04.7

Environmental contribution

80 %
activity certified under ISO 14001

3.48 %
hazardous waste regarding the total

73.5 %
waste recovery

88
environmental management professionals

B
CDP Rating Climate Change

A-
Supplier Engagement Rating

Goals set forth in the **SSP 2019-2023**

Environment

Implementation of an environmental management system covering all the company's productive activities.	75 %
To have zero especially-severe environmental accidents.	0 %
Global environmental footprint: to develop a database categorizing high value-added projects according to their environmental footprint, to be easily added to bid submissions and help obtain a better competitive rating.	40 %

Circular economy

Promote correct waste management practices by focusing on their reduction at source and promoting their revaluation as much as possible. Goal: to achieve the revaluation of 35 % of the waste produced in 2023.	100 %
Promote innovative ways of sustainable consumption, which include sustainable products and services, as well as the use of digital infrastructures and services.	25 %
Encourage the efficient use of resources and promote the acquisition and use of recycled or certified materials as much as possible.	25 %

Climate change

5 % reduction of CO_2 emissions in scope 1 and 2, with a 2017 baseline.	0 % [1]
Reduce the emissions ratio by 5 % / k€ of stable centres, with a 2017 baseline.	100 %
Establish an internal price for carbon.	50 %

[1] 0 %. - Emissions have increased due to the full-year operation of the Abent 3T cogeneration plant. Being excluded from the analysis, Scope 1 and 2 emissions from the rest of Abengoa have been reduced by 14 % compared to 2017, so the objective would be met.

Environmental commitment is an essential requirement in today's business development. Even in a situation such as the current company's scenario, undergoing a severe financial restructuring process, Abengoa remains committed to market requirements regarding sustainable business management as the only way to develop economic activity, as well as being an opportunity for the continuity of its business.

Thus, **excellent environmental management and the fight against climate change** are inherent elements of the business and are present in all its activities and areas. This commitment is included in the **code of conduct** and is developed in the **sustainability policy** and the **environmental policy**.

Code of conduct

- Sustainability policy
- Environmental policy

Principles

- Correct and efficient management of environmental impacts
- Fighting against climate change
- Efficient use of resources and promoting the acquisition and use of recycled or certified materials
- Protection of the environment beyond existing legislation
- Reduction of environmental impacts
- Continuous improvement and transmission of knowledge
- Sensitisation and awareness raising of environmental protection and sustainable development

Under a preventive approach, the company has focused on **improving the** integral **management** of **environmental** and climate change **risks**, **promoting the reduction** of its **environmental footprint** and the application of the **circular economy** principles.

Environmental management sustainability

Abengoa significantly contributes to the responsible management of resources through the production and transmission of clean energy and the production and integral management of water. Additionally, in 2020 the company has continued to develop an environmental management system adapted to the strictest standards in this area.

Pillar of the activity

Drivers of the green economy

Abengoa's activity contributes to the improvement of human well-being and social equity, reducing environmental risks and pressure on natural systems and harmonising economic development and efficient consumption of resources, aligning with the guidelines of the United Nations Environment Programme (UNEP).

Energy generation from renewable sources: thermosolar, photovoltaic and wind technologies. 2.3 GW of solar energy built, 1,100 MW under construction and 480 MW of wind power.

Water treatment and desalination 1.8 million m^3 /day of installed desalination capacity and 2.5 million m^3 /day under construction.

Pillar of internal management

Protection commitment

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 complying with 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.

Commitment vector

Responsible value 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 environmentalprinciples:

All suppliers are required to respect the environment and observe the applicable environmental laws and regulations in their activities.

The supplier shall carry out a preventive environmental approach, by ensuring the minimization of its environmental impact and promoting improvement and efficiency actions in terms of emissions, water consumption, generation and management, energy consumption, use of raw materials and other resources.

Climate action

Global warming estimates included in the report 'AR6 Climate Change 2021: The Physical Science Basis', the first of three parts that will be included in the IPCC Sixth Assessment Report (Intergovernmental Panel on Climate Change) evidence **the need to act firmly to address climate change**, aimed to adjust policies and strategies focused on the most optimistic warming scenario, with a temperature increase not higher than 1.5 °C by the end of the century.

In order to make this initiative successful, a leading role of the private sector is crucial , aligning with the international community in order to ensure compliance with the global commitment to climate action.

In this sense, Abengoa, always under the premise of creating innovative technological solutions for sustainable development contributing to social welfare, joins this global challenge in the fight against climate change and its effects, increasing the presence of renewable energies in the energy mix of the countries in which it operates and guaranteeing access to drinking water in underprivileged areas.

This commitment is not only reflected in its final product, but also in its way of working. In this regard, Abengoa includes in its Strategic Sustainability Plan 2019-2023 goals aimed at mitigating GHG (Greenhouse Gas) emissions derived from its activities and improving efficiency.

The implementation of the climate strategy is supervised by sustainability department committees with Chairman's Office and is enforced through the services offered, promoting the transition to a low carbon economy.

Climate change mitigation

Increased renewable energies repalces fossil fuels, reducing GHG emissions and contributing to the decarbonisation of the economy.

Adaptation to climate change

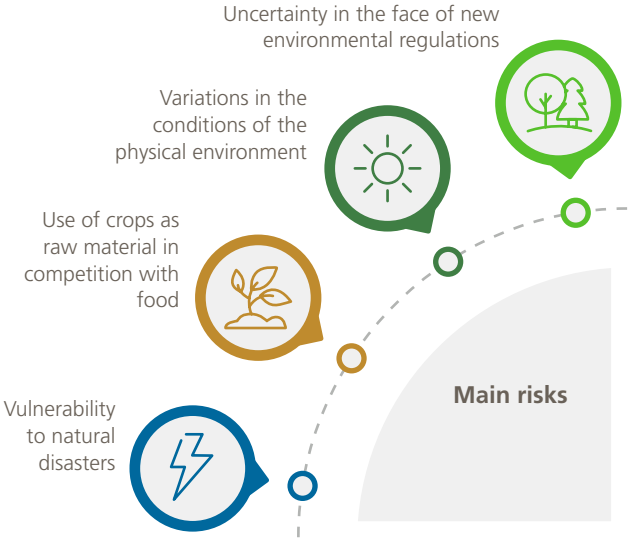
Climate change and population growth imply greater water supply needs in the coming years. Abengoa contributes to meeting this requirement through seawater desalination.

