03. Management of capitals

03.5. Natural capital

Goals set forth in the 2019-2023 SCSRP

Environment

- Implementation of an **environmental management system** that includes all of the company's production activities.
- Achieve a **zero-accident rate for serious environmental accidents**.
- **Global Environmental Footprint**: Create a database that classifies high value-added projects according to their environmental footprint, with the purpose of easily adding this information to the bids presented to tenders and help improve on the competitive classification of the company's bids.

Circular economy

- Promote **correct waste management practices**, focusing on reducing the volume of waste generated and promoting recycling and transformation of such waste into energy as much as possible. Goal: to recycle 35 % of all waste generated by 2023.
- **Promote innovative ways of sustainable consumption**, which include sustainable products and services, as well as the use of digital infrastructures and services.
- Encourage the **efficient use of resources** and promote the acquisition and use of recycled or certified materials as much as possible.

Climate change

- **Achieve a 5 % reduction of CO_2 emissions** in scopes 1 and 2 as compared with 2017.
- Reduce by 5 % the emission rate /k€ in stable centres, as compared to 2017.
- Establish an **internal price for carbon**.

Abengoa is fully aware of the fact that proper environmental management strengthens both the integrity of the environment as well as business viability. In this regard, the company is committed to implementing a sustainable development model which not only provides innovative solutions to help combat climate change, but does this with a responsible approach, guaranteeing the commitment to protect the environment for all of its activities, projects and work centres, as established in its CSR and environmental policy.

In 2018, Abengoa has continued to develop an environmental management system adapted to the strictest standards in this area. With an approach based on preventive management, the company has focused on the **comprehensive management of its environmental and climate change risks**, measuring and **reducing its environmental footprint** and the application of the principles of the **circular economy.**

Main figures

324 Mm^3
(desalinated water collected)

24,579 TJ
(energy consumed)

3.2 $MtCO_2$
(emissions generated)

133 Mm^3
(desalinated water produced)

12,609 TJ
(renewable energy produced)

12,386 GJ
(renewable energy [1])

(1) 12,281 TJ of primary energy consumed from renewable sources and 105 TJ of intermediate renewable energy.

Management approach

Abengoa's general restructuring process led to a redefinition of its global processes, with the purpose of continuing to generate value and optimise its resources as much as possible.

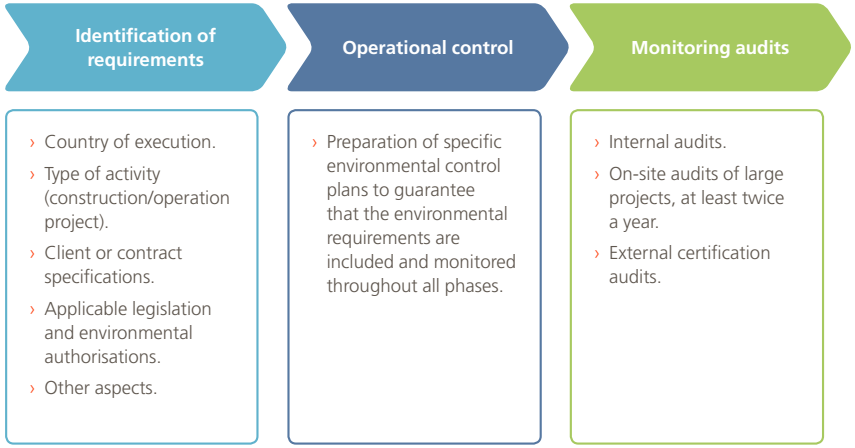
As regards the environment, the senior management has conducted an in-depth review of the environmental management systems and the procedures and resources used, aimed at optimising the processes and maximising their performance, taking the definition of a **centralised management system** as the starting point, adapted to the necessary environmental control aspects and with the establishment of common goals.

To this end, the company has put together the **mechanisms required to conduct the global and homogeneous diagnosis of its environmental behaviour** in any activity or region, guaranteeing that all legal, contractual and best management practice requirements are identified and met and that these focus on minimising the impacts across the process life cycle and help combat climate change.

Abengoa has a staff specialised in environmental-related matters assigned to each project and activity. Likewise, it has a centralised support team, ensuring compliance with the applicable environmental laws, achieving the highest possible level of experience and quality in their activities. In 2018, the environment team was made up of more than 60 professionals specialising in environmental management.

