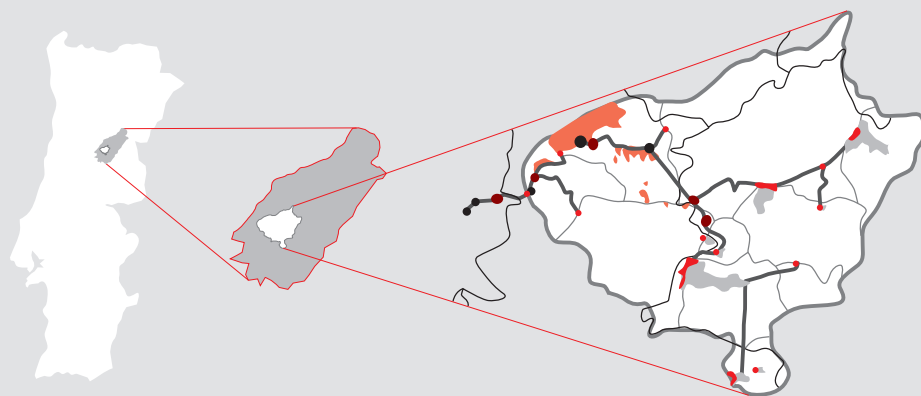
The project was undertaken by a partnership comprising the following entities: CIBIO (Biological Science R&D Unit, Universidade do Porto), IST (Instituto Superior Técnico) and CIMO (Centro de Investigação de Montanha), which provided the technical know-how for the work.

PILOT PROJECT

Cascata da Serra da Estrela was chosen to test the method. It is a hydroelectric system consisting of six power stations in a cascade totalling 80.3 MW installed power in the River Alva basin, covering an area of around 7,200 ha. The system's characteristics are as follows. It is a renewable energy source located in a region of high ecological sensitivity - Serra da Estrela Natural Park. The fires that frequently ravage the region increase the cost of maintaining the system. On the other hand, EDP is constantly making an effort to reconcile the system's different uses. For example, it has voluntary agreements with the local authorities to maintain water levels in the summer, whenever possible, in order to guarantee expectable bathing conditions.

The aim of the pilot project was to calculate the total economic value of the water basin in which Cascata da Serra da Estrela is located and compare it to a scenario in which it did not exist (dismantling). This made it possible to assess the contribution from the Cascata to the total economic value of the basin. In the second phase, the project sought to identify an opportunity cost for EDP by promoting sustainable reforestation of the basin to help reduce the number of fires in the entire region and therefore the maintenance costs arising from the fires.

SERRA DA ESTRELA NATURAL PARK PORTUGAL



— 'Cascata' boundaries — Canals and tunnels — Main roads ○ 'Cascata' water basins
● Reservoirs ● Dams and floodgates ● Hydroelectric facilities ● Base chambers ● Buildings

RESULTS

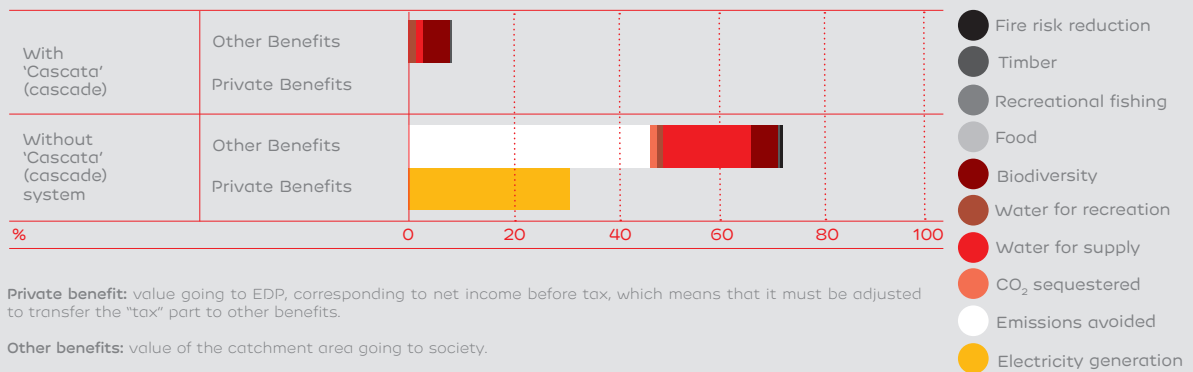
The main ecosystem services offered by the water basin were identified on the basis of a bibliographical review plus fieldwork and a workshop involving the region's main stakeholders.

The following services were considered:

- Grazing, timber, fishing, fresh water (provision services);
- Air quality regulation, climate regulation, water regulation, regulation of erosion (regulation services);
- Recreation (cultural services);
- Biodiversity.

Each of these services was quantified in its biophysical units, many of them using geographical information systems. Finally, different economic valuation methods were used to obtain the results shown in the graph.