Environmental and climate change risk management

Always under the **precautionary principle**, Abengoa's risk management system covers all types of risk, including environmental risks and those related to climate change, in all the activities and geographic areas in which the company operates.

This system includes the **identification and evaluation of actual and potential risks**, the development of **remediation mechanisms** on already materialized risks and the establishment of **procedures to act** on identified potential risks.

This system involves risks arising from the condition of environmental aspects and events which could have an impact on the activity, as well as those generated by the activity and which could have an impact on the environment, establishing the action plans in each case, which are reflected in the environmental impact assessments and the quality and environmental plans of the projects.



Climate change risk management *201-2*

Abengoa has an internal climate risk assessment procedure to exhaustively analyse possible regulatory or physical changes related to climate change, in order to protect its assets and help mitigate the inherent risks. This procedure is included in the company's general risk management system.

This procedure is based on the fifth IPCC status report. In general, the document describes various temperature increase and precipitation fluctuation scenarios based on human action regarding climate change.

Based on an intermediate warming scenario, Abengoa establishes a double analysis, based on country risk and activity risk in the short, medium and long term.

01 Country risk

Projection of rainfall variation for the 2081-2100 period.

Projectied rainfall variation for the period 2081-2100.

02 Activity risk

Detailed analysis of the impacts of climate change for Abengoa's main projects represented in analysis tables, which will be used as a model and will be detailed with the specific data of the project under analysis.

Overall, climate change risks with the highest impact on the company are as follows:

Transitional

Structural	Geographical distribution of projects and facilities.
Regulatory	Uncertainty regarding a new environmental and climate change regulation.
Reputational	Lack of an effective environmental sustainability and climate change strategy.

Physical

Chronic	Variations in the conditions of the physical environment
Others	Natural disasters.

Other

Use of crops as raw materials in bioethanol production process, competing with feeding systems.

Abengoa has implemented procedures to identify and control said risks, the main objective of which is to create a common management, mitigation and control culture at any level of the company in a cross-cutting manner.

Code	Type of risk	Description	Consequences	Type of impact	Business	Medium/ long-term likelyhood	Severity	Management of the risk
A	Structural	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.	• Loss of competitiveness. • Possible penalties.	EPC O&M	Low	Minor	• Establishment of centralised procedures, applicable to all activities of the company across the world.
B	Regulatory	Uncertainty about the new environmental or climate change regulations associated with the future of the Paris Agreement.	• Non-compliance of the legal requirements that prevent the continuation of activities in affected projects or facilities. • The current framework of uncertainty regarding the Paris Agreement could have a significant impact on the investment of financial and technical resources in renewable energy projects, especially in developing countries, and could affect our renewable energy infrastructure construction activity.	• Increased operational costs. • Loss of activity.	EPC O&M	Low	Moderate	• 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 of non-compliance. • Participation in conferences in initiatives and CDP webinars and collaboration with Carbon Pricing Leadership Coalition (CPLC) as a partner. • Monitoring and analysis of documents and news about the progress of the Paris Agreement, as well as monitoring of related national and international policies.
C	Regulatory	New policies that restrict actions that contribute to accelerating climate change or political measures promoting 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.	• Increased operational costs.	EPC O&M	High	Moderate	• Implementation of an emissions management system with accountability throughout all scopes. This will allow the company to establish mitigation and efficiency goals and initiatives. • Setting a mechanism for calculating internal carbon prices, in line with the emerging climate regulation as a result of the Paris Agreement and the business evolution.

Code	Type of risk	Description	Consequences	Type of impact	Business	Medium/ long-term likelyhood	Severity	Management of the risk
D	Reputational	Bad company image as a result of not aligning with the international strategy to combat climate change.	• Currently, the fight against climate change is one of the main concerns at global level. The absence of a strategy to fight against climate change can have a negative impact on a company's reputation with its stakeholders and, in particular, its clients.	• Loss of competitiveness. • Loss of activity.	EPC O&M	Medium	Minor	• Communication and dissemination of Abengoa's climate change strategy, as well asof all initiatives carried out in the Integrated Report and on the company's website.
E	Physical	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 lead to delays in the completion of construction projects, as well as in damage to facilities under operation, and may involve the interruption of the service. • The absence of rainfall could result in fires, with the same implications of failure to complete construction projects and damage to operating facilities. 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. • Changes in the incoming water conditions in desalination plants, causing increased consumption of chemical products and increasing the probability of contaminating the process due to the growth of algae and molluscs inside the facilities. • Increased cost of capital in transmission lines, due to an increase in the voltage to the conductors. • Reduction of the availability of water used in processes due to a reduction in the volume of rainfall in specific regions. • Changes in salinity and pH of incoming water in desalination processes and generation plants, impacting performance and involving greater use of chemical products.	• Increased operational costs. • Loss of activity.	EPC O&M	High	Minor	• Improvement of the environmental impact assessment of projects, including the potential alterations caused by variations in temperature and establishing measures to mitigate the effects. • Insurance policies [1] to cover exposure to weather events. The company's insurance programme protects its entire facilities against physical damage and loss of profit due to 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.

Code	Type of risk	Description	Consequences	Type of impact	Business	Medium/ long-term likelyhood	Severity	Management of the risk
F	Physical	Sea level rise	• Changes in seawater desalination activity, leading to an increase in the operational costs as a result of having to implement protection measures to prevent floods.	• Increased operational costs.	O&M	High	Minor	• Taking into account the potential increase in sea level when designing desalination plants. Abengoa's operating plants were built at a safe height above sea level to prevent sea level rise.
G	Other	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), with their economic, environmental and social effects are being widely debated.	• Loss of activity.	O&M	Very low	Negligible	• Abengoa's activity currently includes the design, engineering and construction of bioethanol production plants from alternative raw materials, such as solid urban waste.

Said risks are identified and evaluated based on their probability of occurrence and their economic and reputational consequences. These two variables finally determine a level of risk. *201-2*

Abengoa has implemented various risk identification and management tools, differentiated according to the process phases:

- **Identification:** climate variation identification maps, accounting for GHG emissions, financial analysis, tools for identifying legal requirements and the risk departments' own experience.
- **Control and management:** mitigation mechanisms, such as increasing the safety coefficients in the design of projects considering the most unfavourable meteorological and environmental parameters or research aimed at the use of alternative fuels.

