01

Activities 2012

Innovative technology solutions for sustainability

ABENGOA

Annual Report 2012

01

Glossary

Operating terms	
A	Ampere
ATN	Abengoa North Transmission
ATS	Abengoa South Transmission
ATE	Abengoa Energy Transmission
bar	Bar
bsh	Bushel
BTU	British thermal unit
CO_2	Carbon dioxide
DGS	Distilled Grains and Solubles
EPC	Engineering, Procurement and Construction
ETBE	Ethyl Tertiary Butyl Ether
g	Gram
gal	Gallon
GHG	Greenhouse Gas
h	Hour
ha	hectare
Hz	Hertz
ISCC	Integrated Solar Combined Cycle
J	Joule
km/h	Kilometer per hour
L	Liter
m	Meter
m/s	Meter per second
m^2	Square meter
m^3	Cubic meter
N	Newton
Pa	Pascal
ppm	Parts-per-million
s	Second
SSEE	Electrical Substations
t	Metric ton
V	Volt
VA	Volt-ampere
VAr	Volt-ampere reactive
W	Watt
We	Electric warr
Wh	Watt hour
Wth	Thermal watt

Financial terms	
€	Euro
$	US Dollar
BRL	Brazilian Real
CAGR	Compound Annual Growth Rate
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization
GDP	Gross Domestic Product
PCAOB	Public quoted Company Accounting Oversight Board
ROE	Return On Equity
SOX	Sarbanes Oxley

Prefixes according to the International Metric System		
m	Mili	10^{-3}
c	Centi	10^{-2}
d	Deci	10^{-1}
h	Hecto	10^{2}
k	Kilo	10^{3}
M	Mega	10^{6}
G	Giga	10^{9}
T	Tera	10^{12}

02

Main figures

During the period 2002-2012 Abengoa's revenue has been growing at a compound annual rate of 17.7 %, the ebitda by 21.7 % and earnings per share by 11.3 %.

Economic – Financial Data

	2012	%Var. (11-12)	2011	2002	%CAGR (02-12) [1]
Income statement (€M)					
Revenues	7,783	9.8	7,089	1,522	17.7
EBITDA [2]	1,246	13.1	1,102	175	21.7
Net income	125	(51.4)	257	43	11.3
Balance sheet (€M)					
Total assets	20,545	9.3	18,794	2,311	24.4
Equity	1,832	6.1	1,726	311	19.4
Net debt (cash) ex project finance	1,409	1,074.2	120	234	19.7
Significant ratios (%)					
Operating margin (EBITDA/ Revenues)	16.0	–	15.6	11.5	–
Return on Equity (ROE) [3]	9.4	–	15.9	13.8	–
Data per share (€)					
Earnings per share	0.23	(51.4)	0.48	0.10	9.3
Dividend per share	0.072	2.9	0.070	0.028	9.9
Quotation on the last day of the year	2.34	(28.7)	3.28	1.12	7.6
Capitalization on the last day of the year (€M)	1,263	(28.4)	1,765	507	9.6
Daily average trading volume (€M)	10.3	(16.4)	12.3	0.8	29.8

[1] CAGR: Compound Annual Growth Rate.

[2] EBITDA: Earnings before interest, tax, depreciation, and amortization.

[3] Net Earnings/ Shareholder's funds.

Types of activities & geographies

Evolution 2012 – 2002 (%)

	Three types of activities 2012		Engineering companies 2002	
	Revenues	EBITDA [1]	Revenues	EBITDA [1]
Areas of activity (%)				
Engineering and construction	58.0	58.1	57.3	52.6
Concession type infrastructures	6.1	24.6	4.0	7.0
Industrial production	35.9	17.3	38.7	40.4
Consolidated total	**100**	**100**	**100**	**100**

	2012	2002
Revenues by geographies (%)		
Spain	25.4	59.8
Brazil	13.2	2.9
USA	25.9	9.5
Europe (ex. Spain)	15.2	6.2
Latin America (ex. Brazil)	13.4	19.0
Asia	4.1	1.9
Africa	2.8	0.7
Consolidated total	**100**	**100**

[1] EBITDA: Earnings before interest, tax, depreciation, and amortization.

03

Our commitment

At Abengoa, we believe that the world needs solutions to pave the way for more sustainable development. Scientists tell us that climate change is a reality and at Abengoa we believe that now is the time to seek out solutions and put them into practice.

Over ten years ago, Abengoa made the strategic decision to focus its growth on the creation of new technologies geared towards sustainable development:

- Generating energy from renewable resources.
- Recycling industrial waste.
- Generating and managing water.
- Creating infrastructures that eliminate the need for new investments in assets that generate emissions.
- Creating new horizons for development and innovation.

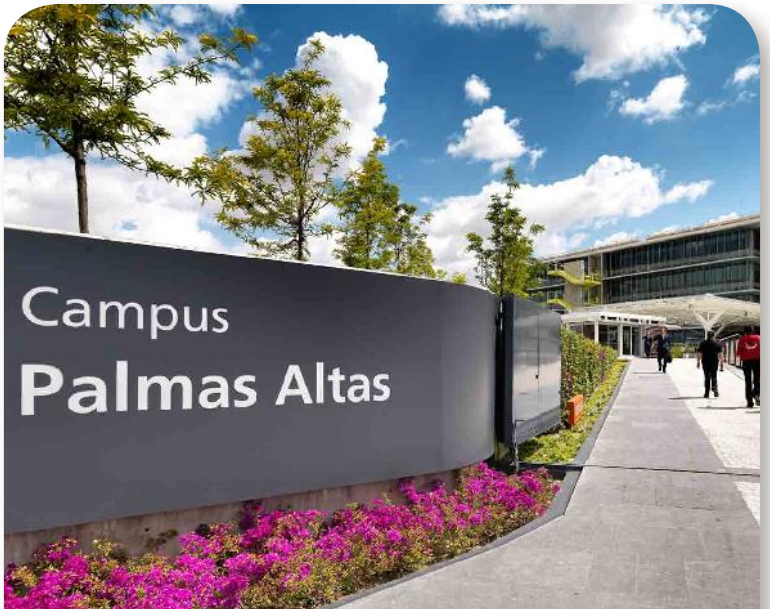
To this end, we invest in Research, Development and Innovation, R&D+i, globally expand those technologies with the greatest potential, and attract and develop the necessary talent.

In a similar vein, we channel human and financial resources into the Focus-Abengoa Foundation to promote social action policies that champion social and human progress.

By following this approach, we create long-term value for our shareholders, ensure the growth of the companies through which we operate and help to make the world a better and more sustainable place for future generations.

04

Report from the chairman



Once again the global economy and the Eurozone in particular had a difficult year in 2012. At Abengoa however, our innovative technology solutions for sustainable development have enabled us to maintain sustainable and recurrent growth. The protracted nature of the global crisis has had a negative impact on the global fight against climate change, but it continues to be a pressing issue for humanity, which is increasingly looking to advances in renewable energy. At the same time, the high risks associated with nuclear energy, the astonishing costs of a foreign energy dependency and the environmental impacts of fossil energy have once again highlighted the importance of tackling the major challenges of sustainability and the development of renewable energy.

The 2012 report by the International Energy Agency predicts that around 31 % of electricity will be generated from renewable sources by 2035 and that demand for biofuels, mainly second-generation bioethanol, will triple. Desalination and water reuse will be decisive factors in ensuring society's access to this primary resource. All of this comes together in the vital role that must be played by renewable energy and lays the foundations for Abengoa to become one of the leading players in global energy development and environmental improvements that will benefit future generations.

The ongoing creation of knowledge and a commitment to technological innovation form the basis of our competitive advantage in the energy and environment sectors. This has led Abengoa to become a major scientific and technological forum and a privileged space for training professionals in R&D+i.

Abengoa Research (AR), the research institute that we launched in 2011, is making significant progress in areas such as the production and storage of solar and marine energy; the development of energy vectors such as hydrogen and bioethanol; the creation of new technologies for recycling waste; desalination; and the reuse of water from industry and other sources.

We are carrying out the scheduled investments in our strategic plan and arranging financing for the corresponding projects. Abengoa's projects map has grown in 2012 to encompass countries such as Oman, Turkey, Ghana and South Korea, and it has consolidated its leadership position in countries such as Brazil, US and Germany.