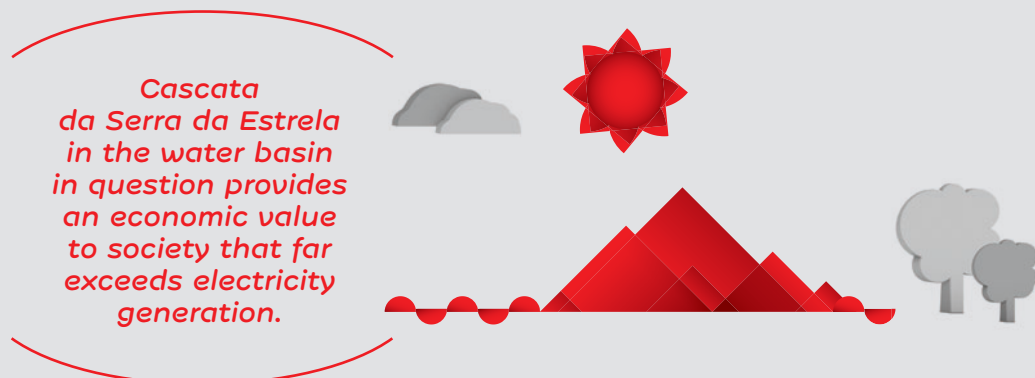
BENEFITS OF BASIN IN AVERAGE SCENARIO



In short, the total economic value (TEV) of the basin is the sum of all the partial values and is significantly higher in the scenario in which the cascade is present. The graphs also show that the other benefits component of the TEV is higher than the private benefits and higher when the cascade exists.

This result shows that the existence of Cascata da Serra da Estrela in the water basin in question provides an economic value to society that far exceeds electricity generation and that a possible dismantling scenario is not economically rational. It was found to be a sustainable infrastructure.

On the other hand, the reforestation scenarios studied in the second phase entailed highly significant costs, given the particularly demanding characteristics of the basin's terrain, with no evidence that reforestation would result in any significant reduction in operating costs. The finding was actually that, in order to maintain the basin's current characteristics, non-reforestation results in a higher value at the end of the study period, not only due to the high estimated investment but also the natural regeneration capacity that these ecosystems may have.



CONSERVATION OF FLORA HYDROELECTRIC PLANT SANTO ANTÓNIO DO JARI



The Santo António do Jari Hydroelectric Plant has an installed capacity of 373.4 MW and is scheduled to go into operation in 2014. It is located in the River Jari, a tributary of the River Amazon.

An environmental impact assessment and a basic environmental project (BEP) were performed, both of which were analysed and approved by the IBAMA - Brazilian Institute of the Environment and Renewable Natural Resources. The BEP consists of 38 environmental programmes, 17 of which are socioeconomic, 12 biotic, seven physical, one environmental construction plan and one environmental management plan. The main aim is to minimise and/or offset impacts caused by the undertaking.

373.4MW

INSTALLED CAPACITY

38

ENVIRONMENTAL PROGRAMMES

Around 90% of the area directly affected is covered by native vegetation consisting essentially of rainforest and savannah. A survey of the flora identified more than 500 species, and 22 are on IBAMA and/or IUCN lists of endangered species. A broad flora conservation programme was therefore drawn up. Its goals are:

- To conduct surveys of the genetic heritage of the region's flora;
- To preserve species of flora affected.

These goals will be achieved in a vegetal germplasm collection and rescue programme and a flora monitoring programme. The aim of the former is to implement mitigation measures and of the latter is to identify negative environmental impacts and preserve the flora heritage.

COLLECTING AND RESCUING VEGETAL GERmplasm

The construction of this complex generates impacts such as loss of habitats and biodiversity, with the resulting reduction in the genetic variability of populations. As each population has a different genetic load, collecting germplasm is an important tool in conservation and mitigation of the impact on genetic resources by preserving genetic variability between individuals of the same species.

Planning begins with demarcation of the areas and identification of target species to be collected, according to the following criteria: conservation status, endemism, frequency and scientific and economic interest. Other species will also be collected as long as they do not compromise the collection of the target species.

The ideal number of specimens to be collected per species is 30. The matrices selected (sources of propagules) must favour diversity and each one will be geo-referenced.

This initiative will provide the germplasm for planting the target areas in related environmental programmes - programme for the recovery of degraded areas or the plan for environmental conservation and use of surroundings of reservoirs. If it is not possible to involve all the material in these two programmes, it will be donated to research institutions such as universities, botanical gardens, NGOs, etc. Re production of species outside their original habitat will be guaranteed and priority will be given to the collection of the species camu-camu and chestnut tree to be used in programmes to recover degraded areas.

MONITORING OF FLORA

This sub-programme will set up an integrated monitoring network that is sensitive to possible impacts from the installation of the complex, particularly changes in vegetation in the permanent preservation areas (PPAs) of the River Jari and the future reservoir.

The aim is thus to identify possible changes in vegetation in the PPAs, monitor the qualitative and quantitative parameters of the ecosystems in question and identify species that can be used as environmental quality indicators.

The preliminary selection of the study areas was based on analyses of satellite images, maps of the region's typical flora, use and occupation of the soil and existing knowledge of the areas from surveys made for the environmental impact assessment.