The environmental management system is **based on the ISO 14001:2015 standard and is reviewed by an external certified entity**. The company has three verification files, defined according to its three main activities: engineering, construction, and operation and maintenance. Currently, 79.4% of its business has been certified. In 2019, all other projects and activities will be included in these certification files.

Abengoa ensures that the applicable requirements of each project or activity are met



Environmental management approach as a cyclical improvement process

Environmental sustainability with a global approach

As a pillar of the activity

The company continues to focus on sustainability as a pillar of its business strategy. Thanks to its business model and management and operation processes, Abengoa has a positive impact that helps in the responsible management of resources through its clean energy production and transmission systems and with the comprehensive production and management of water.

- **Generation of energy from renewable sources**: solar thermal, photovoltaic and wind. Thermosolar, photovoltaic and wind energy. 2.1 GW of solar energy already built, 860 MW under construction and 480 MW of wind energy.
- **Water treatment and desalination**. 1.5 millions of cubic meters/day of installed capacity installed and 2.2 million of cubic meters/day under construction.

As an internal management vector

Abengoa is aware of the fact that its services and processes must respect the environment and help preserve natural resources. Therefore, it has established its **commitment to protecting the environment**, which goes beyond simply observing the current laws.

In this regard, the centralised management system has a series of procedures to guarantee that the environmental aspects of all projects and facilities are identified and assessed, ensuring that the environmental impacts of the company's activity are taken into account in all decisions made and to minimise them.

As a commitment to the supply chain

The company transmits its environmental undertaking to all suppliers as a key element in its commitment to sustainable development, as established in Abengoa's code of social responsibility for its suppliers and subcontractors, which establishes the following environmental principles:

- All suppliers are required to respect the environment and observe the applicable environmental laws and regulations in their activities.
- The supplier must use a preventive approach that protects the environment, ensuring it minimises its environmental impact and promoting actions for improvement and efficiency in relation to emissions, water consumption, waste generation and management, energy consumption, use of raw materials and other resources.

Environmental and climate change risk management

The scope of Abengoa's risk management system covers all business areas and types of risks, including environmental risks and those associated with climate change.

As regards the **risks associated with climate change**, Abengoa has taken into account the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD) to manage them. The company considers that alignment with the international standards and the need to raise the awareness on financial risks and opportunities associated with climate change are an essential step to improving transparency.

In general, the environmental and climate change risks with the biggest impact for the company are:

Transitory			Physical		
Structural	Regulatory	Reputational	Chronic	Punctual	Other
Geographical dispersion of projects and facilities.	Uncertainty associated with the new environmental and climate change regulations.	Absence of an effective environmental sustainability and climate change strategy.	Variation in the conditions of the physical environment.	Natural disasters.	Use of crops as raw materials in the bioethanol production process, competing with feeding systems.

A series of procedures have been established to identify and control these risks, with the main purpose of creating a common management, mitigation and control culture across all levels of the organisation. *201-2*