Demand for Abengoa's products and services continues to rise, since we are a global company that specializes in dynamic sectors. In 2012 we recorded an 10 % increase in revenues to €7,783 M compared to 2011, which is also reflected in our margins with an increase of 13 % in ebitda to €1,246 M.

The issue of new Class B shares and the conversion rights of Class A shares into Class B shares has been a key element in providing Class B shares with sufficient liquidity to be included in the IBEX 35 index and for a potential listing on the NASDAQ. The support at the General Shareholders' Meeting in September of 2012 regarding the proposal to split Class A shares into Class B shares have encouraged us to continue working in the same direction.

Last year the company successfully refinanced €1,663 M of its long-term syndicated bank debt. Corporate net debt at the end of 2012 was 1.8 times corporate ebitda, totaling €1,408 M, while total net debt, including non-recourse financing primarily associated with our concessions, was 6.6 times consolidated ebitda, at €8,282 M. We ended the year with a cash position of €3,451 M, which will allow us to confidently meet our investment and debt commitments scheduled for 2013.

In 2013 we intend to continue to grow and strengthen our financial structure.

Engineering and construction

Revenues in this area grew by 19 % to €4,512 M. At the end of the year the order book totaled €6,679 M.

In the US, Abengoa will carry out the engineering, development and start-up of one of the largest photovoltaic plants in the world, in California, while the works on the concentrating solar power plants in Arizona and the Mojave Desert are progressing satisfactorily.

We have also been selected to construct the largest combined cycle plant in Poland, power transmission lines in Latin America and Australia, and new desalination plants in the Middle East and North Africa.

Concession-type infrastructures

At the end of 2012 we had generated more than 4,324 GWh of energy in solar, hybrid and cogeneration plants, and we brought into operation 6 new plants with an installed capacity of 300 MW during the year. We have also produced 97,435 ML of desalinated water, after new plants in Algeria and China came into operation.

The total capacity installed and under construction of our power plants in the US, Abu Dhabi, South Africa, Algeria, Mexico, Brazil, Uruguay, Spain, India and Holland totals 2,432 MW. We are also currently developing new desalination plants in Algeria and Ghana, and various power transmission lines in Brazil, Peru and Chile.

Industrial production

The construction in Kansas (US) of the first industrial plant to produce second-generation ethanol using Abengoa's proprietary technology and the development of the first bio-refinery pilot plant in Salamanca (Spain) are examples of our research from recent years becoming a reality, as well as demonstrating our technological leadership in this sector. In addition to biofuels, our industrial recycling activity also continues to grow, with revenues of €2,798 M and ebitda of €215 M.

Diversification and growth

Our growth model is based on the simultaneous management of businesses with different profiles and characteristics, which we refer to as our "three horizons". We invest the cash flows from our traditional activities into growth in our emerging businesses, while we have numerous options for the future that will evolve until reaching maturity. Asset rotation is part of our business model.

Our options for the future are Abengoa Water, Abengoa Hydrogen, Abengoa Seapower and Abengoa Energy Crops, in addition to numerous technological opportunities that Abengoa Research and the business groups obtain from their research.

The company's international activities account for 75 % of total revenues, including our businesses in Latin America that represent 27 %, Asia 4 %, Europe 15 %, Africa 3 %, and the US with 26 %.

Human capital, employment and innovation

We at Abengoa know that our future success depends on us being creative now, while this depends on training and ensuring the devotion of everyone of us at Abengoa. There are now over 26,000 of us in 2012, 19 % more than 2011.

In 2012 we invested more than 1.7 M hours in training and we launched joint programs with acclaimed universities in every country where we are present.

Abengoa also increased its number of patent applications to 203 and was recognized as the leading Spanish company in the international patent applications ranking. These achievements are due to the efforts of the team comprising 747 company researchers, as well as investment in R&D+i projects totaling €91.3 M.

Audit

Once again we have subjected our internal control system to an independent audit process, in accordance with PCAOB standards. Our Annual Report therefore includes five independent verification reports on the following areas: financial statements, SOX (Sarbanes Oxley) internal control system, Corporate Social Responsibility Report, Corporate Governance Report and the design and application of the company's risk management system in accordance with the specifications of the ISO 31000 standard.

CSR sustainable development

As companies we have an obligation to ensure that our actions contribute to economic development and social progress. The sustainable and responsible policies that we apply to these activities reduce the risks and the social and environmental impacts of man's actions, and strengthen our corporate governance and relations with stakeholders, demonstrating that we are a reliable, profitable and secure company. They also contribute to the development of the communities where we are present through the People, Education and Communities Program (PEyC).

Abengoa's social actions, to which we allocated €10 M this year, are channeled via the Focus-Abengoa Foundation.

We use the Corporate Social Responsibility Report, prepared in accordance with the principles of the Global Reporting Initiative (GRI) and the AA1000 sustainability assurance standard, to inform all our stakeholders of our social, environmental and financial performance during 2012, as well as the objectives, challenges and areas for improvements that we will work on during the coming year.

In order to continue to improve through your recommendations, and to achieve our objectives of commitment with sustainable development, we provide you with our Corporate Social Responsibility e-mail address (csr@abengoa.com), our website (www.abengoa.com), our twitter profile and our corporate blog (blog.abengoa.com).

Felipe Benjumea Llorente

05

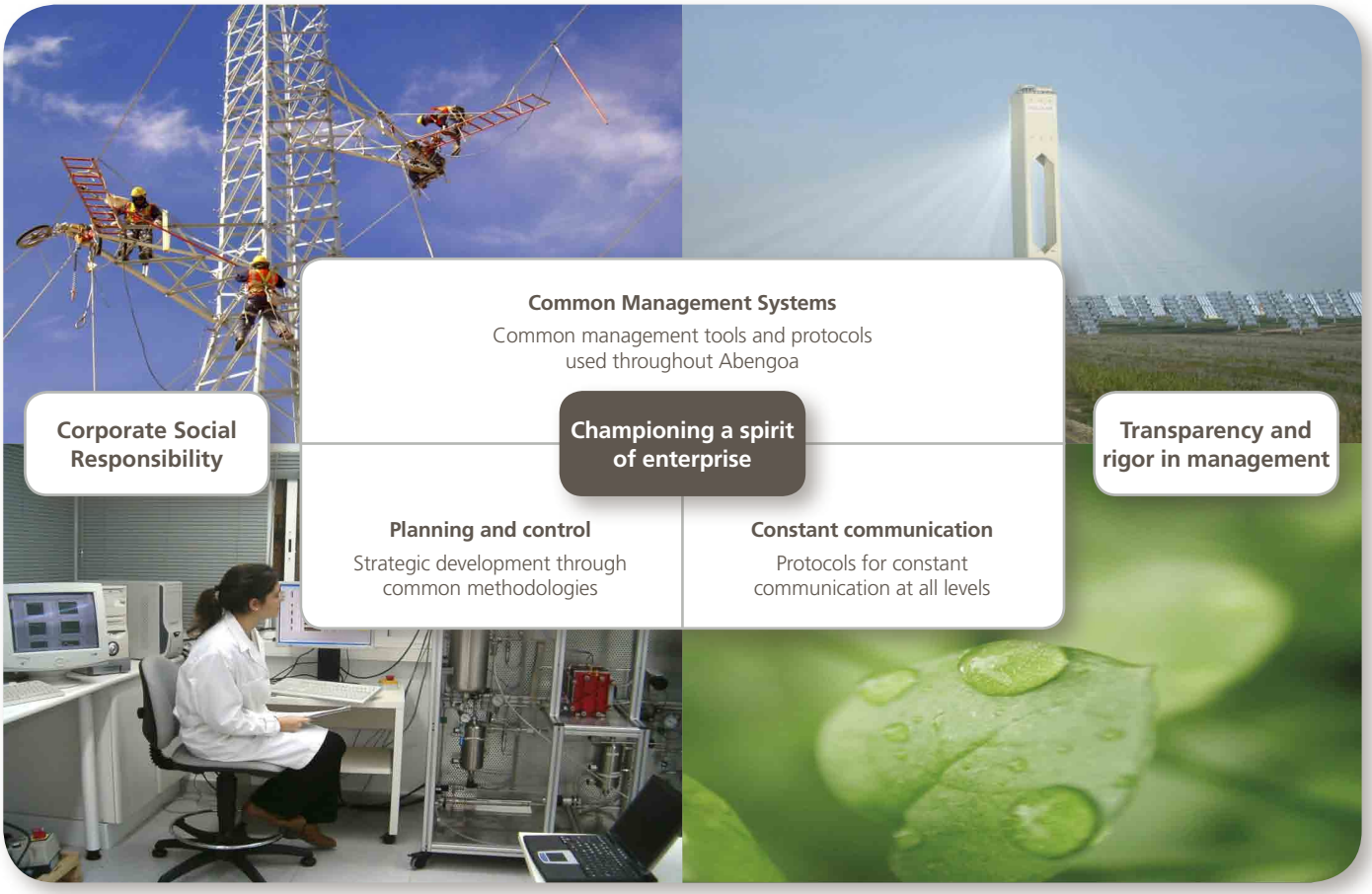
Our management model

Growth at Abengoa is founded on five strategic cornerstones:

- Creation of new businesses that help combat climate change and foster sustainable development.
- A dedicated and highly competitive human team.
- Permanent strategy of creating value by generating new options and defining current and future businesses through a structured process.
- Geographic diversification in the markets offering the greatest potential.
- Heavy investment in research, development and innovation.