Find out more on: www.edpjari.com.br

2.3 WIND ENERGY

CLIMATE REGULATION

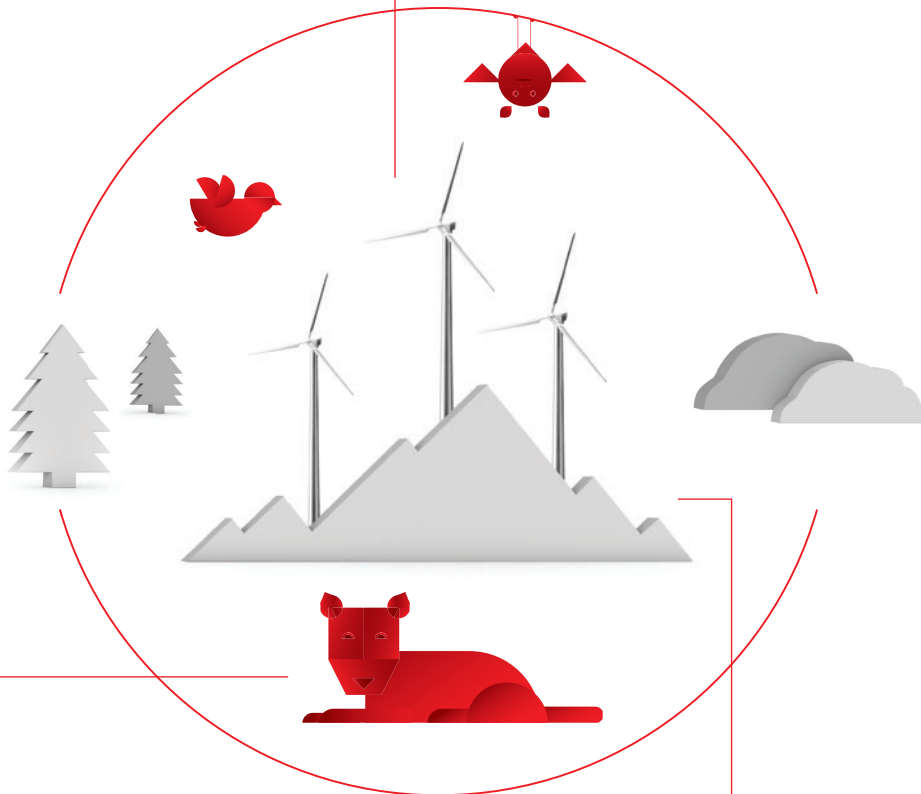
Local and global ecosystems influence on climate.

Wind generation has no effect on climate change at local level though it does depend on regimes with strong winds. It is often located in mountainous areas where human intervention is less intensive and ecological sensitivity is greater. At global level, wind generation avoids the emission of carbon dioxide as it uses no fossil fuels, thereby helping to reduce the impact of climate change. This impact is recognised as one of the main threats to biodiversity today.

BIRDS AND BATS

Although they have not yet been studied much, we know that birds and bats provide important services to help balance ecosystems, including pest control, pollination and the nutrient cycle.

This fauna is potentially affected by wind generation. Continuous monitoring of our farms has shown a less significant impact than expected. Partnerships have been formed to implement compensatory measures for species at risk.



IBERIAN WOLF

The ecological benefits of wolves are mainly associated with maintaining the balance of the ecosystem, including disease control as they mainly catch weak and sick prey.

The impact of wind energy on this species is indirect and arises from the remote location of farms in habitats where wolves still exist in the Iberian Peninsula as they contribute to disturbing them. Adjustment of the wind farm's location, continuous monitoring and limitation of access are measures that EDP has taken, complemented by partnerships to reduce the risk of extinction of the species and improve conditions for its survival.

RETENTION OF SEDIMENT AND SOIL FORMATION

In this context, this means the role of ecosystems in retaining rock erosion and accumulation of organic matter.

Typically, the area directly affected by a wind farm is less than 1% of the total area in which it is located and includes the area of the turbines, access roads and auxiliary equipment needed to manage the farm effectively.

MORAY FIRTH OFFSHORE RENEWABLES



In 2009, EDP Renováveis (EDPR) was allocated 1.3 GW of offshore wind capacity in the United Kingdom in a joint venture with SeaEnergy – Moray Offshore Renewables Ltd (MORL) in north-eastern Scotland. SeaEnergy was acquired by Repsol in June 2011. MORL is now owned 67% by EDPR and 33% by Repsol. The area of the future facility is located on Smith Bank, Moray Firth, off the northeast coast of Scotland and covers 522.15 km². It is around 25 km southeast of the Caithness coast and water is 30 to 60m deep.

1.3GW

OFFSHORE WIND
CAPACITY

522.15km²

AREA

30-60m

DEEP

The project requires extensive environmental assessment and in-depth, multidisciplinary studies are currently under way to identify possible cumulative impacts. The scope of the impact assessment has already been defined and base status has already been established. No rare or protected species have been identified (in accordance with the EU Habitats Directive and the Wildlife & Countryside Act) within the limits of the area, although there are biological nature conservation zones of international, national and local importance in the vicinity of the project. The scope of the environmental assessment included these zones in order to evaluate the possible effects of the project in this vicinity. In particular, this extended scope included assessing impacts on benthic ecology, fish and crustaceans, marine mammals and birdlife.

1.1 Benthic ecology: Samplings of the seabed, video monitoring and artisanal fishing were included in the characterisation of the environment where these species abound.

1.2 Fish and crustaceans: A number of spawning and nursery areas were identified in the vicinity of the future wind farm. Several species that migrate between salt and fresh water (diadromous fish) were identified in the Moray Firth area. Consideration is being given to the possible sensitivity of all the species to the project and mitigation measures will be taken as appropriate. This area is used a lot in commercial fishing (main stakeholders). The fish population potentially affected and considered in the scope of this project included regional species, fish sensitive to electromagnetic fields, species with spawning and/or nursery areas and migratory fish species.

1.3 Marine mammals: 16 species of marine mammals have so far been catalogued in the Moray Firth area. Some species, like common seals, bottlenose dolphins and porpoises live in the Moray Firth all year round. Other species such as the common dolphin and pilot whale are only found there at a certain time of year. In addition to these data, MORL conducted visual studies from vessels, acoustic monitoring, noise modelling assessments, air surveys and an analysis of old identifications by photographs and marking studies that are being included in a programme of studies of cetaceans in the region by the University of Aberdeen and the Sea Mammal Research Unit at the University of St. Andrews.