The follow-up and monitoring of these risks, among others, as well as the applied mitigation measures, allow the development of 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.

Opportunities associated with climate change

The identification and analysis of risks associated with climate change allows the company to identify new business opportunities associated with climate change.

A low-carbon economy offers business growth opportunities:

Type of opportunity	Description	Business	Management of the opportunity
Business	Boosting the renewable energies business in the event stricter regulations are applied to the use of fossil fuels.	EPC	Engineering and construction of renewable energy plants (2.3 GW built in solar energy, 1,100 MW under construction and 480 MW of wind power).
Business	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.	EPC	Engineering and construction of desalination plants and water transport infrastructure (1.8 million m^3/day of installed desalination capacity and 2.5 million m^3/day under construction).
Reputational	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.	EPC O&M	Communication, dissemination and improvement of Abengoa's climate change strategy, following the lines of work established in the Strategic Sustainability Plan.

Adaptation of TCFD recommendations

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

More information in the chapter 'About this report'.

Internal carbon pricing strategy

Abengoa belongs to the Carbon Pricing Leadership Coalition (CPLC), a joint initiative of 34 governments, more than 172 companies and 100 strategic partners, promoted at the Paris Climate Summit in December 2015 and administered by The World Bank Group, whose common goal is to foster systems and mechanisms to set carbon prices all over the world.

By adhering to it, Abengoa acquired a number of commitments, among which are the following:

CARBON PRICING LEADERSHIP COALITION

- Establish an internal carbon price high enough to affect investment decisions and thus reduce greenhouse gas emissions.
- Publicly advocate the importance of establishing a price for carbon through policies that take into account each country's specific economic and political context.
- Communicate the progress of the two previous criteria in the public information reported by the company.

And all with the intention of contributing to the goal of limiting the increase of the global average temperature to 1.5 °C above pre-industrial levels.

Taking this commitment into account, Abengoa has defined a **climate action mechanism by establishing an internal carbon price**, aligned with the emerging climate regulation as a result of the Paris Agreement and with the evolution of the business as a whole.

The initiative involves including the requirement to calculate the costs that would be incurred by the GHG emissions linked to a new project according to the internal price defined by the company. This monetization of CO_2 emissions will allow Abengoa to optimize decision-making and business strategy planning, making the company aware of the economic cost of emissions from new projects and consequently allowing regulatory changes aimed at monetizing GHG emissions.

CSR EUROPE Responsible business. Better future.

#CEOsCall2Action
A New Deal for Europe

Abengoa is part of the 'A New Deal for Europe' initiative, promoted by CSR Europe. This initiative brings together European leaders to establish a global strategy for a sustainable Europe by 2030, in order to accelerate sustainable growth, fight against climate change and create inclusive prosperity.

Abengoa's participation in this initiative helps to materialize and strengthen its commitment to fight against climate change and positions the company among European leaders in climate action.

Carbon Disclosure Project

CDP DISCLOSER 2020

Overall assessment Climate change: B

SER Rating: A-

In 2020, Abengoa obtained a **B rating** in the **Carbon Disclosure Project (CDP) 'Climate Change' questionnaire**. Additionally, the company obtained an **A rating** in the **Supplier Engagement Rating (SER)**, a rating which measures the effectiveness with which organizations are engaging their suppliers in the fight against climate change.

Both assessments consolidate Abengoa as a leading company in the fight against climate change and its effects, due to the technological solutions made available to its customers, the way activities are managed and the transmission of its commitment to the supply value chain.

Environmental management system

Abengoa redesigned its environmental management system prioritizing **the performance optimization and maximization**, resulting in a **centralized system** and adapted to the highest standards in the field.

This management system articulates the mechanisms needed to establish a global and homogeneous diagnosis of its environmental behaviour in any activity or region, and is focused on minimising impacts throughout the life cycle and help combat climate change, guaranteeing that all legal, contractual and best management practice requirements are met This system is governed by the requirements of the ISO 14001:2015 standard and is verified by an accredited external body.

The company has two verification procedures, defined on the basis of the main activities: construction and operation and maintenance services. At present, **more than 80 % of the business is certified** under this standard

Abengoa's environmental management team has qualified environmental personnel in each project and activity, as well as a centralized support team, ensuring compliance with applicable environmental legislation and reaching the highest levels of experience and quality in the development of its activities. It currently comprises a total of **88 professionals** who are environmentally responsible and have experience in all current company activities.

Abengoa's approach to environmental management is designed as a cyclical improvement process:

Abengoa ensures compliance with the requirements applicable to each project or activity.

Identification of requirements

- Country of execution
- Type of activity (construction/ operation project)
- Client or contract specifications
- Applicable legislation and environmental authorisations
- Other aspects

Operational control

- Development of specific environmental management plans to ensure the inclusion and monitoring of environmental requirements at all stages

Follow-up audits

- Internal audits
- Major projects on-site audits, at least twice a year
- External certification audits

Environmental performance

Abengoa has an internal IT tool called Integrated Sustainability Management System (ISMS) to record and manage environmental aspects.

Environmental aspect	Impact level	Detail	Origin of impact	Impact prevention and mitigation
GHG emissions	High	Scope 1	• Mainly due to fuel consumption at Abengoa-operated plants • Fuel consumption in active construction projects	Preventive maintenance Energy efficiency Emission reduction targets
		Scope 2	• Mainly due to electricity consumption at Abengoa-operated desalination plants • Electricity consumption in buildings with personnel	
		Scope 3	• Materials and services supplied to Abengoa • Commuting • Waste management • Other emissions from electricity consumption (distribution and value chain losses)	
Energy consumption	High	Fuel	• Mainly due to the consumption of natural gas from Abengoa-operated cogeneration plants • Fuel consumption in active construction projects	Preventive maintenance Energy efficiency Emission reduction targets
		Electric power	• Mainly at the Abengoa-operated desalination plants	
Other polluting gases	High	CO, NOx, SOx, COV and particulates	• From fuel consumption at Abengoa-operated plants and, to a lesser extent, at active construction projects	Preventive maintenance Energy efficiency Emission reduction targets
Waste	High	Hazardous and non-hazardous waste	• Asset construction projects • Plant operation activity • Offices	Objectives to increase recovery Spill prevention measures
		Spills	• Mainly in solar thermal plant operation	
Biodiversity	Medium	Protected areas and species	• Asset construction projects • Bioethanol plant operation activities	Habitat protection and restoration, reforestation, and monitoring, wildlife rescue and relocation measures, among others
		Impacts on biodiversity	• Asset construction projects	
Water	Medium	Salt water	• Operation of desalination plants	Consumption reduction plan Replacement of membranes
		Water from other sources	• Asset construction projects • Plant operation activity • Offices	
Noise pollution	Low	Noise	• Asset construction projects • Plant operation activity	Measures established in impact assessments in each case
Light pollution	Low	Excess lighting	• Asset construction projects • Plant operation activity	Measures established in impact assessments in each case