These cornerstones are shaped through a management model based on three core concepts:

- Corporate social responsibility.
- Transparency and rigor in management.
- Fostering of business spirit.



Our management model is reflected in the three business vistas:

H1

Cash flow generators

- Combined cycle power plants.
- Cogeneration.
- Electrical power transmission systems.
- Solar (tower, parabolic trough and PV).
- Bioenergy (1st generation).
- Industrial waste recycling.
- Desalination and water reuse.
- Other renewable energies (wind and Waste to Energy).

H2

Strategic commitments

- Abeinsa 2015 plan of new products and geographies.
- Electrical power transmission systems (direct current and new geographies).
- Solar (superheated steam tower and molten salts, large storage, HCPV).
- Bioenergy (2nd generation).
- Water intake and transportation system.
- BioButanol and butadiene.
- W2B (Waste to Biofuels).

H3

Viable options

- Abeinsa in new sectors.
- Solar (new technologies and geographies).
- Biorefinery (new bioproducts).
- Energy crops (biomass and energy crops).
- Hydrogen.
- Ocean energy.
- New reuse technologies.

06

Activities

06.1

Engineering and construction

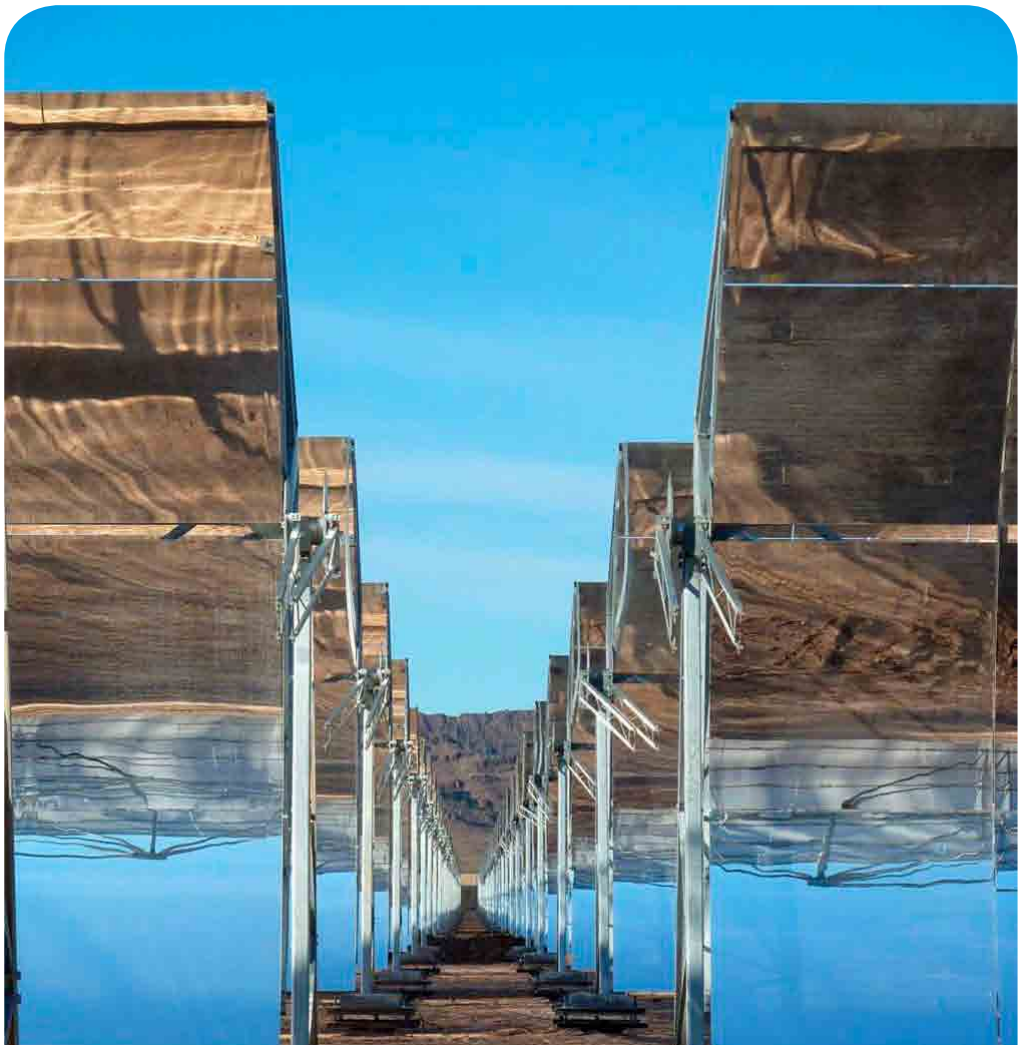
Abengoa, with seventy-plus years of experience in the energy and water engineering and construction market, boasts a lengthy track record in performing complex turnkey projects: solar thermal plants, hybrid solar-gas turbine plants, conventional power plants and biofuel facilities, together with hydro infrastructures, including large-scale desalination plants and power transmission lines, among others.

Key figures - financial	2012	2011	2010	Chg. 12-11 (%)
Revenue (€ M)	4,512	3,807	2,302	18.5 %
EBITDA (€ M)	724	531	259	36.3 %
EBITDA margin (%)	16.0	13.9	11.3	15.1 %

The prevailing uncertainty and instability plaguing the markets is testing the mettle of companies, which are now having to demonstrate, more than ever before, their management capacity and ability to adapt to change. We are proud to announce therefore that Abengoa's Engineering and Construction division has once again responded well to the crisis while remaining loyal to the company's strategy: it closed out the year with a total of €4,512 M under construction, €3,738 M in procurement and €6,679 M on the order book, the back of the company's drive to diversify business activities and regions.

The division not only continues to offer promising growth potential, but year after year continues to better itself in terms of profit reported and projected future earnings. It is continuing with its recent drive towards international expansion and growth, while cementing its leadership in those markets where it operates.

Mirrors at a solar power plant



With engineering and construction being the cornerstone of Abengoa business, the company's mission in this field could essentially be defined as the design, engineering and construction of:

- Transmission systems and power generation plants.
- Water treatment and desalination plants, hydro facilities and waste treatment.
- Industrial infrastructures and installations associated with conventional and high-speed rail travel.
- Telecommunication systems.
- Civil engineering.

The overarching aim of the division is to become an international market leader in the engineering and construction of energy and environmental infrastructures and industrial installations on the path towards sustainable development.

The Engineering and Construction division has established a stable footing now in over 40 different countries across five different continents, thus requiring it to adjust to the different social, cultural and economic environments in which it works, focusing its business at all times on local corporate responsibility. It is therefore able to understand and adapt to the different needs of each community in which it operates its different lines of business.

Aerial view of Montes del Plata (Uruguay)

Human capital is a key factor in accomplishing its objectives. Employees contribute knowledge and are the force driving the company forward. Relying on teamwork and drawing on their professionalism and excellence, our employees are without doubt what marks the Engineering and Construction division apart from the competition.