1.4 Birdlife: The Moray Firth area hosts many breeding colonies of wintering marine and aquatic birds (sea ducks, diving ducks, divers, great crested grebes and waders) and is an important feeding ground during spring and autumn migration for species that breed at high latitudes. The species with conservation status in the Smith Bank area include the common guillemot, fulmar, black-legged kittiwake and common gull.

Air surveys of the project areas were conducted in 2009 and 2010. Further air surveys were performed in a broader area in 2011 for a better understanding of the distribution and connectivity with Special Protection Zones. In April 2012, MORL began a visual study from boats to gather information on the region's birds. During the 2011 breeding season, marking studies were conducted on four species (fulmar, black-legged kittiwake, razorbill and common guillemot) on the outcrops in the eastern part of Caithness. A total of 249 birds and 160 feeding forays were monitored.

As a result of the exhaustive work, including studies, field research and development of engineering concepts, EDPR presented its stakeholders with environmental studies conducted in the location of the Moray Offshore Renewables project off Moray Firth, its transmission infrastructure that backs up the construction work on the wind farms and the offshore transmission infrastructure. The publication of this information is an important milestone in a project that will generate low-carbon electricity in sufficient quantities to supply 850,000 Scottish homes a year. Construction is expected to begin in 2015.

For more information, visit <http://morayoffshorerenewables.com>

2.4 ELECTRICITY DISTRIBUTION

BIRDS AND BATS

Although they have not yet been studied much, we know that birds and bats provide important services to help balance ecosystems, including pest control, pollination and the nutrient cycle.

Collision and electrocution of birds in the electricity distribution grid is one of the negative impacts of this activity.

EDP takes a number of measures to minimise these impacts, ranging from changing layouts to insulating equipment and flagging lines.

Information on ongoing practices and results of work done in partnership with NGOs can be found on:

www.edpdistribuicao.pt> ambiente



RETENTION OF SEDIMENT AND FORMATION OF SOIL

In this context, this means the role of ecosystems in retaining rock erosion and accumulation of organic matter.

Maintaining the safety of the distribution grid requires specific management practices in the protection corridors, where the controlled growth of vegetation can pose a risk to the grid and its surroundings. In Portugal, some of these corridors are also classified as fuel management corridors for fire control, which requires tighter control of vegetation, with very careful clearing of plant life, which increases soils erosion.

All EDP companies operating in distribution have manuals of good practices in the management of corridors and EDP Distribuição has drawn up corridor management guides, including fuel management corridors, to minimise environmental damage and guarantee the sustainability of its practices. www.edpdistribuicao.pt> ambiente

See also www.edpescelsa.com.br> empresa> sustentabilidade> guia de arborização

MANAGEMENT OF ELECTRICITY LINE PROTECTION STRIPS



In Portugal, EDP Distribuição manages more than 13,300 km of protection corridors inside environmental protection areas. For safety reasons, it guarantees appropriate management and maintenance of vegetation in the surrounding areas, electricity line protection corridors, thereby reducing risks of interference in the grid.

13,300km

PROTECTION
CORRIDORS
INSIDE
ENVIRONMENTAL
PROTECTION
AREAS

50

PILOT CASES

240ha

UNDERWENT
TESTS

MORE THAN

22

STAKEHOLDERS
WHERE INVOLVED

From 2009 to 2011, as part of the Environmental Performance Promotion Plan, the ERSE supported the project undertaken by EDP Distribuição in partnership with the NGO FloraSul aimed at drafting a guide and manual on good management practice in fuel management in protection corridors in forest areas. The idea was to minimise impacts on biodiversity with innovative good maintenance practices that had been tested in different habitats and environmental conditions, with the collaboration of national nature conservation authorities, woodland owners and other stakeholders.

AN INNOVATIVE PROCESS

Management of protection corridors used to involve removing all vegetation in their area of influence. The innovative process tested in this project consisted of removing plant life selectively, eliminating invasive species and maintaining native vegetation, thereby helping to conserve ecosystems.

During the work, native species of bushes and trees are conserved and in some cases, new plants are planted in order to restore previous vegetation in order to contribute to local biodiversity, control erosion and decrease the probability of forest fires.

Management of invasive species is complex and entails high costs. These species are fast-growing and compete strongly for available resources. It is therefore necessary to intervene frequently to manage the vegetation, as it is only actively controlled at the edge of the protection corridors and so the unmanaged species in the surrounding areas are able to invade them. Their management will therefore be more effective if it is carried out beyond the limits of the protection corridors (in cooperation with other stakeholders), together with the conservation of native species.

IMPLEMENTATION OF THE ACTION PLAN

During implementation of the action plan, it was possible to map the native vegetation and invasive species in the vicinity of the lines. This resulted in 1:10000 maps of the environmental protection areas (with a 100 m buffer).

After the area of intervention had been mapped, the stakeholders were identified and involved in the process. This new approach in corridor management makes it possible for the different stakeholders to collaborate, thereby reducing investment costs and focusing on more effective control of these species. The pilot cases showed that different parties are prepared to be EDP's partners in specific areas.

The technique was used in 50 pilot cases, in which over 240 ha underwent tests of five different techniques for eradicating *Acacia dealbata*, making it possible to find more efficient solutions for managing these species and identify indicators and monitoring processes.