Metrics and main figures

283 Hm^3
Collected salt water

31,072 TJ
Energy consumed

2.9 $MtCO_2$
GHG emissions produced

116 Hm^3
Produced desalinated water

1,866 TJ
Renewable energy produced

10,439 TJ
Consumed renewable energy

Climate footprint

Abengoa accounts for its GHG emissions for all their scopes and sources. To this end, it has procedures and tools designed for this purpose, as well as over 13 years' experience in measurement.

The methodologies are based on the reports of the Intergovernmental Panel on Climate Change (IPCC) and the emission factors used are generated by different sources:

- IPCC.
- IEA: International Energy Agency.
- DEFRA: Department for Environment, Food and Rural Affairs, United Kingdom.
- National inventories of GHG emissions.
- Environmental product statements.

Direct emissions have increased due to the Abent3T cogeneration plant operating on a full-year basis in 2020 for the first time since its start-up. In 2020 its emissions amounted to 870,900 tCO_2, equal to 14 % of Abengoa's direct emissions.

GHG emissions (tCO_2eq) *305-1, 305-2, 305-3*	2020	2019	2018
Direct emissions	1,346,195	1,125,206	738,458
Indirect emissions (scope 2)	225,622	236,236	313,746
Other indirect emissions (scope 3)	227,020	313,272	773,486
Total	**1,798,838**	**1,674,714**	**1,825,690**

GHG emissions (tCO_2eq)	2020	2019	2018
Direct emissions from biomass	1,082,979	1,211,686	1,331,008

Emission intensity *305-4*

1.44 $tCO_2/k€$ [1]

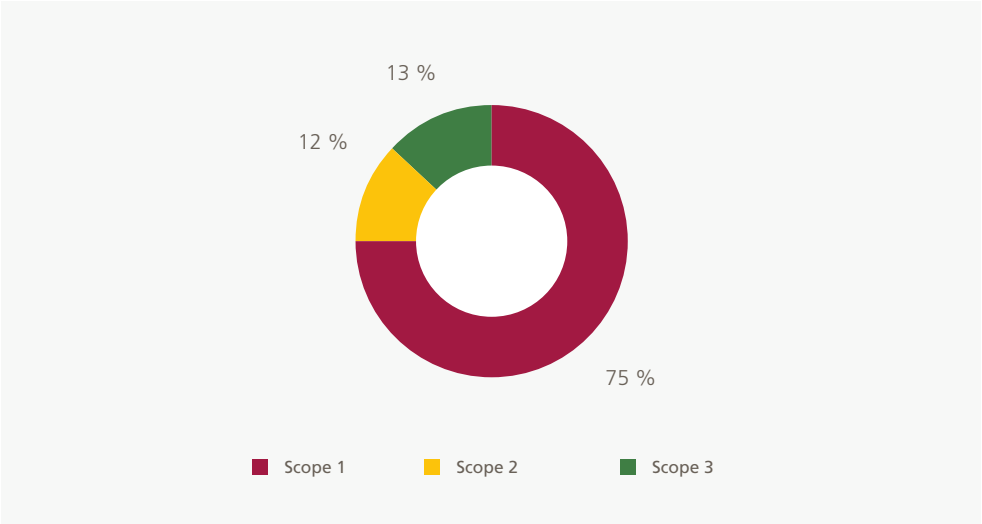
[1] The ratio is different from the ratio reported in the Non-Financial Information Statement, taking into account it is considering Scope 3 emissions, calculated subsequent to the publication of the annual accounts.

Other indirect emissions

Abengoa considers the emissions of its value chain to be as important as those generated by its own internal processes. In 2020, the amount of Scope 3 emissions accounted for 13 % of the company's global inventory, the main source coming from supplies, given the weight of construction activity in Abengoa's business.

The evolution of emissions of this scope has been positive, having achieved an overall reduction of 27.5 % compared to 2019.

GHG emissions by type of source (tCO_2eq)	2020	2019	2018
Suplies	160,510	231,845	651,676
Business trips	473	1,317	1,388
Waste management	522	3,558	7,560
Losses in the distribution of electricity consumed	38,648	49,388	80,363
Fuels value chain	26,867	27,164	32,499



Other polluting emissions *305-7*

Industrial processes involving combustion are the main mechanisms of atmospheric pollution, generating sulphur and nitrogen oxides, carbon monoxide, volatile organic compounds, among other pollutants.

Air pollution contributes to reducing the amount of nutrients available in the substrate, preventing plant growth and aggravating the effects of climate change. Furthermore, the nitrogen and sulphur oxides emissions react in the atmosphere producing acid rain, leading to an increase in nutrients in the water masses endangering aquatic ecosystems, as it causes plants and other aquatic organisms to grow excessively, consuming dissolved oxygen and increasing excess organic matter.

Unfortunately, these effects are aggravated by the still existing link between the lifestyle of a large part of the population and the emission of atmospheric pollutants: transport, industry, agriculture or even home life.

Therefore, being aware of this, Abengoa has implemented the necessary mechanisms to establish a global and homogeneous diagnosis of its environmental behaviour in any activity or geographic area, ensuring that all legal, contractual and good environmental management practices requirements are duly identified and controlled and aimed to minimize the impacts throughout the life cycle, promoting the fight against pollution in all its aspects.