Three key ideas underpin the strategy of this division: technology, discipline and diversification. This has provided the platform for sustained growth, which has catapulted the company forward and positioned it among the world's leading construction firms in the field of power infrastructure. According to the ENR (Engineering News Record) table for 2012, Abengoa ranked as the largest international construction firm in power transmission and distribution, the second largest international constructor of electrical infrastructure and the fourth largest contractor in Latin America. As a first this year, Abengoa has been ranked among the largest contractors operating in the United States, coming in eighth. It also ranks leader in the cogeneration and solar power sectors.

Detailed below are the main projects that Abengoa's Engineering and Construction division is currently engaged in by region:

America

- Work is continuing on the one-stop turnkey engineering and construction project to construct a 640 MW combined cycle plant in Centro Morelos, Mexico. This electrical power plant of the Mexican Federal Electricity Board ("Comisión Federal de Electricidad", or CFE) will form part of the "Proyecto Integral Morelos" project, a key initiative in developing central Mexico.
- Work is also continuing for the CFE on an EPC contract to construct the 42.3 MW Baja California Sur IV internal combustion plant in the state of Baja California Sur.
- Commencement of the Agua Prieta Fase III EPC contract to construct a 12 MW solar field in the state of Sonora (Mexico), which will be integrated with a combined cycle gas turbine (CCGT) to become Mexico's first hybrid solar-gas turbine plant.
- Completion of work on the 300 MW cogeneration plant in Tabasco (Mexico), which is located at the facilities of the state-owned company Petróleos Mexicanos (Pemex). The power plant is capable of generating electricity and thermal energy through two gas turbine generators with their respective electric generators, and two heat recovery steam generators. The new plant, which Abengoa will also operate and maintain for 20 years, will be able to generate up to 800 t/h of steam to supply electricity to the Nuevo Pemex Gas Processing Complex in Tabasco, while feeding surplus power to the Mexican power grid.
- Abengoa is pressing on with the engineering project for the El Zapotillo Aqueduct, which includes the construction of 139 km of large diameter piping; pumping stations with a total installed capacity of 24,000 kW; a water treatment plant of 3,800 L/s; a 100,000 m³ storage tank and a 40 km distribution circuit within the municipality of León (Mexico). The contract also envisages a 25-year concession to operate the aqueduct.
- Work is continuing on the 500 kV power stations for UTE in Uruguay. The project involves the supply and turnkey installation of two 500 kV stations, effectively connecting the Punta del Tigre power line with the existing 500 kV Uruguayan power transmission grid.

Aerial view of the Melo frequency converter station (Uruguay)

- The project embraces the design, construction, operation and maintenance of the wind farm, which contains 25 wind turbines. The farm will be operated for a 20-year term running from final delivery and start-up. In the final quarter of the year Abengoa was awarded a contract for a new 50 MW wind farm in Uruguay, including operation for a 20-year term. Aneel (the Brazilian National Electrical Power Agency) also awarded Abengoa three other wind farms in Trairí, with a combined installed capacity of 64 MW.

- In Uruguay, Abengoa has secured the new 50 MW Cadonal wind farm for the state-owned utility (UTE) "Administración Nacional de Usinas y Transmisiones Eléctricas". The company has also been awarded a 70 ML bioethanol plant for the state-owned company Alcoholes de Uruguay (ALUR). The facility will process sorghum, corn, barley and wheat and will be located in Paysandú (Uruguay). The project also envisages the construction of an 8 MW cogeneration facility annexed to the parent plant, which will supply the latter with electricity and steam using biomass as feedstock.
- In Arizona, the Solana solar power plant is nearing completion, with the start-up phase already under way. The 280 MW facility features parabolic trough technology and boasts six hours of heat storage. More specifically, the facility already has all its main equipment installed, along with the transmission line and electric substation to evacuate power, both of which are now live. In addition, the salt melting process has already started for the thermal storage system. The plant is expected to enter operation at some point in 2013, whereupon it will become the world's largest solar power plant of its kind.
- In California, construction of the 280 MW Mojave Solar parabolic trough plant is progressing rapidly and well on schedule. Assembly of the troughs for the solar field is already under way and most of the work is currently focusing on civil engineering, completing foundations for the main items of equipment and lifting various tanks for water and thermal oil.
- In the United States, Abengoa has been awarded the engineering, construction and start-up of what is to be one of the world's largest photovoltaic plants, with an installed capacity of 200 MW and with the project worth $360 M. The facility is to be constructed in 18 months and is expected to be brought online gradually over the latter half of 2014.
- The company is currently building the first second-generation bioethanol plant planned for commercial operation, located at Hugoton, Kansas. The facility will run on cereal straw instead of grain, producing 95 ML of bioethanol a year and 20 MW of electricity.
- In Peru, the company Minera Cerro Verde has chosen Abengoa for the engineering, construction and start-up of the 500/220 kV La Joya transformer substation and the 220 kV San Camilo transmission line (TL), with the value of the contract exceeding $160 M.

Construction of a transmission line in Peru

- Construction is continuing on the 500 kV Chilca-Marcona-Ocoña-Montalvo transmission line and three new substations in Peru, along with upgrade work on a further three, including the installation of two series compensation capacitors at the Ocoña substation. The 872 km project encompasses the design, supply, construction and financing of the entire electricity system, and operation and maintenance for a 30-year term.

T93 Chaquicocha-Andahuaylas, 4,450 mamsl (Peru)

- Work is also continuing in Peru on the 220 kV ATN2 Las Bambas-Cotaruse TL. This project includes engineering work, procurement of equipment and construction of the line, which will span roughly 132 km. The contract also envisages line operation and maintenance for 18 years.
- Work on a further three lines is also progressing in Brazil: the 230 kV Jauru-Porto Velho alternating current line, as part of the Pre-Madeira project, with a total length of 987 km; the 586 km and 500 kV Oriximiná-Silves-Lechuga line; and, last but not least, the 108 km and 230 kV ATE VIII Itacíunas-Carajás power line, with the contract encompassing not only line construction but also operation and maintenance for 30 years.
- Abengoa has started construction of the 600 kV Coletora Porto Velho-Araraquara 2 Bipolo2 DC (direct current) line in Brazil, which will measure approximately 2,412 km, one of the largest in the world, and is designed to transmit a maximum of 3,150 MW.
- In the last quarter of 2012, Abengoa walked away with a concession agreement for three new power transmission lines in Brazil. The new efficient and sustainable infrastructure will help meet part of the country's energy demand once operational, which is scheduled for March 2016. The first concession involves four transmission lines spanning 1,816 km and two electrical substations in the states of Tocantins, Piauí, Bahía and Maranhao, while the second of the contracts will require the company to construct a 286 km transmission line and two substations in the states of Ceará, Paraíba and Río Grande do Norte. The third and final contract awarded to Abengoa consists of a 370 km transmission line located between the Estreito and Itabirito 2 stations in the state of Minas Gerais.
- Completion of work on the Abengoa Brasil building in Rio de Janeiro. The project involved the turnkey construction of an office building located in Barra de Tijuca, with a floor area of 8,070 m² on four levels. All phases of the building (design, construction, operation and maintenance) were originally conceived with sustainability firmly in mind with the aim of securing the LEED (Leadership in Energy and Environmental Design) "Green Building" certificate.

- Abengoa has also signed three further EPC contracts in Chile: two to upgrade line capacity for E-CL and Transelec Norte customers through live line installation work along sections of 244 and 174 km, respectively; and the third to construct a 15 km power transmission line at 110 kV.
- In Chile, the Sierra Gorda mining company has awarded Abengoa three new contracts: the construction and operation and maintenance of two TLs, measuring 50 and 79 km, and an EPC agreement embracing the design, construction and start-up of all the transmission lines at 33 kV.
- Also in Chile, Cleanairtech Sudamérica S. A., a company belonging to the Compañía Minera del Pacífico (CAP) group, awarded Abengoa a contract worth $65 M to develop a desalinated water piping system.
- Abengoa has been selected by Canadian mining company Goldcorp to carry out the engineering, design, construction and commissioning of the entire 132 kV electric power transmission project, which will span a total of 55 km in the province of Santa Cruz, in southern Argentina.
- Also in Argentina, the company was chosen by Fondo Fiduciario para el Transporte Eléctrico Federal (CAF) to interconnect the Río Coronda and Rosario Oeste transformer stations (Argentina). The contract, worth $70 M, involves the turnkey construction of a extra-high voltage 500 kV line spanning 65 km in the province of Santa Fe, lying between the Río Coronda and Rosario Oeste transformer stations, and also requires Abengoa to upgrade both transformer stations.