Several workshops were held with the stakeholders identified, such as the AFN, ICNF, local authorities, NGOs and members of the scientific community, to share all the knowledge acquired in the process, conduct an open discussion and validate the management options being developed. More than 22 stakeholders were involved, along with a vast number of informal partners.

We are currently developing a training module for around 400 people. It is also necessary to involve service providers in order to ensure the techniques are used properly. During the implementation phase they received intensive training and intervention was permanently monitored.

See the guide and manual on:

www.edpdistribuicao.pt > ambiente > desempenho ambiental > faixas de gestão de combustível

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3. SOCIETY

EDP aims to develop scientific knowledge and promote biodiversity by getting to know more about the ecosystems on which we depend, as explained in our biodiversity policy. We therefore collaborate and support a number of projects undertaken by NGOs and scientific and academic institutions, thereby giving back to society the value generated by the company and contributing knowledge, research and society's awareness.

3.1 BET – BUSINESS ECOSYSTEMS TRAINING

EDP participated in preparing a training package developed for the private sector by the WBCSD to raise companies' awareness of the importance of biodiversity by recognising impacts and dependence on the services provided by ecosystems. The result of this workshop can be viewed on www.wbcd.org/bet.aspx. The package is now being adapted in the different regional networks to which EDP also belongs, such as BCSD Portugal and BCSD Brasil.

3.2 LEARNING BIODIVERSITY PROGRAMME

The Learning Biodiversity project is designed to be a versatile, universal tool for communicating biodiversity, with its importance focusing on three themes: man as a bio-dependent being, causes of loss of biodiversity and what we can do for biodiversity.

The project is different because of its unique approach to loss of ecosystem services.

The project is divided into two components (theory and practice) and in the last three years its pilot project has involved schools in Sendim (Miranda do Douro), Mogadouro and Torre de Moncorvo, covering 120 5th and 6th grade pupils. The Collect, Germinate and Plant initiative enabled the children to participate in the plants' entire cycle, including collecting the seeds, germinating them in the EDP greenhouses and replanting them in their original habitat. The campaign served as an active example of what can be done for biodiversity.

After the end of this phase, the Learning Biodiversity will take advantage of the experience acquired and be adapted to the Baixo Sabor natural heritage awareness programme as part of the compensatory measures of the Baixo Sabor Hydroelectric Plant.

3.3 EDP BIODIVERSITY FUND



The EDP Biodiversity Fund was set up in 2007 and funds projects that promote and restore biodiversity, with a total of 2.5 million euros being invested over five years. It was initially used to fund Business & Biodiversity commitment initiatives and those with guaranteed EU support. An invitation to submit applications was issued in 2008



*In browsedp,
you can view all
the documents that
the company considers
of interest
to the community*

[www.browsedp.edp.pt/
dashboard.php](http://www.browsedp.edp.pt/dashboard.php)

Up to 2011, applications were open to public or private non-profit organisations and scientific or university institutions with technical competences in the conservation of nature. Preference was given to furthering scientific knowledge on different aspects of biodiversity, optimisation of conservation and improvement in the dynamics of ecosystems, with special focus on the areas most relevant to EDP's activities and the regions in which it operates.

01 Local and regional movements of the Lesser Kestrel



02 Bryophytes Atlas



03 Conservation of the River Lamprey and Brook Lamprey



04 Faia Brava Reserve



05 Conservation of the Biodiversity of Temporary Ponds



06 Conservation and enhancement of threatened endemic flora in Portugal



07 Atlas of Wintering and Migratory Birds of Portugal



08 Description of genetic heritage of the White Willow



09 Cultivos Yerbas i Saberes Terras de Miranda



10 FINDKELAP - Sea floor forests



11 ECONOMOUNTAIN - Economics of biodiversity in the hills of Vila Pouca de Aguiar



12 Atlas of riparian vegetation in mainland Portugal



13 ECOFLOW - Ecological effect of the hydrological system on the fish community in Portuguese rivers



14 Biodiversity, endemism and protected species



15 The Miranda donkey in management of low shrub vegetation and ecosystems of high conservation value



EDP BIODIVERSITY FUND PROJECTS FROM 2008 TO 2011

2008

PROJECT	GOAL	CURRENT STATUS	REPORT ON BROWSEDP	COMPLETION
BrioAtlas – Portugal (Atlas of Portugal's endangered bryophytes)	Preparation of a Red List of Bryophytes in Portugal, by updating the distribution of endangered bryophytes and identifying priority areas for their conservation.	<p>Publication in final stages, in which:</p> <ul style="list-style-type: none"> a detailed list is given of the conservation status of national bryoflora for around 700 species (including a red list of bryophytes in Portugal, with IUCN classification of taxon); there is an update of phytogeographical knowledge of the 255 species considered to be endangered: ecological determinant and distribution patterns of each taxon, identification of priority areas for their conservation and threat factors. 	Yes	2012
Local and regional movements of the little bustard (<i>Tetrax tetrax</i>)	Drafting of a map of the risk of collision with overhead power lines to the little bustard, a bird classified in the Red Book of Vertebrates as vulnerable in Portugal and affected by EDP's power distribution activities.	<p>Collision risk maps were drawn up and validated with mortality data obtained in Birdlife Agreements I and II.</p> <p>Cartography is useful in the installation of new distribution lines, identification of those with the higher collision risk, correction of lines in the most problematic sections and minimisation of impacts.</p> <p>The results were presented and discussed at a seminar of specialists, students and EDP and REN employees and engineers.</p>	Yes	2012
National Conservation Plan for the River Lamprey and Brook Lamprey	Drafting of a National Conservation Plan for the two species.	<p>The work made it possible to:</p> <ul style="list-style-type: none"> Confirm the high threat status of the species and the occupation of a small area of distribution in mainland Portugal; Develop an explanatory, predictive statistical model identifying environmental parameters conditioning the distribution of the species and assessing the probability of their occurrences in Portugal; Define classification criteria for priority watercourses for their conservation, useful information to be included in territorial management instrument in Rede Natura 2000, for example, in defining Special Conservation Areas. 	Yes	2011
Life Estepárias Project ⁽¹⁾	Promoting conservation of three endangered steppe birds: bustard, little bustard and lesser kestrel in the Baixo Alentejo region.	<p>Corrections were made to 38 km of lines (the plan is to correct 40 km). Anti-collision devices were installed.</p> <p>The project can be monitored on www.lifeesteparias.lpn.pt/</p>	No	2012