Pollutants (t)	2020	2019	2018
CO	1,724	1,621	1,471
NOx	2,657	2,410	1,871
SOx	153	149	224
PM	1,631	1,644	1,909
VOC	128	122	114

The parameters used to calculate atmospheric pollutants have been taken from the Joint EMEP/EEA air pollutant emission inventory guidebook 2019.

Additionally, in the construction projects noise measurements are carried out according to their respective environmental impact assessments, complying with the current legislation at each location.

Energy footprint

Abengoa plays a fundamental role in providing engineering, construction and operation solutions for clean energy production technologies, in order to minimize dependence on fossil fuels, which is still significant today.

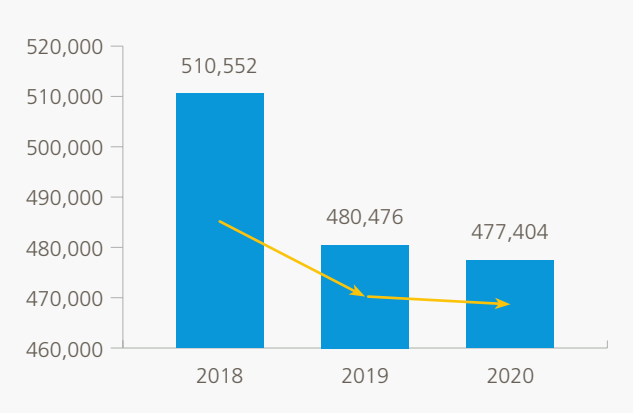
Additionally, it seeks efficiency in its consumption, promoting the use of renewable energy, which in 2019 was 33.6 %.

Direct energy consumption *302-1*

Fuel type (GJ)	2020	2019	2018
Biofuels	49,079	43,647	52,145
Biomass	10,390,029	10,492,870	12,229,325
Petroleum products	791,615	698,271	2,028,397
Natural gas	19,841,548	17,035,372	8,431,475
Total	**31,072,271**	**28,270,160**	**22,741,342**

The increase in natural gas consumption is due to the fact that the Abent3T cogeneration plant has operated in 2020 on a full year basis for the first time since its start-up. Its natural gas consumption was 12,843 TJ, increasing the overall energy consumption by 41.3 %.

Consumption of intermediate energy



Abengoa consumes **certified renewable energy** at the Almería desalination plant (16,786 in 2020), representing 3.52 % of the total electricity consumed.

Energy intensity *302-3*

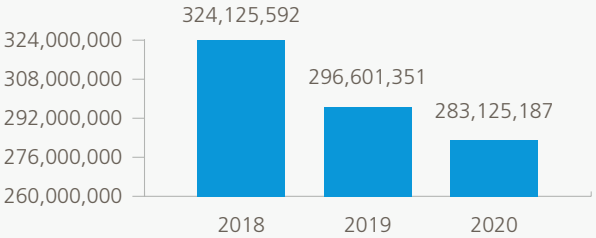
26.2 GJ/k€

Water footprint

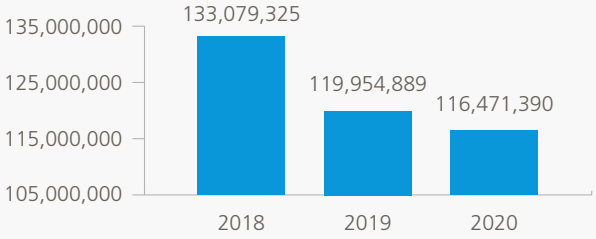
Nowadays, it is essential for organizations to know the magnitude of their impact on water resources and to identify the critical points in their value chain, in order to focus efforts and to design management and administration control measures.

In this sense, Abengoa offers solutions for the integral water cycle through desalination and water treatment, the construction of hydraulic infrastructures, as well as the promotion of optimization and efficiency in all its facilities and projects, in order to ensure that consumption is kept to a minimum.

Sea water collection (m³) *303-1*



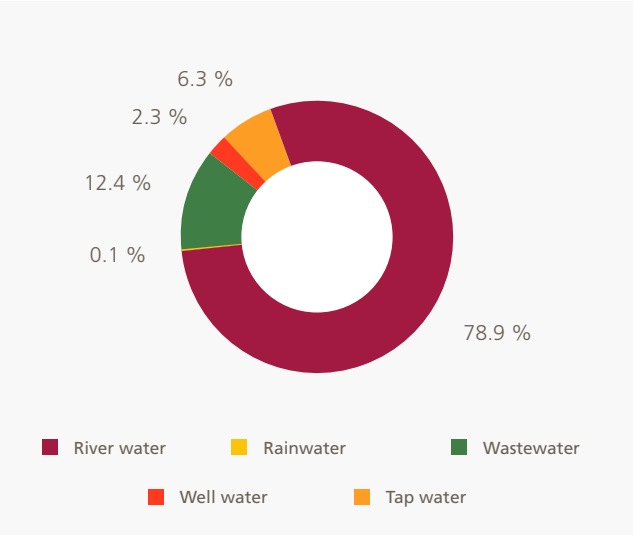
Desalinated water produced (m³)