Risk	Consequences	Management
Geographical dispersion of projects and centres of the company.	› Failing to meet the requirements in processes associated with the environment. › Failing to comply with the ISO 14001:2015 standard, with an impact on the external certification of the group.	› Establishment of centralised procedures, applicable to all activities of the company across the world.
Uncertainty about the new environmental or climate change regulations associated with the future of the Paris Agreement.	› Failing to observe the legal requirements that prevent the activities in affected projects or facilities from being carried out. › The current uncertainty associated with the United States' withdrawal from the Paris Agreement could have a significant impact on the investments in financial and technical resources in renewable energy projects, mainly in developing countries, and this could affect our renewable energy infrastructure construction activity.	› Establishment of procedures and measures that guarantee the regular identification of the legal requirements associated with environment-related matters, with the purpose of ensuring they are up-to-date at all times and to have enough margin for action in case these are not observed. › Participation in the conferences and webinars of Caring for Climate (C4C) and the Spanish Office for Climate Change. › Monitoring and analysis of documents and news about the progress of the Paris Agreement, as well as monitoring of related national and international policies.
New policies that restrict actions that contribute to the **acceleration of climate change** or political measures that promote the adaptation to climate change.	› Some examples include the implementation of carbon price fixing mechanisms, the reduction of GHG emissions, use of energy with lower emissions, adoption of energy efficiency measures and the promotion of more sustainable practices in the use of soil.	› Establishment of an emission management system, counting the emissions in all areas. This will allow the company to establish mitigation and efficiency goals and initiatives. › Establishment of an internal carbon price calculation mechanism, aligning them with the emerging climate regulations established in the Paris Agreement and in accordance with the growth of the business.
Reputation.	› Currently, the fight against climate change is one of main concerns at the global level. The absence of a strategy to fight against climate change can have a negative impact on a company's reputation as regards its stakeholders and, in particular, its clients.	› Communication and dissemination of the Abengoa's climate change strategy, as well as of all initiatives rolled out in the Integrated Report and on the company's website.
Increase in temperature and variations in the rainfall levels.	Generalised impacts: › Malfunction caused by structural expansion. › Problems associated with corrosion and in the useful life of main components, reducing such a useful life. › An extreme increase in rainfall could result in failing to meet certain requirements and finally in the early termination of construction projects, as well as in damage to facilities under operation, leading to service interruptions and downtime. › The absence of rain could increase the number of fires, also leading to the early termination of construction projects and damage to facilities under operation. Specific impacts, by type of technology: › Alteration of the production of effective power in combined-cycle plants and gas plants, due to a reduction in the mass flow of turbines caused by a reduction in the air density. › Alteration of the conditions of feed water in desalination plants, causing an increase in the consumption of chemical products and increasing the probability of contaminating the process due to a rise in the number of algae and molluscs in the facilities. › Increased cost of capital in transmission lines due to an increase in the voltage in conductors. › Reduction of the availability of water used in processes due to a reduction in the volume of rainfall in specific regions. › Alteration of the feed water salinity and pH levels in desalination processes and power plants, with an impact on the performance and leading to a higher use of chemical products.	› Improvement of the environmental impact assessment of projects, including the potential alterations caused by variations in temperature and establishing measures to mitigate such effects. › Insurance policies (1) to cover the exposure to meteorological phenomena. The company's insurance plan protects all facilities against physical damage and the loss of profits caused by these extraordinary risks.

(1) There is currently no environmental provision and guarantee information available. The company's insurance plan includes third-party liability policies, which cover the environmental risks of the activities, among other risks.

Risk	Consequences	Management
Sea level rise.	› Changes in the seawater desalination activity, leading to an increase in the operational costs, as a result of having to implement protection measures to prevent floods.	› Taking into account the potential increase in the sea level when designing desalination plants. Abengoa's plants in operation were built at a safe level above the sea level to prevent the effects of sea level rise.
Use of crops as raw materials in the bioethanol production process, competing with feeding systems.	› The growth of the global biofuel market has given rise to controversies at different levels and between different stakeholders (from groups of countries to business entities and individual consumers). It is for this reason that its economic, environmental and social effects are being widely debated on.	› Abengoa's activity currently includes the design, engineering and construction of bioethanol plants from alternative raw materials, such as solid municipal waste, as in the case of the plant currently being built in Nevada (US), which will have a capacity to produce 10 million gallons of biofuel per year.

These and other **risks are monitored**, as well as the mitigation measures applied, to **develop the lessons learned**, transforming risk management into a mature process that can provide feedback and be used to implement measures based on the experience gained in other projects, whether new or existing.

Likewise, assessing risks allows the organisation to identify new business **opportunities associated with climate change**.

A low-carbon economy offers business growth opportunities:

- **Boosting the renewable energies business** in the event stricter regulations are applied to the use of fossil fuels.
- A **greater demand for water** due to the potential increase in temperature or the greater number of hours of light caused by a drop in the rainfall volumes.
- **Increased pressure from stakeholder groups** in relation to the establishment of measures to combat climate change, arising from society's greater awareness of the need to protect the environment.

Environmental performance

Abengoa seeks to **minimise the environmental impact** of its activities **and resources used**. The company has defined various environmental aspects as of a high priority and for control and management in all of its activities after assessing the environmental aspects and impacts with its centralised management system and taking into account the type of business of the company, which focuses on the construction and operation of facilities. However, such a priority does not exempt Abengoa's different businesses from managing any other environmental aspect that, despite not being critical to the company as a whole, is individually critical at the project level.