(1) Project co-funded by the European Commission LIFE - Nature Programme

2009

PROJECT	GOAL	CURRENT STATUS	REPORT ON BROWSEDP	COMPLETION
Conservation and Valuation of Endemic Flora in Portugal	Conservation of rare, endangered species of plants in Portugal, in situ and ex situ, and their use, especially for medical purposes.	<p>14 endemic species were studied, most of them endangered, and their seeds stored for long-term conservation in the A.L. Belo Correia Seed Bank. The percentage of species protected by the Habitats Directive conserved ex situ increased from 27% to 36%.</p> <p>Methods were developed for in vitro multiplication and optimal conditions were identified for germination of seeds in six species.</p> <p>Chemical characterisation and bioactivities were performed on several species (antifungal and antioxidant activity)</p> <p>The genetic diversity of the population of <i>Senecio doricum</i> subsp. <i>lusitanicus</i> was determined and its vulnerability was assessed. This information will be useful for future in situ conservation measures.</p>	Yes	2012
Research, Conservation and Dissemination of Biodiversity in Temporary Ponds	Programme for the conservation of biodiversity of crustaceans and amphibians in ponds, with the development of a network of micro-reserves and a nationwide education programme.	<p>Part I The diversity of crustaceans and bacteria per pond was analysed: 21 species and 29 strains and we confirmed the importance of heterotrophic energy in the pond food chain. The first map of the distribution of micro-crustaceans in the centre and south of Portugal was made and a collection of specimens was deposited at Museu Nacional de História Natural e da Ciência.</p> <p>Conclusion the greatest threat - physical disturbances in ponds; lower degree of threat - eutrophication and presence of exotic species</p> <p>Part II We established a network of micro-reserves for amphibians (Mindelo, Grândola and Constância), and several others are being designated. A website on these habitats and their diversity of crustaceans was created www.charcoscomvida.org, photo competition, exhibition "Presos no Charco" at the MNHNC, brochure, pamphlets and activities at schools. This environmental education campaign involved 121 entities, 70 of which were schools.</p>	Yes	2012
Faia Brava Reserve	Promotion of the conservation of nature with a view to the creation and sustainable management of a private nature reserve involving NGOs and the community as a whole.	<p>The following were recovered:</p> <ul style="list-style-type: none"> • 5 km of riparian galleries; • 150 ha of cork oak and holm oak woodland (100 ha wood and pasture land and 50 ha devoted to forestry). <p>The following were installed:</p> <ul style="list-style-type: none"> • 20 ha of grain fields; • a network of ponds with 20 water points. <p>Four inventories were completed (invertebrates, flora, reptiles and amphibians) identifying a total of 600 species and two master's theses were written on the vulture. The Faia Brava Reserve was classified as the country's first private protected area (214 ha) and a APP Faia Brava management plan was drawn up and approved by the ICNB, now the ICNF.</p>	Yes	2011

2010

PROJECT	GOAL	CURRENT STATUS	REPORT ON BROWSEDP	COMPLETION
Atlas of Portugal's Wintering and Migratory Birds	Promotion of knowledge of the distribution and relative abundance of bird species during winter and the post-mating period throughout the country	<p>A webpage was created: http://www.spea.pt/pt/estudo-e-conservacao/censos-de-aves/atlas-aves-invernantes-e-migradoras;</p> <p>More than 300 volunteers were arranged and the first year of fieldwork was completed (we are now in the second);</p> <p>30% of the territory was covered.</p>	No	2013
Characterisation of genetic heritage of native riverside trees: <i>Salix salviifolia</i>	Learning about the degree of genetic biodiversity of populations of riverside tree species for greater success in conservation of this type of habitat	<p>Eight populations of <i>Salix salviifolia</i> were selected and characterised geographically in each of the Zêzere and Tua basins, representing the ecological gradient occupied by the species and foliar material was collected from the 423 specimens geo-referenced (males and females in similar proportion), with a view to a study of inter- and intra-population genetic diversity.</p> <p>We will use 12 loci of micro-satellites previously tested by the INRB team on the species. At the same time, as an important decision support tool, we are creating an ACCESS database connected to a SIG application, more specifically for the delimitation of regions of origin for a large number of riverside tree species throughout mainland Portugal.</p>	No	2013
Cultivos Yerbas i Saberes: Biodiversity, Sustainability and Dynamics in Tierras de Miranda	Conservation of ethno-botanical heritage by involving populations in the management and conservation of biodiversity and development of spaces for demonstrating management and conservation of biodiversity	<p>An inventory was made of species, customs and know-how, following the seasonal rhythms of vegetation and agricultural tasks in the fields and family kitchen gardens in Terra de Miranda.</p> <p>Seeds of old crops were collected and sent for conservation at the BPGV. We conducted 15 awareness, environmental education and cultural campaigns involving different audiences and the local population.</p>	No	2012
Findkelp, seabed forests	Promotion of knowledge of species of kelp and those depending on them, construction of management guidelines based on public participation instruments and scientific publication	<p>Conclusions: Populations in the north consist of large forests with high genetic connectivity. Populations in the south are small and highly isolated. They are richer in terms of genetic diversity.</p> <p>The transplanted adult specimens are viable for colonising areas fostering marine biodiversity.</p> <p>The wealth of species of fish in the kelp forests was documented.</p> <p>The fieldwork made it possible to develop innovative techniques for video recording and GPS positioning of sessile species.</p>	No	2012