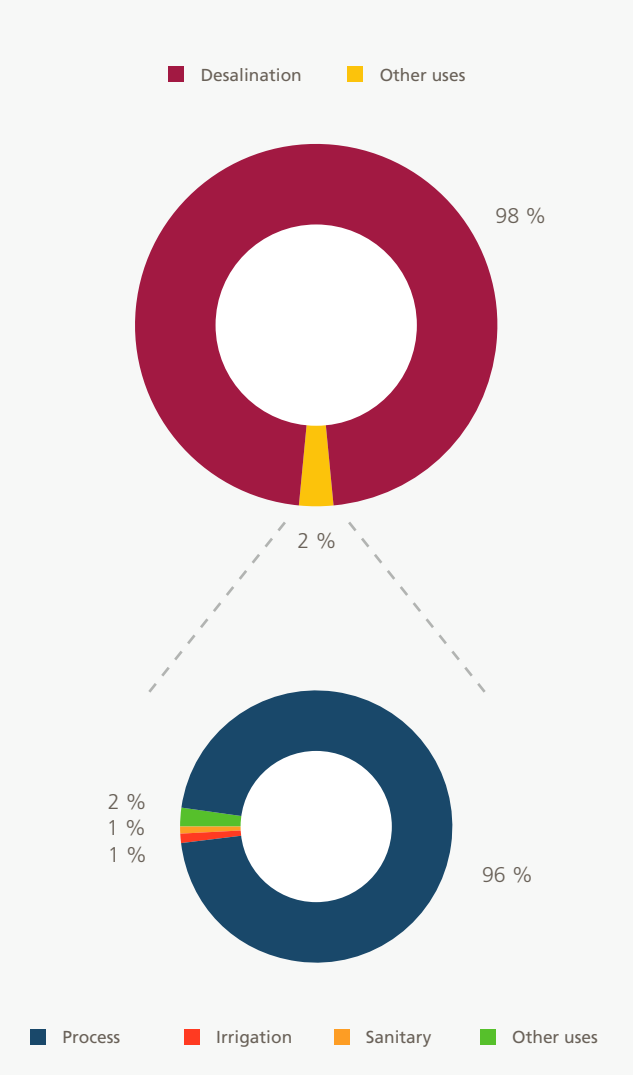
The water produced by Abengoa at its desalination plants has generated a positive impact on the planet of 116 Hm³, equivalent to the annual consumption of 2.35 million people for one year.

Water collection from other sources (m³) *303-1*

	2020	2019	2018
Well water	127,377	179,109	207,891
Tap water	342,006	358,412	356,158
River water	4,296,881	5,895,336	6,063,855
Rainwater	4,852	7,537	2,786
Wastewater	675,314	5,776	1,056,696
General total	**5,446,430**	**6,446,170**	**7,687,386**



Type of use



Abengoa and the circular economy

All productive activities should consider the positive and negative impacts of the life cycle of the materials used, in order to evaluate their flow within the system and their environmental impact.

Today more than ever, it is necessary to turn to a model that optimises resource use, promoting reduction and reuse, and making it more sustainable and competitive.

To achieve this, Abengoa continues to work on incorporating the circular economy principles into its processes, products and services, and has established a line of action in its Strategic Sustainability Plan to meet its commitments in this area:

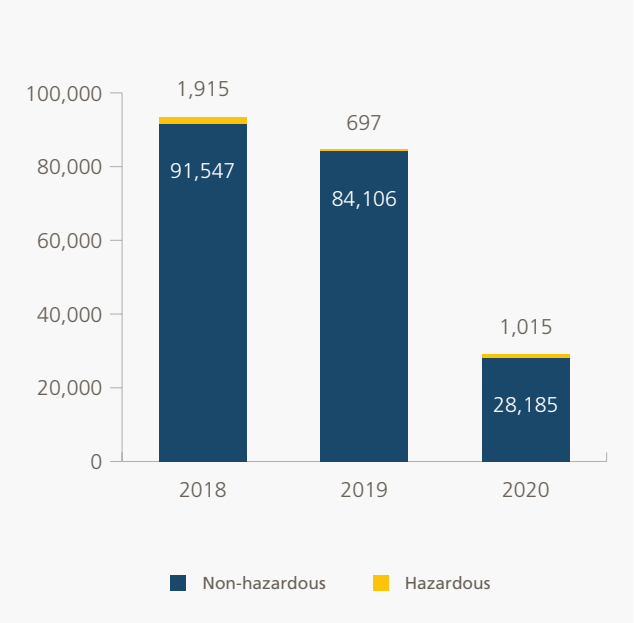
Reduce the environmental impacts in the life cycle of Abengoa's products and services, including the supply chain and raw materials production.

Encourage the efficient use of resources and promote the acquisition and use of recycled or certified materials.

Promote correct waste management practices, focusing on reducing the volume of the same and promoting recycling as much as possible.

Waste

Regarding waste, Abengoa has managed a total of 29,200 tonnes in 2020, of which only 3.48 % were hazardous waste.



*The reduced total amount of waste generated was due to the decreased activities caused by the SARS-CoV-2 pandemic, which has affected all construction projects, the main contributors to this indicator.

Final treatment (t) *306-2*	2020	2019	2018
Temporary storage	1,646	819	64
Composting	289	223	19
Permanent deposit	123	151	855
Incineration	88	77	41
Recycling	19,416	17,045	29,280
Energy recovery	57	75	529
Reuse	1,686	44,833	20105
Landfill	4,608	7,250	31,406
Other	1,287	14,330	11,163
Total general	**29,200**	**84,803**	**93,462**

As a result of the efforts of the entire company, **waste recovery in 2019 was 73.5 %**, 0.2 % higher than the previous year.

From the Board, heat transfer fluid spills (HTF) from the parabolic trough collectors plants it operates are closely monitored, due to the company's concern about the potential mismanagement of environmental impact in case of accidental spills.

This achieves prompt action, as well as the implementation of preventive measures, in both affected and unaffected plants.

Two spills occurred During 2020, with a total of 3,980 litres of HTF spilled.

Use of materials

Through its Strategic Sustainability Plan, the company promotes the efficient use of resources and promotes the purchase and use of recycled or certified materials to the extent possible, as well as the efficient use of resources. *301-1*

	2020	2019	2018
Steel (kg)[1]	29,001,555	71,680,622	4,859,709
Wood (kg)	18,132,394	11,561,806	23,266,223
Cement (kg)[1]	1,167,640	6,223,113	2,565,775
Concrete (kg)[1]	443,585,526	630,025,264	102,361,584

In 2020, 6,625 kg of paper were purchased at Abengoa's three main offices[2] in Spain, with a PEFC certification.

1 The reduction is due to a decreased construction activity as a result of the SARS-CoV-2 pandemic.
2 Palmas Altas Campus (Seville), Torrecuellar centre (Seville) and office on Manuel Pombo Angulo (Madrid).

Biodiversity

Abengoa's strategy for biodiversity conservation consists of the combination of **measures for the prevention, management and restoration** of the impacts derived from its activity.

Prior to starting a project, Abengoa performs **environmental impact assessments** to identify and manage the effects its activity will have on the environment.

On all projects, Abengoa takes into consideration the prevention and restoration of any areas that may be affected by the development of its activities. For this purpose, the company implements measures for habitat protection and restoration; reforestation; and monitoring, rescue and relocation of fauna, among others.