Africa

- Financing was secured in 2012 and construction started on the Khi Solar One (50 MW) plant, employing superheated steam tower technology and two hours of heat storage, one of the largest in the world to utilize this technology. The facility is located close to Upington, in the Northern Cape province of South Africa.
- Work has also got under way on the KaXu Solar One plant, a 100 MW parabolic-trough solar power facility with a heat storage capacity of three hours. The plant will be sited outside the city of Pofadder, also in the north of the Northern Cape province of South Africa. To construct and develop both plants, Abengoa has joined forced with IDC (Industrial Development Corporation), South Africa's largest development finance institution. This partnership has been made possible thanks to Abengoa's ongoing drive towards sustainable development, particularly its contribution towards the progress of the communities in which it operates.
- Abengoa has secured a $231 M contract for a new desalination plant in Tenes (Algeria), which will have a capacity of 200,000 m³ of water per day.

Moving mirrors at a solar power plant

Asia and Middle East

- Construction work is now in progress on the high-speed rail line to link up the cities of Medina, Jeddah and Mecca in Saudi Arabia, a contract awarded to the Spanish-Saudi Arabian consortium Al Shoula Group (with Abengoa being one of the members). The contract includes the construction and assembly of the railroad line, spanning roughly 450 km of electrified double track designed for trains to travel at speeds of up to 350 km/h, along with installation of the signaling and telecommunications systems, rail electrification, the operations and control center, and full maintenance for 12 years.
- Construction is also continuing on the 100 MW Shams-1 parabolic trough solar plant, the largest concentrating solar thermal facility in the Middle East, located in the desert surrounding Abu Dhabi. The plant will be the first site to operate in the desert and has been specifically designed for this environment. The project is currently at an advanced stage of the start-up phase, meaning the solar field is already operational and it is expected to enter into operation in 2013. The plant will help curb annual CO_2 emissions by 175,000 t thanks to nearly 600,000 m² of parabolic troughs.
- Completion of the seawater desalination plant at Qingdao. The facility will be able to desalinate 100,000 m³ of water per day and will supply drinking water to 500,000 people.
- The company ACWA Power International has tasked Abengoa with the design, engineering, construction and subsequent operation and maintenance support for a desalination plant employing reverse osmosis technology in Barka, Oman. The plant will cost $55 M and will eventually supply drinking water to more than 225,000 inhabitants.
- In Gujarat, India, Abengoa is constructing a new factory to manufacture metal structures, which will have an annual production capacity of 30,000 t to meet company needs in neighboring regions.

Desalination plant, Quindao, China

Europe

- Abengoa has been entrusted with the engineering and construction of Poland's largest combined cycle plant, boasting an installed capacity of 450 MW. The contract signed with the government-sponsored electric utility and gas distribution company is worth €380 M.

Oceania

- Lastly, we would highlight the company's entry into the strategically important Australian market with a 132 kV line, which is expected to open up the doors to more opportunities within the region.

06.2

Concession-type infrastructures

Abengoa boasts an impressive portfolio of proprietary assets under concession, all generating income through long-term sale agreements, guaranteed purchase agreements (take or pay) and power purchase agreements.

	2012	2011	2010	Chg. 12-11 (%)
Key figures - financial				
Revenue (€ M)	473	428	308	10.6 %
EBITDA (€ M)	307	298	208	3.0 %
EBITDA margin (%)	64.9	69.7	67.5	–6.8 %
Key figures - power transmission				
Km Constructed (km)	1,476	3,903	3,717	–62.18 %
Average availability factor (%)	99.40 %	99.50 %	99.10 %	–0.10 %
Key figures - solar				
Plants in operation (MW)	743	443	193	68 %
Plants under construction (MW)	910	1,060	930	–14 %
Production (MWh)	~990	~367	~160	~170 %
Key figures - desalination				
Installed capacity (ML)	675,000	375,000	315,000	80 %
Annual production (ML)	97,435	82,405	60,745	18.1 %
Key figures - cogeneration				
Installed electricity capacity (MWe)	70.56	70.56	70.56	0.00 %
Installed thermal capacity (MWt)	142.91	142.91	142.91	0.00 %
Annual electricity generation (MWh)	345,231.00	396,664.26	392,455.39	–12.97 %
Annual thermal power generation (MWh)	238,702.99	285,922.89	279,451.61	–16.51 %

Transmission lines

When compared with electrical systems as a whole (generation, transmission and distribution), power transmission infrastructures account for only a small percentage of total costs, both in terms of the initial investment and subsequent operation and maintenance costs. They are, however, a core element of the electricity system as a whole and promise much for the future.

Abengoa enjoys a strong international presence and a tried and tested track record in managing power transmission assets. It therefore has a bright future in store with huge growth opportunities to be had.

Abengoa's power transmission concessions are found in numerous countries, while the assets it manages are at different stages of maturity. At present, the company has 6,693 km of lines under concession spanning the length of Peru, Chile and Brazil. This year Abengoa has added 129 km to its project pipeline thanks to two new transmission line contracts awarded in Chile, which are already under construction, and a further 2,472 km owing to the three new power lines secured in Brazil.

Abengoa aims to cement its position of international leadership in power transmission concessions that contribute towards sustainable development. With this objective in mind, the company's power transmission division is chiefly engaged in the implementation and exploitation under concession of public and private electrical power transmission systems.

Abengoa's leadership as an international power transmission and distribution contractor affords it a major competitive edge in harnessing the wealth of opportunities to be had in power transmission concessions. This, coupled with its proven experience in line engineering and construction, has opened up huge opportunities in many different regions worldwide.

The main points underpinning Abengoa's strategy in power concessions are as follows:

- Maintaining its leadership in Latin America. The region remains critical to ongoing growth. Moreover, assets approaching maturity can be rotated, thus creating new investment opportunities.
- The United States remains a key objective given the obsolescence of existing transmission systems, the huge distance between power generation on the one hand and end consumption on the other, and the increasing presence of renewable energies within the energy mix.
- Asia. Due to the current shortage of much-needed electrical power infrastructures, the region is also an attractive target market.

In the first quarter of 2012, Abengoa reached an agreement with "Compañía Energética de Minas Gerais" (CEMIG), one of Brazil's leading electrical utilities, to sell 50 % of the joint venture, embracing four power transmission concessions relating to the STE, ATE I, ATE II and ATE III lines. Abengoa had already sold the first package of 50 % back in 2011 as part of the asset rotation strategy announced by the company, thus enabling it to make new investments to continue growing.

As part of this asset rotation strategy, the Chilean transmission lines (Abenor, Araucana and Huepil), in which Abengoa held a 20 % stake through Transam, were sold to the company Transelec Norte, S. A. at year-end.

Abengoa has a grand total of 6,693 km of transmission lines under concession, 1,476 km of which are already in operation in Brazil, Chile and Peru.

The following lines are also scheduled to enter into operation in the near future:

- In Brazil, the Manaus and Línea Verde lines, spanning a total of 586 and 987 km, respectively, ATE VIII covering 108 km, and Norte Brasil at 2,375 km.
- In Peru, the ATS line measuring 900 km and ATN2 at 132 km.
- In Chile, the two new lines spanning 129 km.

Detailed below are Abengoa's main concessions in the three countries where it operates:

Chile

Abengoa business remains strong in Chile and the company is a key player in the country's electricity market. The company expects to report sharp growth for the coming years based on its investments and market position.

Construction of a transmission tower (Chile)

Brazil

Abengoa remains heavily involved in the Brazilian power transmission market, with the following projects currently in operation:

- ATE IV: Aneel has awarded Abengoa a contract for the 30-year operation and maintenance under concession of the 85 km transmission line (TL) and four substations.
- ATE V: the company has secured a 30-year concession to operate and maintain the 132 km of 230 kV TL and substation.

- ATE VI: the contract envisages the 30-year operation and maintenance of the 230 kV TL and substation for Aneel. The transmission line spans a total of 131 km.
- ATE VII: the agreement involves the 30-year operation and maintenance under concession of the 230 kV TL and substation. The power transmission line is 115 km in length.

Peru

Abengoa continues to grow in the power transmission line market, with the following lines currently in operation:

- ATN: 220 kV high-voltage line and associated substations. The project embraces the design, supply and construction of the entire electricity system, plus operation and maintenance for a 30-year term. The project involves 570 km of 220 kV line, two new substations and upgrades to five existing substations.