2011

PROJECT	GOAL	CURRENT STATUS	REPORT ON BROSEDP	COMPLETION
Atlas of riparian vegetation in mainland Portugal	Drafting of a manual of information on plant species characteristic of riverside ecosystems in mainland Portugal.	We prospected the distribution of species, collected specimens for the herbarium and photographed morphological aspects in different watercourses in the areas of Évora, Odemira and Sintra. We are now starting the compilation of the information from different bibliographical sources and the preparation of species factsheets.	No	2014
Biodiversity, endemism and protected species associated with lagoons and watercourses in Serra da Estrela: valuation of a century of hydroelectric plants	Contribution to better knowledge of species of macro-invertebrates associated with natural and artificial lagoons on the Serra da Estrela central plateau and watercourses coming from them.	Technical information on species of macro-invertebrates known in Serra da Estrela was collected, including geographical distribution data. Next steps: fieldwork to gather data on the abundance and distribution of endemic, endangered species.	No	2013
ECOFLOW - ecological effect of the hydrological system on the fish community in Portuguese rivers	Study of the effect of changes in flows in the freshwater fish community typical of the central region of Portugal, the River Mondego. The study will help define a hydroelectric generation policy.	The project is still in its initial stage and the first progress report is scheduled for February 2013.	No	2014
Economountain - economics of biodiversity in the hills of Vila Pouca de Aguiar	Reinforce the connection between the local economy and ecosystem services by internalising management costs of ecosystems in products that can be valued on the market.	Substantial changes were made to the flock management model as the planned model was not suitable. The local shepherds have shown an interest in the directed grazing model. The LIFE proposal was reinforced to take advantage of what has been learned in this project. Monitoring is under way.	No	2014
The Miranda donkey in management of low shrub vegetation and ecosystems of high conservation value	Aimed at contributing to the promotion of semi-natural meadows as high conservation value ecosystems via management (cutting and grazing) using a native donkey breed, the Miranda donkey.	The semi-natural meadows and undergrowth were surveyed and reconnoitred and the areas were then purchased or rented.	No	2014

3.4 OSPREY

EDP and the CIBIO began a project to reintroduce the osprey in Portugal in 2011. Over a five-year period, 10 birds will be brought in every year to restore the species' breeding population. It ceased to nest in Portugal in the early 21st century.



OSPREY

(Pandion haliaetus)

2011

REINTRODUCE THE OSPREY

10birds

EVERY YEAR

5years

PERIOD

The first ten ospreys (five from Sweden and five from Finland) arrived in Portugal in July 2011. They remained in a natural habitat near Alqueva, where they were habituated until it was time to migrate.

Portugal still has highly favourable habitat conditions for the species, including not only the rocky coast, which was its last stronghold but also some estuary wetlands and dam reservoirs. The recovery of the osprey in these areas is possible, but depends on the collection of birds from donor populations, where the species is not endangered, and their transfer and release in suitable locations.



This will create an initial breeding group from which it will be possible to promote the progressive re-colonisation of the species' previous areas. The process involves transferring young, not adult birds so that they will get used to the release site more easily.

The work is being done in partnership with the EDIA, SAIP, TAP and ICNB and in close collaboration with partners in Spain, where a similar project has been successfully under way since 2003.

3.5 EDP BIODIVERSITY CHAIR

The lack of scientific knowledge about the environmental impacts of hydroelectric plants and wind farms has resulted in a highly significant financial outlay on monitoring and minimisation and offset measures with sometimes unknown degrees of efficacy. In order to improve support for decision making, **EDP, in partnership with Fundação para a Ciência e Tecnologia and Universidade do Porto, worked to set up the EDP Biodiversity Chair** for three years. The aim of this chair is to foster scientific knowledge of the impacts on biodiversity of growth in electricity generation from renewable sources and seek greater efficacy in approaches to minimise and monitor these impacts.



FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

U. PORTO

With **funding of €120,000 a year, four lines of action** have been defined:

- **POPULATION ECOLOGY:** modelling of the population viability of endangered species in systems modified by the construction of infrastructures. This line focuses essentially on the effects on population dynamics of changes in the survival rate (e.g. mortality in wind farms) and breeding success (e.g. provision of additional food).
- **FRAGMENTATION OF HABITATS AND METAPOPULATION PERSISTENCE:** quantification of connectivity and modelling of its effects on metapopulation persistence in systems fragmented by infrastructures. This line focuses essentially on the fragmentation of hydrographic networks and metapopulations of aquatic and semi-aquatic vertebrates with a reduced dispersal capacity.
- **LONG-TERM ECOLOGICAL RESEARCH:** articulation of environmental infrastructure monitoring programmes with long-term ecological research within the framework of ILTER (International Long term Ecological Research). This line began with the Baixo Sabor Hydroelectric Plant and its expansion to other facilities is currently being studied.
- **OFFSETTING AND MINIMISING IMPACTS:** development of quantitative tools for estimating the quantity, type and location of measures needed to offset impacts on biodiversity of new infrastructures. This line is a component of the work and benefits from the results of the other three lines of research.