Basic environmental management indicators

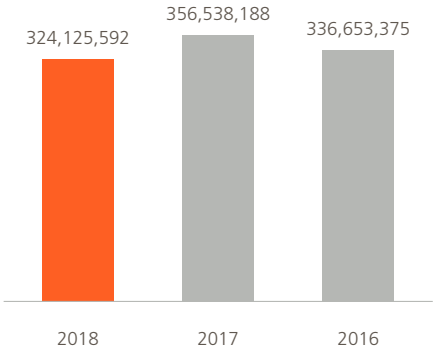
Energy	Water	Waste	Pollutant emissions
Consumption of primary energy and intermediate energy	Collecting water, broken down by primary source and desalinated water production efficiency.	Generation of waste, classified by hazardousness and type of treatment.	GHG Emissions and emission of other pollutant substances

Water footprint

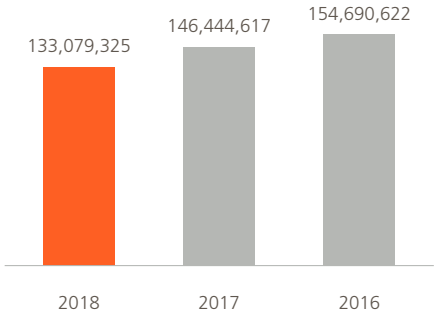
Water is an essential element for processes across the planet, whether natural or anthropogenic. The lack of this resource or incapacity to access it, incorrect management or deficient sanitation systems, in addition to the aggravating effect of growing populations have turned water into a critical element on which humanity must act as soon as possible.

Aware of this, **Abengoa provides solutions to the comprehensive water cycle by desalinating and treating water**, and by building water infrastructures and promoting new horizons for development and innovation in this area.

Seawater collection (m³) *303-1*

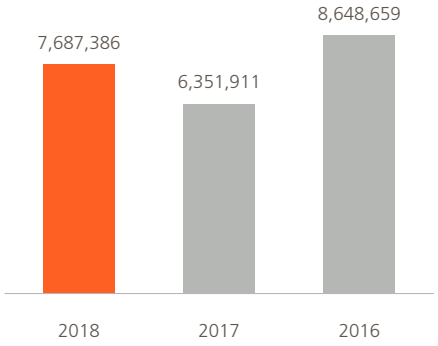


Production of desalinated water (m³)



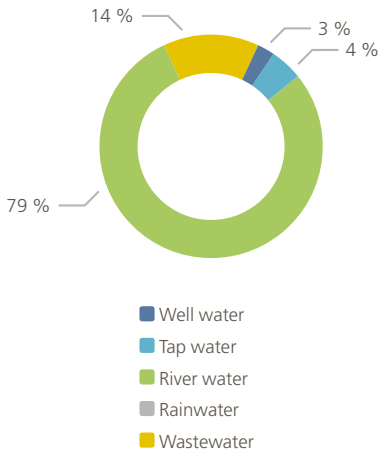
The water produced by Abengoa in its desalination plants has generated a positive impact on the planet of 133 Hm³, equivalent to the annual consumption of 2.75 million people for one year.

Collection of water from other sources (m³) *303-1*



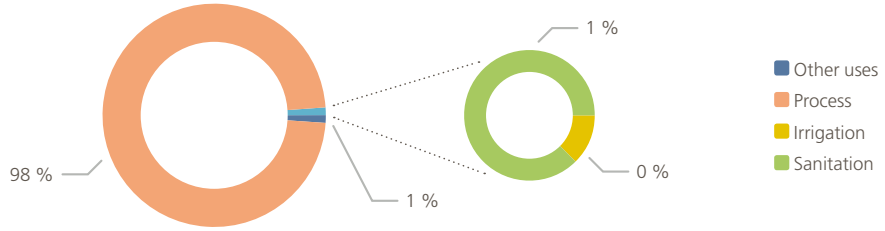
According to the source (m³)

Source	2018	2017	2016
Well water	207,891	312,011	369,382
Tap water	356,158	451,581	1,256,693
River water	6,063,855	5,557,546	6,976,001
Rainwater	2,786	4,542	4,611
Wastewater	1,056,696	26,231	41,972
Total general	**7,687,386**	**6,351,911**	**8,648,659**



13.78 % of the total water consumed is rainwater or water that has been previously used.

Type of use (%)



Furthermore, Abengoa is committed to ensuring that the water used is treated and discharged with the purpose of remedying the possible damage arising from the use of water in its activities, ensuring that the final quality levels are within the limits established in the current regulations and laws. The total volume of discharges in 2018 was 174,076,542 m^3 and the company took the necessary measures to guarantee a minimum impact on the marine ecosystem.