Upcoming concessions

In 2012, construction work got under way on a direct current power line spanning 2,375 km in Brazil, while two transmission lines were awarded in Chile and construction continued on various lines in Peru.

Solar power

The enormous advantages offered by solar thermal power have driven the sector forward over recent years, with solar power currently providing a mature, profitable and efficient solution for power generation.

In this regard, the solar power market has continued to experience global growth over 2012, due in part to its expanding globalization and international expansion. Although certain countries with experience in the solar power market, such as Spain, have scaled down their growth plans, other countries with huge solar resource potential have taken up the mantle and are driving growth within the market. Countries such as South Africa, India, China and Saudi Arabia have been rolling out lofty plans to develop and promote renewable energies based on the concession of new projects and with specific capacity targets in place for both photovoltaic and solar thermal energy.

From a technological standpoint, rapid gains have been made in solar thermal power plants, with the aim invariably being to render them more efficient. The sector will therefore witness a gradual reduction in costs, allowing solar energy to compete in cost-terms with conventional power sources in the mid-term, while providing clean and safe generation. Thanks to these advances, solar energy is, and will continue to be, an optimal solution for power generation in both developed and emerging countries, while playing a central part in the energy mix of these countries.

Against this backdrop of fierce competition, Abengoa's technological innovation and flexibility in adapting to new regions allowed it, in 2012, to cement its position as an international benchmark within the solar power market.

Solar concessions at Abengoa are divided into the following lines of activity:

- Development of solar and hybrid power plants.
- Commercial operation of solar and hybrid power plants.

By constructing and commissioning new plants, ramping up its international presence in new markets and securing contracts in relation to new projects featuring groundbreaking technologies hitherto untested in a commercial environment, Abengoa has underscored its position of global leadership in the field of solar thermal power plants under concession.

Abengoa's solar business has power generation facilities and offices across the globe, covering a wide range of different regions:

- Europe: Spain and Italy.
- America: United States and Chile.
- Africa: Morocco, Algeria and South Africa.
- Asia: UAE, China and India.
- Oceania: Australia.

Solana

Although most of its plants are located in its two main markets, namely Spain and the United States, Abengoa is striving to expand internationally. Through this process of internationalization, Abengoa is not only spurring on the future growth of its concession-based solar power business, but is also diversifying its business, enabling it to reduce concentration risk, meaning the uncertainty associated with possible regulatory or market changes.

The company also focuses heavily on analyzing and developing potential new markets, working actively with local governments in preparing new development plans for solar power and offering them its many years of experience in plant development.

Moreover, our commitment to diversification and technological innovation means we can swiftly adapt to the conditions and requirements of new markets while offering bespoke solutions that optimize solar-based power generation in each region.

Abengoa's solar business continued to meet its targets over the course of 2012 while cementing its global leadership in installed solar technology capacity. Abengoa currently has 19 solar power plants in commercial operation.

All plants operating commercially (2 power tower plants, 4 parabolic trough plants, 5 photovoltaic plants and 1 hybrid plant) have reported high levels of efficiency, while actual production is exceeding the production levels estimated prior to construction. A total of seven new plants were also commissioned in 2012.

Looking ahead to 2013, Abengoa's solar business will focus its efforts on reaching a number of international milestones:

- Ongoing construction of its international projects in South Africa and the United States.
- Operational start-up of the Shams-1 plant in the United Arab Emirates and the Solana facility in the United States.
- Expanding the project pipeline by bidding on new business opportunities in emerging markets.

Solar power concessions at Abengoa are divided into the following lines of activity:

- Development of solar and hybrid power plants.
  This area includes activities such as prospecting ideal locations for solar plants, carrying out the necessary administrative formalities to proceed with construction, negotiating project financing and construction agreements and, when needed, identifying potential partners and reaching agreements with the same. These steps are invariably followed, whether in the case of solar plants that generate electricity, hybrid plants that harness sunlight along with a conventional energy source, or industrial plants that generate heat for commercial and industrial uses.
- Commercial operation:
  The solar power plants developed by Abengoa sell their electricity under long-term concession-based agreements. Optimal operation and maintenance of these plants is key to locking in or even enhancing the projected returns from the plants, while the company's experience in carrying out this crucial work enables it to make technological improvements to future plants. Moreover, the sheer number of commercial plants currently in operation has allowed Abengoa to harness synergies between the different facilities, thus increasing their operational efficiency further.

Solúcar platform

At year-end 2012, Abengoa had a total of 743 MW in operation and a further 910 MW under construction in different regions worldwide:

Spain

During 2012, the company gained further experience in operating the two main solar thermal technologies: power tower and parabolic trough.

In terms of power tower technology, we already have over five years of experience operating the PS10 plant, the world's first commercial plant, and more than three years operating the PS20, both located at the Solúcar Platform in Sanlúcar la Mayor, Seville (Spain). The PS10 facility generates clean energy to meet the needs of 5,500 households, thus helping to cut annual CO_2 emissions by 6,000 t, whereas the PS20 plant generates enough electricity to power 10,000 households while helping to slash annual CO_2 emissions by 12,000 t.

PS20

Shifting our attention to parabolic trough plants, 550 MW have entered commercial operation at a number of different solar platforms in Spain, with 11 plants now utilizing this technology. Each of these parabolic trough plants generates enough electricity to meet the yearly power needs of 26,000 households while helping to cut annual CO_2 emissions by 31,400 t.

One of the main advantages of the company operating and maintaining a large number of plants is that it helps to lower operation and maintenance costs due to the synergies, warehouse management and maintenance agreements with manufacturers, and training of highly skilled personnel. Furthermore, benchmarking can be conducted, thus helping to pinpoint things that can be improved on and develop optimal operating strategies.

At the Solúcar Platform, the first three parabolic trough plants to have been brought into commercial operation by Abengoa have been operating successfully since 2010. These facilities are providing considerable value-added, as operating them on a daily basis has proved to be a continual learning process and has generated a wealth of valuable experience that can be used when designing new plants and operating methods, and also when developing specific operational support components, thus confirming Abengoa's position of technological leadership within the sector.

In addition, Spain has a further four solar platforms featuring parabolic trough plants, three of them in collaboration with leading international partners: Eon, JGC and ITOCHU.

These plants are located at the Écija Solar Platform, with the first of its two plants operational since 2011 and the second since 2012, and at the El Carpio, Solar Extremadura and Solar Castilla-La Mancha Platforms, also operational since 2012. All these plants have been operating commercially for several months at least, reporting very promising results in terms of power output. The success of these new arrivals has been made possible thanks to the experience Abengoa has built up over the years.

Extremadura platform

Algeria

Algeria

Abengoa has been consolidating operations at the 150 MW Hassi R'Mel hybrid combined cycle facility with solar field in Algeria, which is celebrating its first year in commercial operation.

Upcoming concessions

Looking ahead to 2013, the Solana (Arizona, United States) and Shams-1 (located in the desert of Abu Dhabi) are expected to enter operation, with both to become part of Abengoa's infrastructure under concession line of business, illustrating once again the company's drive towards diversifying and internationalizing its business. In the coming years, the company intends to continue expanding its concession-based business internationally with the Mojave Solar project, in California, United States, and Khi Solar and Kaxu Solar in South Africa. All these plants are currently under construction.

Desalination

The world is facing a major challenge in terms of water, which is materializing on two fronts:

- Water shortage, which is reaching alarming levels and is exacerbated further by a lack of water treatment facilities.
- Industry consumes huge volumes of water and depends heavily on this resource to function smoothly, meaning water management is now critical for its ongoing survival.

The global economic crisis facing us now is making the situation even more complicated. The world needs major investments to upgrade existing facilities and develop new water infrastructures to help correct or mitigate existing water shortage and contamination problems. However, countries and governments lack the financial resources needed to tackle this problem effectively and in many cases we cannot wait any longer. This opens up a huge market opportunity for the private sector wishing to invest in water, as public-private partnerships can be used to construct the required water infrastructures with private capital, which are then operated under a concession agreement.

Abengoa is engaged in the promotion, development and operation of water treatment plants and seeks to consolidate its international leadership in the desalination plant business by managing company-owned assets and expanding water treatment and reuse business and industrial outsourcing.