In cases where the impacts caused by Abengoa's activities cannot be minimised, compensation actions are implemented, as provided in studies carried out previously.

In addition, it establishes **environmental monitoring plans** to review the implemented measures.

Protected areas

Specifically, the company analyses each facility to consider whether it is inside a protected area and the fauna and flora species that may be affected.

During 2020, Abengoa's activity affected special protection areas in two locations: *304-1*

- Construction project of a desalination plant in Agadir (Morocco), a project within the Parc National Du Souss Massa, with international significance for migratory waterfowl in the migratory stage and with suitable habitats for their wintering.
- Construction project of an irrigation network for an area of 13,600 hectares, as part of the desalination plant project in Agadir, Morocco. The main pipeline starts at the above mentioned desalination plant, and reaches the irrigated area outside the park.
- 17.4 hectares of legal reserve in the Brazilian bioethanol plants São Joao and São Luiz. In these activities the significant impacts and their duration and reversibility have been identified and evaluated.
- The Red Sea project is located within an IBA (Important Bird Area) as established by Birdlife International n.d.

In these activities the significant impacts and their duration and reversibility have been identified and evaluated.

Protected species *304-4*

The most significant protected animal and plant species affected by Abengoa's activity are as follows:

- Ghaf tree (Prosopis cineraria), protected by the UAE's Federal Law No. 24 of 1999 for the protection of the environment
- Oryx (Oryx leucoryx), recognized as a vulnerable species by the IUCN.
- Sand gazelle (Gazella marica), recognized as a vulnerable species by the IUCN.
- Mountain gazelle (Gazella gazella), recognized as a vulnerable species by the IUCN.
- Cedar (Cedrela odorata), recognised as special protection species according to NOM -059-Semarnat-2010.
- Painted bunting (Passerina ciris), recognised as special protection species according to NOM -059-Semarnat-2010.
- Dot-winged antwren (Microrhopias quixensis), recognised as special protection species according to NOM-059-Semarnat-2010.
- Boa (boa constrictor), recognised as endangered species according to NOM -059-Semarnat-2010.

Impacts on biodiversity

The construction activity had the greatest impact on biodiversity in 2020, with projects for the installation of parabolic trough collectors and the construction of desalination plants being the most significant. In this regard, the following projects can be highlighted: *304-2, 304-3*

Type of project	Impacts on biodiversity	Measures
Solar field of parabolic trough collectors at the Mohammed bin Rashid Al Maktoum Solar Park in Dubai	• Combustion emissions and generation of dust caused by earth-moving works. • Dune ecosystem loss, habitat of animal and plant species of Al Marmoom Desert Conservation Reserve.	• Translocation of the main plant and animal species, in cooperation with the Dubai Municipality Natural Resources Conservation Section. • Installation of feeding and watering stations for the Arabian Oryx and the gazelle within the boundaries of the project area. • Minimisation of lighting to avoid excessive artificial light. • Regarding air pollution, activities involving earth-moving are minimized in case of strong winds, construction areas are dampened and traffic speed is reduced to 20 km/h.
Cogeneration plant in Mexico	• Vegetation modification has a direct impact on fauna, affecting the mobility of species due to the transformation of their biological corridor and the availability of habitats.	• Flora and fauna rescue and relocation programmes. Establishment of two buffer areas. Environmental monitoring. Incorporation of green areas.

Abengoa's Strategic Sustainability Plan incorporates as a short-term objective the implementation of a biodiversity assessment study and conservation actions carried out by Abengoa, to be applied to the rest of the activities, provided that conditions allow it.

The company received no environmental fines or penalties in 2020. *307-1*

Sensitisation and awareness raising campaigns

Abengoa is committed to raising the environmental awareness of its workforce, in order to increase its involvement in **achieving the objectives of the Strategic Sustainability Plan**. For this purpose, the following communications channels were used in 2020:

Ecological transition

Ensuring a better future for present and future generations requires the contribution and effort of all segments of society and the productive fabric, which should shift towards sustainable development models and harmful gases reduction.

We should all be part of the ecological transition.

Abengoa is fully aware that the private sector should be the driving force to achieve the required change. In this sense, the company has begun to develop action plans aimed at creating technologies that contribute to achieving this objective. These plans have been approved and are currently under development:

	Action Plan	Context	Ongoing projects	Description and progress
A	Increased presence of renewable energies in industries requiring intensive heat consumption	Projections to 2050 include a substantial increase in energy consumption by different industrial sectors, which should be accompanied by the increased use of renewables for thermal and electrical generation in this sector.	SH1 Project	Development of a small aperture collector (SH1) specifically configured for industrial heating applications due to a compact, lightweight and easy-to-assemble design.
			Modeling of industrial heat installations	Development of specific software to design and optimize industrial processes through 100 % renewable solutions.
			CSPplus Project	This project develops new high-temperature storage systems (up to 750 °C), such as storage in phase change materials (PCM), concrete and industrial waste, or in thermoclines. This project is being developed under the framework of a H2020 Project led by the University of Lleida, with which Abengoa has entered into a strategic collaboration agreement to participate as an industrial member.
B	Transformation of the energy matrix to eliminate the use of fossil fuels and achieve carbon neutrality by 2050	The replacement of fossil fuel-based facilities by hybrid renewable plants (with intermittent resources) cannot compromise the adaptation of generation profiles to the demand of end consumers. Therefore, Abengoa is addressing this challenge through research and development in the energy storage area, both electrical (through electrochemical batteries) as in large-scale thermal (through molten salts).	eMagic Project	The eMagic Project seeks to develop an innovative battery that uses magnesium instead of lithium as an active element, which could represent a radical change in the sizing and use of this type of large-scale installations. This project is being developed in consortium with Spanish and European companies and research centres as a H2020 project.
C	Implementation of hybrid solutions with 100 % renewable technologies offering clean, manageable and sustainable energy without requiring the use of fossil fuels for backup generation	CSP technology (concentrated solar power) has the ability to integrate its thermal storage in any type of installation, shifting power generation over time and thus becoming independent of the availability of its primary resource (the sun); therefore, being the only fully manageable alternative at present. A climate neutral medium term future in which energy systems are free of CO_2 emissions will only be possible with a higher proportion of manageable renewable energies. The solution to this challenge lies in the hybridization of renewable technologies, being Abengoa one of the world's leaders in this field with leading know-how accumulated due to the huge experience in the different renewable technologies developed during the last decades.	SolarsCO2OL Project	Development of an electric heater prototype for molten salts with the capacity to store surplus energy from intermittent renewable generation plants (mainly photovoltaic and wind) in a thermal storage system. In this way, it is possible to seize this surplus to generate energy when it is really required, even if the primary resource (sun or wind in this case) is not available. This project is being developed in consortium with Spanish and European companies and research centres as a H2020 project.