Energy footprint

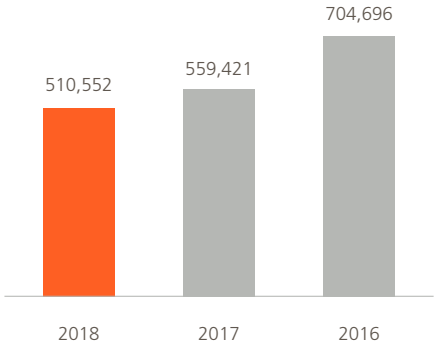
Energy management has been one of this century's main global challenges for the mitigation of climate change. Economic and technological development and the population growth have led to the non-stop increase in the demand for energy. This, in addition to the high dependence on fossil fuels are proof of the urgent need to increase the efficiency in the use of energy, as well as to maximise the presence of clean energies in the global energy mix.

Abengoa is aware of this and of the role of companies in finding solutions. Therefore, it contributes to helping mitigate this with its clean energy production technology engineering, construction and operation services. Likewise, it seeks to ensure its consumption is as efficient as possible, promoting the use of renewable energy. As a result, out of the total energy used by the company in 2018, 50.4 % [1] was obtained from renewable sources.

Consumption of primary energy (GJ) *302-1*

Type of fuel	2018	2017	2016
Biofuels	52,145	47,837	25,677
Biomass	12,229,325	12,317,116	15,372,412
Oil derivatives	2,028,397	1,919,379	2,023,164
Natural Gas	8,431,475	8,555,514	12,662,200
Total general	**22,741,342**	**22,839,846**	**30,083,453**

Consumption of intermediate energy (MWh)



Energy intensity *302-3*

18.9 GJ/€k

Note 1 54 % of primary energy and 6 % of intermediate energy are from renewable sources.

Climate footprint

Climate change continues to be one of the pillars of the company's sustainability policy, not only in relation to the impact on the physical environment, but also for its repercussions on the economy and world population. Abengoa is aware of the fact that this situation cannot be reversed, but that it requires the effort, work and commitment of everyone: governments, companies and society as a whole.

It is for this reason that Abengoa focuses its activities on offering solutions aimed at reducing emissions and on energy efficiency, not only in the end product but throughout the supply chain.

GHG Emissions (tCO_{2eq}) ***305-1, 305-2, 305-3***	2018	2017	2016
Direct emissions	738,458	652,332	1,044,098
Indirect emissions (scope 2)	313,746	315,283	418,938
Other indirect emissions (scope 3)(1)	773,486	589,825	2,306,639
Total	**1,825,690**	**1,557,440**	**3,769,675**

(1) Supply emissions include the emissions associated with capital goods. The list of sources was expanded in 2018, including the emissions associated with waste management and emissions during business trips.

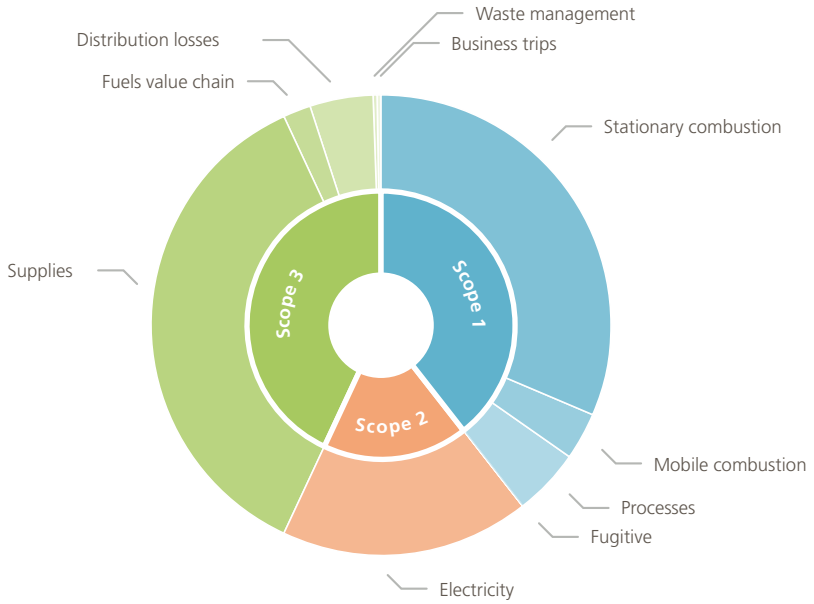
GHG Emissions (tCO_{2eq})	2018	2017	2016
Direct emissions from biomass	1,331,008	1,103,015	2,025,292

The increase in emissions of scope 3 is due to the rise in the number of sources, having added the emissions associated with business trips and those derived from managing the company's waste. Likewise, the number of families of materials included in the calculation of supply emissions has increased.