Abengoa focuses primarily on the international stage and is present on four continents. 30 % of its employees can be found at its offices in Seville and Madrid, while 70 % work at company offices in the United States (Harlingen and Austin, Texas), China (Beijing and Dalian), the United Arab Emirates (Abu Dhabi) and at the offices of concessionaire companies and projects in Skikda, Tenes and Honaine (Algeria), Chennai (India), Qingdao (China) and Accra (Ghana).

Looking ahead to the future, Abengoa intends to center on concession-based wastewater treatment and regeneration plants for reuse, a market offering tremendous potential as water reuse will become an integral part of the solution to the water quantity and quality problems facing the planet.

The industrial water sector is another key future market, in which Abengoa strategy is to rely on a services-oriented business model, enabling industrial plants and factories to outsource their water operations (industrial outsourcing).

R&D investment in water treatment technologies is a key aspect of Abengoa's strategy. Over the course of 2012, Abengoa invested €5 M into a total of 30 different R&D+i projects so as not to lose grip of its technological leadership in desalination plants and to open up new business opportunities.

Abengoa business in the water desalination market is articulated through four divisions:

- Water treatment plants under concession: development and management of seawater and brackish water assets under concession.
- Operation and maintenance of desalination and wastewater plants.
- Water treatment solutions: design engineering, specification and EPC monitoring in desalination projects.
- Developing new technologies through the company's R&D department.

Algeria

Skikda: the Skikda desalination plant, with a capacity of 100,000 m³/day and in operation and maintenance since 2009, produced 100 million cubic meters of desalinated water in 2012.

Honaine: following provisional acceptance, the plant was brought on-line on July 12 and has continued production since then. The facility boasts a capacity of 200,000 m³/day and is currently Abengoa's largest desalination plant in operation.

Honaine, Algeria

Ténès. Abengoa has resumed construction of the Tenes desalination plant after various months of stoppage for reasons beyond the company's control. The plant will have a capacity of 200,000 m³/day. Operation and maintenance of the facility is scheduled for summer 2014.

View of the Ténès desalination plant, Algeria

India

The Chennai desalination plant, with a capacity of 100,000 m³/day, has been producing water since 2010 and is the first plant to have been developed in India under a project finance framework.

Spain

Production at the desalination plants in Almeria and Cartagena, with a capacity of 50,000 m³/day and 65,000 m³/day, respectively, is continuing to meet our expectations. The operation and maintenance period is 25 years for the former and 15 for the latter.

Desalination plant in Cartagena

Ghana

In November 2012, Abengoa started construction of the Nungua desalination plant in Ghana. The desalination plant will require an investment of $125 M and will have a desalination capacity of 60,000 m³/day. Work is expected to last approximately 24 months, during which time roughly 400 direct and indirect jobs will be created.

China

In March, we were invited to take part in the official ceremony organized by the Dalian local authorities to celebrate the laying of the cornerstone of what is set to become one of China's largest industrial hubs, to be constructed at the new petrochemical park on Xizhong island. Abengoa, signed a collaboration agreement to construct water treatment plants to supply local industry.

In May, Abengoa signed a memorandum of understanding (MoU) in Madrid with the Qingdao authorities, to sign a bilateral agreement to collaborate on wastewater regeneration and reuse projects.

United States

In the United States, Abengoa has been awarded the feasibility and preliminary engineering study for a drinking water nanofiltration plant.

Abengoa Water has also signed an agreement to develop solutions for the treatment and reuse of water used in the shale gas extraction process.

Abengoa also gave an address before the Natural Resources Committee of the Texas House of Representatives, highlighting its leadership in the Texas desalination market.

Cogeneration and other concessions

The cogeneration market in Spain is facing a difficult situation, due firstly to a slow-down in business over recent years and secondly to the enactment of the new energy reforms, which will most likely cause the market to shrink further. That said, Europe as a whole and Latin America are becoming increasingly aware of the value of efficient technologies capable of generating significant cost savings and boosting industrial competitiveness, a must in these times of crisis. Abengoa therefore expects to see large-scale development of cogeneration facilities in these regions over the coming years, especially in terms of large cogeneration facilities attached to refineries or chemical plants (heavy energy consumers).

At present, Abengoa has cogeneration plants in Spain and Mexico with an installed capacity of 400 MW, with the optimal management of these assets becoming the main mission of this business line. We might define Abengoa's vision in this area as setting itself up as an international benchmark in managing concession-based cogeneration plants safely, reliably and efficiently.

Cogeneration generates electricity and high-temperature heat simultaneously, both of which are used in industrial processes; an energy-efficient solution being spearheaded by Abengoa. Heat and electricity are therefore generated from biomass, natural gas or industrial waste for subsequent use in industrial processes, with the surplus sold to the grid.

São Luiz cogeneration plant in Pirassununga, Brazil

Abengoa has also been active in the wind power market by constructing and operating numerous wind farms in Uruguay and Brazil.

The company is also involved in concession-based custom construction projects, such as hospitals, courthouses and cultural centers.

Abengoa operates the following installations:

- Cogeneración Villaricos, S. A. (Covisa), Enernova Ayamonte, S. A. (Enernova) and Aprovechamientos Energéticos Furesa, S. A. (Aprofursa). These companies generate electrical power while using the heat to produce water or steam. The electricity is then sold, while the heat is used by the host industry.
- Procesos Ecológicos Vilches: company specializing in the recycling of livestock waste to produce fertilizer and electrical power through a purine treatment plant (pig waste, mixed excrement, urine, water, leftover animal feed and other foreign bodies), combined with an electrical power cogeneration plant.
- The Centro Cultural Mexiquense de Oriente (CCMO) cultural center, Abengoa's first concession in Mexico. The complex, with an operational term of 20 years, sits on 17 ha of land and boasts 35,000 m² of museums, libraries, workshop modules with over 60 classrooms intended for a range of different art-related subjects, an administrative building, auditoriums, an open-air theater, a concert hall with seating for 1,200 people, a cafeteria, a restaurant and parking spaces for over 1,000 vehicles.
- Irrigation zone of the Navarra Canal. The intention with this concession is to recover investment by levying an irrigation charge.
- Cerrato hydroelectric power plant on the Pisuerga river and mini-stations along the Canal de Aragón y Cataluña irrigation canal. Toe-of-dam, run-of-river and diversion plants in northern Spain. Investment here is recovered by selling the electricity generated by the plants.
- Hospital Costa del Sol (Malaga): the contract envisages the 40-year operation of the hospital building and underground parking lot. The hospital building has a floor area of 31,200 m², while the parking lot occupies 25,500 m² (960 spaces).
- Hospital del Tajo (Aranjuez, Madrid): the contract envisions the exploitation (management and maintenance) of the hospital for a 30-year term. Gross surface area amounts to 58,000 m².
- Court buildings: Abengoa owns surface rights to construct and maintain the courthouses at Olot, Cerdanyola and Santa Coloma de Gramanet, and to operate the buildings through a lease with the regional government of Catalonia.

Upcoming concessions

In 2012, construction got under way on the El Zapotillo aqueduct (Mexico), the Peralta wind farm (Uruguay) and three wind farms in Brazil.

Construction of the cogeneration plant in Tabasco (Mexico)

06.3

Industrial production

Abengoa has created this line of business to group together its technology-heavy businesses, such as biofuels, industrial waste recycling, hydrogen technologies, ocean energy, energy crops and the development of solar technology. In these businesses, the company enjoys a strong position of leadership in the geographic markets where it operates.

	2012	2011	2010	Chg. 12-11 (%)
Key figures - financial				
Revenue (€ M)	2,798	2,855	2,250	–2.0 %
EBITDA (€ M)	215	273	345	–21.2 %
EBITDA margin (%)	7.7	9.6	15.3	–19.8 %
Key figures - bioenergy				
Installed capacity (ML)	3,175	3,175	3,140	0
Annual production (ML)	2,289	2,758	2,341	–17 %
Key figures - recycling				
Installed capacity (Mt)*	1.6	1.5	1.5	6.7
Waste managed (Mt)	2.2	2.2	2.2	3.8

* Includes installed capacity in steel, aluminium and sulfur valorization businesses.

Bioenergy

Abengoa´s bioenergy business intends to cement its position of leadership in the biofuel sector while developing sustainable solutions for the transportation sector and bioproducts from biomass. The company is currently focused on developing technologies for producing second-generation biofuels from lignocellulosic biomass, especially bioethanol via enzymatic hydrolysis and gasification and catalytic synthesis of alcohols, and also on obtaining high value-added bioproducts.