	Action Plan	Context	Ongoing projects	Description and progress
D	Reconversion, modernization and decarbonization of existing generation plants	The objective of this plan is to offer efficient solutions for the dismantling of conventional generation plants that are approaching the end of their life cycle, and to update, with energy storage systems the CSP/PV generation plants.	USC-Hybrid Project	Development of the detailed engineering of a pilot project to replace a supercritical coal-fired steam generation unit (extrapolated to superheated steam conditions) with a hybrid solar installation (photovoltaic and solar thermal). The proposed set-up is based on a hybrid installation that will use solar photovoltaic and solar thermal technology with tower and molten salts technology. At the same time, the concept of circular economy is promoted by reusing all the equipment in the power block.
			Retrofit of renewable generation plants	Developing an update model (retrofit) for renewable generation plants (photovoltaic, wind and/or solar thermal) to be provided with energy storage in order to be more efficient and manageable. Most of the existing renewable plants in Spain currently allows modifications in the facilities that would improve their efficiency, increasing renewable generation and reducing the carbon footprint. Abengoa promotes plans such as: • Provision of thermal storage or expansion of the existing storage and • self-consumption compensation.
			Scarabeus Project	Pilot project to optimize the supercritical CO_2 power cycle supported by a high-efficiency solar thermal installation. The optimization of the cycle is achieved by adding small amounts of additives capable of condensing the mixture, thus optimizing the cycle while analysing the different feasible configurations and studying the most efficient one.
E	Modelling and control of sustainable generation solutions	The objective of this plan is to develop software (GEA, for its acronym in Spanish, Abengoa Energy Manager); and AEMS, Abengoa Energy Management System) to scale, evaluate, optimize and monitor the operation of hybrid, renewable and/or conventional facilities. Abengoa's research and development lines include the development of software and simulation models to optimize the interconnection of different types of energy systems.	Development of GEA software – phase 1	Development of a tool to define hybrid plant configurations, optimizing the solution with technical-economic criteria and minimizing its impact in terms of CO_2 emissions.
F	Development of new control algorithms for renewable generation plants	The objective of this plan is to improve the efficiency of current technology through control systems to optimize the cost ratio per MWh generated.	RobOST	A new control algorithm is being developed for CSP plants with tower technology (the most efficient) by using artificial intelligence, which will allow to increase the efficiency of solar fields and, therefore, a significant reduction in implementation costs.

	Action Plan	Context	Ongoing projects	Description and progress
G	Reducing resource use in desalinated water production	To reduce the electricity consumption of high-capacity reverse osmosis desalination plants, the focus has been on the most energy-demanding process, which in this case is high-pressure pumping to the membranes. Two fronts have been chosen, improving pump performance and reducing control losses (pressure is variable depending on the seawater salinity and temperature).	Improving performance	Grouping of the racks, which size is limited due to redundancy and maintenance needs, and communication of the pump discharge manifolds due to plant availability requirements (pressure centre). When both ends of the high pressure manifold communicate, flow circulation is improved in case of failure and the best operating conditions are obtained.
			Reduction of control losses	Each high pressure group is split into two stages and frequency control is applied only on the lowest, thus reducing overall losses.
H	Decarbonization of aviation fuels by developing biofuel production plants from municipal solid waste	Development of an advanced aviation fuel production plant, integrated with a green hydrogen production plant through on-site electrolysis. The plant will transform more than 340,000 t/year of solid waste to produce 116 Ml/year of kerosene and 31 Ml/year of gasoline. The project will give Abengoa a strategic positioning in the decarbonized fuels industry.	Production plant engineering	The MSW is gasified to obtain syngas, which is cleaned and conditioned before being introduced into a Fischer-Tropsch reactor. The hydrocarbons mixture obtained is finally transformed into advanced aviation kerosene. The yield of the process is increased due to the green hydrogen generated by an electrolyser. Hydrogen is likewise used as fuel for auxiliary plant vehicles (waste transport trucks, plant vehicles, etc.).
I	Decarbonization of the electricity grid by developing power plants based on fuel cells and hydrogen	Creation of a new generation of fuel cell based power plants suitable for flexible operation for grid support. These power plants use green hydrogen which is converted into emission-free electricity and heat. Additionally, improvements in the development of fuel cell systems allow the efficiency and life cycle of these fuel cells to be increased.	Grasshopper Project	This project seeks to upgrade the technology of PEM-type hydrogen fuel cell plants and thus achieve a 100 % renewable and manageable electricity grid at an affordable cost. The main objectives of the project, in which Abengoa contributes its extensive experience in generation plants, hydrogen and fuel cells, are as follows: 1. Energy cost reduction 2. Fast and flexible operation to allow the provision of electricity grid services. In order to meet both objectives, Abengoa has developed a 100 kW pilot plant currently in operation at its test facilities located in the port of Seville (Spain), with which is intended to validate numerous technical improvements, commercialization strategies and serve as a laboratory for ongoing and future developments beyond the project.

Efficient office

US Green Building Council (USGBC) in 2015 awarded Abengoa the **LEED platinum certification** (Leadership in Energy & Environmental Design) in its headquarters Campus Palmas Altas, located in Seville (Spain).

This certification corroborates Abengoa's commitment to develop measures and initiatives that contribute to improve the performance efficiency of its activity.

Among other initiatives, Abengoa offers its workers a direct connection to the metropolitan area through a walkway built by Abengoa that crosses the SE-30, allowing pedestrians and cyclists to cross, as well as the use of public buses from Tussam and the Seville Metropolitan Transport Consortium.

LEED is a voluntary sustainable building certification system based on the incorporation of systems that contribute to energy and water efficiency, the use of alternative energies, the separation of waste and the improvement of interior environmental quality and the selection of materials.