Emissions by type of source in 2018

Type of source	Stationary combustion	Mobile combustion	Processes	Fugitive	Electricity
tCO_{2eq}	596,403	55,600	85,641	813	313,746

Supplies	Fuels value chain	Distribution losses	Waste management	Business trips
651,676	32,499	80,363	7,560	1,388

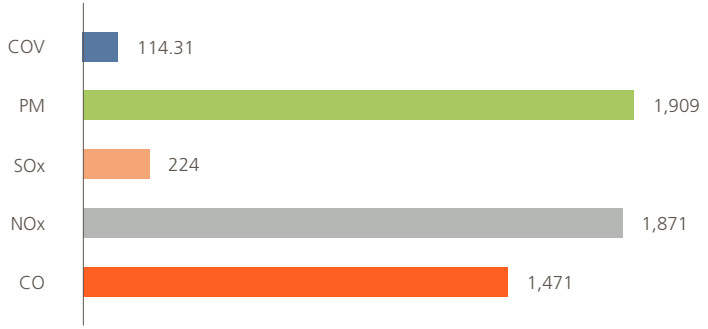


The supply source includes the emissions associated with the products and services supplied by suppliers. In the case of products, the calculations were based on families of materials, applying emission factors from internationally recognised sources (DEFRA or IPCC, among others), as well as from the company's history of emission factors. The most relevant families of materials in 2018 have been metal structures (steel and aluminium), concrete, zinc and fuel (production phase, not use). As regards the services, estimates were drawn up, considering an average emission factor according to the service emission history since the establishment of its GHG inventory.

Intensity of emissions [2] *305-4*

2.4 tCO_{2eq}/€k

Other emissions of polluting substances (t) *305-7*



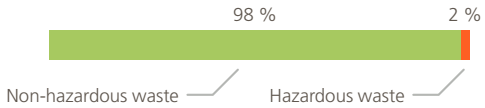
Abengoa and the circular economy

Abengoa continues to work in the incorporation of the circular economy's principles into its processes, products and services, and has established a line of action in its strategic CSR plan to meet its commitments in this area:

- **Encourage the efficient use of resources** and promote the acquisition and use of recycled or certified materials.
- **Reduce the environmental impacts** in the life cycle of Abengoa's products and services, including the supply chain and raw material production systems.
- **Promote correct waste management practices**, focusing on reducing the volume of waste generated and promoting recycling and transformation of such waste into energy as much as possible.

Waste

Abengoa has managed 93,462 tons of waste in 2018, of which only 2 % were hazardous waste.



Waste	2018	2017	2016
Non-hazardous (t)	91,547	43,865	37,344
Hazardous (t)	1,915	1,609	4,301
Total	**93,462**	**45,474**	**41,645**

Note 2 The emissions intensity include scope 1, 2 and 3.

Breakdown, by type of waste management process (t) *306-2*

Type of waste management process	2018	2017	2016
Temporary storage	28,199	0	0
Composting	19	3	2,033
Permanent deposit	855	548	619
Incineration	41	46	150
Other	30,874	1,890	4,178
Recycling	1,236	3,891	6,855
Energy recovery	529	561	516
Reuse	302	689	3,735
Landfill	31,407	37,844	23,560
Total general	**93,462**	**45,474**	**41,646**

The generalised increase in waste is due to the increase in the company's construction activity throughout 2018.

Abengoa is aware of the environmental impacts that can be caused by incorrectly managing the heat transfer fluid (HTF) used in the parabolic trough power plants it operates, in the event of accidental spillages. In this regard, the Chairman's office ensures all HTF spillages are monitored properly, with the purpose of ensuring a speedy response is provided and that the preventive measures required are implemented in all plants, regardless of whether they have been affected by the spillage or not. During 2018, there have been 4 spillages, with 32,650 litres of HTF spilled in total.