3.6 PLANTING OF NATIVE TREES IN SPAIN

In collaboration with the municipal councils of Oviedo, Siero and Sobrescobio in Asturias, in 2011 Fundación HC Energía continued the native tree planting project that began in 2009. A total of 20,000 trees were planted: 10,000 in Oviedo, 7,000 in Siero and 3,000 in Sobrescobio.

The programme has the support of FAPAS (Fondo para la Protección de Animales Salvajes) and has two goals: to increase the number of trees to guarantee the biodiversity component and produce fruits to serve as food for the fauna in the areas in question.

In 2011, the Fiesta de la Naturaleza was held, with the theme Planta hoy para tener mañana in the forest area of Acebera, Lugones (Siero), where HC Energía customers and employees took part in nature-themed activities, including planting trees, setting up birdhouses for local species to nest, educational routes on forest biodiversity and games and recreational activities for children.

www.fiestadelanaturaleza.com



NUMBER OF TREES PLANTED					
	OVIEDO	GIJÓN	SOBRECIBIO	SIERO	TOTAL
2009	10,000	10,000			20,000
2010	10,000				10,000
2011	10,000		3,000	7,000	20,000
					50,000

TREES PLANTED BY TYPE	
	TOTAL
Abedul	20,045
Acebo	60
Aliso	575
Avellano	885
Castaño	11,264
Carpe	36
Cerezo Silvestre	4,788
Endrino	295
Haya	1,141
Laurel	350
Manzano Silvestre	931
Peral Silvestre	575
Roble	5,645
Serbal	690
Sauce	2,720
	50,000



3.7 REPOPULATING ASTURIAN RIVERS WITH FISH

Fundación HC Energía has been undertaking a fish repopulation initiative to contribute to sustainable development in the areas in which the company operates.

fundación
hc energía



It has been working with Real Asociación Asturiana de Pesca Fluvial and the North Atlantic Salmon Fund, to protect the life cycle of the salmon by purchasing fishing rights in the North Atlantic.

In collaboration with Asociación de Pescadores y Amigos del Nalón and the students of local schools, the aim of Fundación HC is to favour the recovery of the fish population and raise young people's awareness of the need for protection of biodiversity and environmental education. It is the students that release the fish into the rivers in areas where there is no angling.

Since 2008, the repopulation of the rivers in Asturias has resulted in the release of over 377,000 young fish.

2008

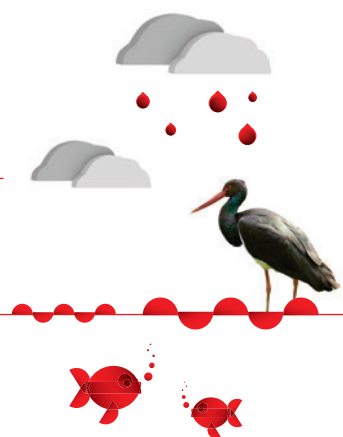
RELEASE OF YOUNG FISH: 115,000

2010

RELEASE OF YOUNG FISH: 250,000

2011

RELEASE OF YOUNG FISH: 12,000



3.8 PARTNERSHIPS WITH EDP RENEWABLES

EDP Renewables has a number of partnerships with environmental NGOs.

In 2011 the most important were:

- Continued partnership with **Migres Fundación** in monitoring the griffon vulture (*Gyps fulvus*) and Montagu's harrier (*Circus pygargus*) in the Straits of Gibraltar and reinforcement of the population of the lesser kestrel (*Falco naumanni*) in Tarifa, Spain;
www.fundacionmigres.org
- Start of a five-year partnership with **Fundación Patrimonio Natural in Spain**;
www.patrimonionatural.org
- A cooperation agreement with **Indre Nature** in France, also for a five-year period;
www.indrenature.net
- Collaboration with the **Doñana Biological Station** in Spain to analyse birdlife mortality data associated with wind farms in the Cádiz region. The results of two studies point to forms of compatibility of the farms with conservation of species and suggest solutions to current problems;
www.ebd.csic.es
- A partnership with the **American Wind Wildlife Institute** with the publication of a prospective selection tool for supporting investment decisions.
www.awwi.org

4. THIS REPORT

All the technical and operating data on the company refer to December 2011. They received external assurance in the EDP 2011 Annual Report and Accounts.

Specific information on biodiversity, such as the projects and case studies reported, are duly dated and contain information for 2012.

As part of EDP's sustainability strategy, this report was produced assuming the concern with preserving the environment. It was printed on paper X-PER - the Fedrigoni, whose commitment produce paper according to the standards of environmental safety:

- **ECF Pulp** Elemental chlorine-free;
- **Neutral PH** Paper produced in neutral pH, determined by use of the process;
- **Acid-Free** Acid-free, and therefore meeting the requisites of ISO 9706;
- **Long Life Papers**;
- **Heavy Metal Absence.**

The inks comply with the international standard ISO 11890-1:2007, which determines the maximum amount of volatile organic compounds, petroleum derived substances that can be used.

5. ACKNOWLEDGEMENTS

EDP would like to thank all its partners, especially for their support in preparing some contents and for providing the images used in this report.



www.edp.pt