Materials

Abengoa encourages the efficient use of resources and promotes the acquisition and use of recycled or certified materials.

In 2018, it has purchased 13,525 kg of paper for the main offices [3] of Abengoa in Spain, all of which are FSC [4] certified.

Main materials supplied during 2018 (kg): *301-1*

Materials (1)	2018
Steel	1,033,499
Wood	23,266,223
Cement	2,565,775
Concrete	1,889,046,331

(1) For materials only the main raw materials were checked externally: steel, wood, cement and concrete.

Note 3 Palmas Altas Campus (Seville), Torrecuéllar centre (Seville) and office at Manuel Pombo Angulo (Madrid).

Note 4 Canon Black Label Zero FSC/TCF.

Biodiversity management

Abengoa considers that the responsible use of the natural heritage and its conservation is an ethical commitment and an indispensable element to achieve global sustainability. In this regard, the company has included a line for the **study of biodiversity and its assessment and Abengoa's environmental preservation lines** in the Strategic CSR Plan, aimed at rolling them out across all activities, provided that the conditions allow for this.

In relation to this, the most significant impacts on biodiversity are contemplated in the corresponding environmental impact statements or equivalent figures, according to the legal framework in each country and to the activities that so require. Likewise, compensation actions are carried out when required, as set forth in these statements or in the equivalent figures.

Currently, the company's most significant impact on biodiversity is associated with the construction of desalination plants. The construction process increases the water turbidity levels and prevents the penetration of light, which prevents photosynthesis from occurring in marine flora. A compensation plan is executed to act on this impact, which proposes transferring part of the affected flora to areas not affected by the construction process. *304-2*

Protected areas

Two of Abengoa's activities have an impact on protected areas: *304-1*

- Project for the construction of a **desalination plant in Agadir** (Morocco), inside the Parc National Du Souss Massa.
- **Bioethanol production activity in Brazil**, affecting 17.4 hectares of the legal reserve in the bioethanol plants of São Joao and São Luiz.

Abengoa receives an award in the United Kingdom from the International Green Organisation:

The company, together with Amey and Network Rail, received the **Golden Apple Award for the Best Environmental Practices** in the construction category in 2018 for the waste reduction plan implemented in a railway electrification project.

Abengoa received the award from the International Green Organisation in the United Kingdom for its waste reduction plan developed in a railway electrification project rolled out by the company in the UK.

In particular, the Golden Apple Award for the Best Environmental Practices was given as a joint award to Abengoa through its Transmission and Infrastructure vertical, to Amey, its partner in the project, and to their client, Network Rail (NWR), in the Construction and Waste Management category.

The award recognises the success of the plan implemented for the minimisation of aggregates and reduction of waste with reuse in the railway electrification project carried out in the Great Western region, which is currently being executed in the United Kingdom by the consortium made up of Amey-Abengoa.

The International Green Organisation was established in 1994 as an international independent, non-profit and non-political organisation aimed at recognising and promoting the best environmental practices across the world.

The company received no environmental fines or penalties in 2018. *307-1*

Palmas Altas Campus

Efficient office

Abengoa has a firm commitment to the development of measures and initiatives that help improve the efficiency of its activities. Proof of this is that Palmas Altas Campus, headquarters of the company in Seville (Spain) is LEED (Leadership in Energy & Environmental Design) Platinum certified by the US Building Council (USGBC). LEED is a **voluntary sustainable building certification system** based on the incorporation of systems that contribute to energy efficiency, the use of alternative energies, the improvement of interior environmental quality, efficiency in the consumption of water, sustainable development of free spaces on plots or the selection of materials. Likewise, it is directly connected to the metropolitan area with a **walkway built by Abengoa, which crosses the SE-30** and allows pedestrians and cyclists to cross it, and is also used by the public buses of the Tussam and Metropolitan Transport Consortium of Seville. A series of **improvements** were implemented in the cooling tower filling and treatment systems in 2018, **aimed at reducing the consumption of water**. Likewise, various **measures** were implemented **to optimise the consumption of electricity**, such as replacing the lamps in car park 2 with LED lamps, changing to the low-voltage power supply system in three of the buildings or the adjustment of the operating times and setpoints of the air-conditioning systems, in accordance with the outdoor temperatures.