New regulations in the United States and the European Union now require the biofuel industry to meet strict sustainability criteria. The regulations are intended to bring about a reduction in greenhouse gas emissions generated during the biofuel life cycle and also guarantee the origin of the feedstocks used to produce them.

In response to legal requirements, which govern both first and second-generation biofuels, Abengoa has implemented greenhouse gas (GHG) emission accounting and verification systems as well as feedstock certification systems to differentiate between biofuels that are sustainable and those that should be disregarded, as part of the ongoing fight against climate change.

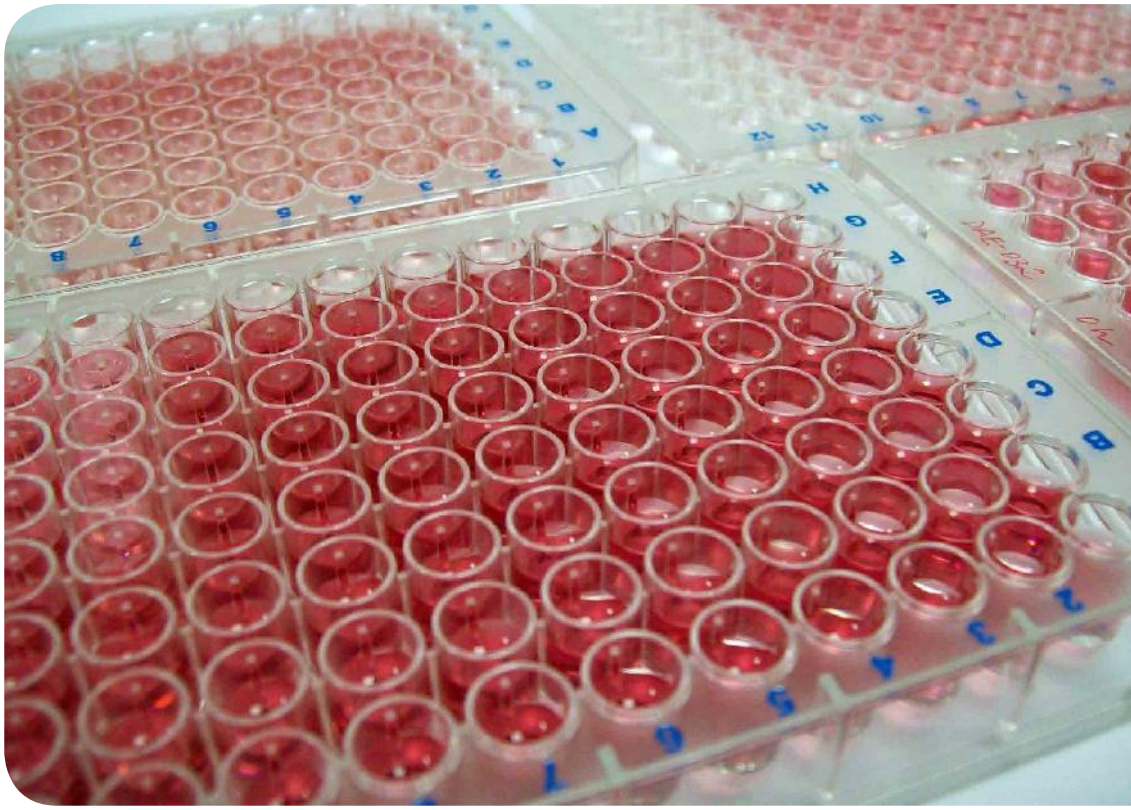
In relation to second-generation biofuels, the development of enzymatic hydrolysis technology has enabled us to convert agricultural waste, wood waste and other potential energy crops into ethanol, without upsetting the ecological balance or the food chain. At the same time, second-generation biofuels are very effective at cutting emissions in comparison to the fossil fuels they are replacing.

In the field of bioenergy, Abengoa's business mission centers on the following activities so as to reap the greatest returns for its stakeholders, industry and society at large:

- Fostering the sustainable development of the transportation fuel market while developing biochemical products through the use of renewable feedstocks and environmentally-friendly technologies that help curb carbon emissions while cushioning the environmental impact.
- Developing innovative technological solutions through continuous investment in R&D, leading to more efficient production processes, diversification of feedstocks and the manufacture of new products.
- Creating value for shareholders by focusing business on the creation of profitable and sustainable technological solutions.
- Promoting the personal and professional development of its employees through continuous training and setting up and overseeing customized development targets and plans.

In the field of biofuels, Abengoa is involved in the energy sector and in industrial production. It develops transport biofuels, bioethanol and biodiesel, among others, as well as chemical bioproducts that employ biomass (cereal grains, sugarcane, cellulosic biomass and oleaginous seeds) as feedstock. Biofuels are used to produce ETBE (a gasoline additive), or for direct blending with gasoline or diesel. Abengoa is also developing new biofuels (jet kerosene and biodiesel from sugars). The chemical bioproducts will be identical to those currently produced by the petrochemical industry in terms of functionality, but will be more sustainable and are intended for immediate replacement of existing products.

Laboratory enzyme trials



In the bioenergy sector, Abengoa boasts operations in five countries across three continents. It currently owns fourteen plants for producing bioethanol and other process-related co-products, along with a biodiesel production plant, distributed as follows:

- Europe: Spain, France and Holland.
- United States.
- Brazil.

These plants cater to the demands of global bioethanol markets from practically any corner of the world. Most sales are made in countries where the bioenergy is currently produced, although sales are also made in other countries and regions, including Germany, the United Kingdom, scandinavian countries and Italy.

Tokyo - ship exporting bioethanol from Europe

With a view to using new raw materials as sources of carbon, the company's efforts focus on enzymatic hydrolysis and catalysis processes.

Enzymatic hydrolysis technology is one of the core areas on which Abengoa is centering its technological development work. The main objective being pursued is to produce bioethanol from lignocellulosic inputs, chiefly different kinds of cereal straw and herbaceous crops.

In order to develop this technology further, Abengoa is constructing the first commercial biomass-to-bioethanol plant in Hugoton (Kansas, United States). The project has been made possible thanks to the company's knowledge of the processes involved and its years of experience in operating and resolving issues with the York pilot plant (United States) and the BCyL demonstration plant (Spain).

In the field of catalysis, the company is working on the technology needed to convert ethanol into high value-added products, such as butanol.

Biomass-to-ethanol demonstration plant in Babilafuente, Salamanca

Abengoa has developed a groundbreaking technology allowing for the catalytic production of n-biobutanol from the bioethanol produced at first-generation plants.

Abengoa is also involved in the Waste to Biofuels project. The aim of this project is to develop a one-stop solution for managing municipal solid waste (MSW). On the one hand, this will allow more waste fractions to be used by converting agricultural waste sugars into biofuels and energy, while on the other it will provide a more sustainable and efficient alternative to final disposal of waste at landfill sites.

Projects by region and key achievements

Abengoa is Europe's leading biofuel producer (with a production capacity of 1,500 ML) and one of the main producers in the United States (1,440 ML) and Brazil (235 ML), with a grand total of 3,175 ML of installed production capacity distributed between 14 plants operating in five countries across three continents.

Europe

In relation to second-generation biofuels, Abengoa started up its BCyL biomass plant in 2009, the world's first commercial-scale demonstration plant, capable of producing ethanol from biomass continuously through enzymatic hydrolysis technology.

Ongoing operation of the plant has proved that the technology is technically and economically viable and has allowed the company to streamline and optimize the production process.

United States

The US Environmental Protection Agency (EPA) has authorized the North American subsidiary of Abengoa Bioenergía to produce E15 (15 % ethanol and 85 % gasoline), the new blend of fuel available for cars and trucks built from 2011 onward. The current US administration has set the objective of helping service station owners install 10,000 pumps for the new fuel over the coming five years.

Night-time shot of the Abengoa Bioenergy of Indiana plant at Mount Vernon (United States)

Brazil

The Brazilian National Development Bank has chosen Abengoa to develop second-generation ethanol and biobutanol from sugarcane biomass, utilizing both the straw and the bagasse. The company will be responsible for implementing the technology required to carry out the project and for carrying out the engineering work to construct a plant capable of producing 100 ML of second-generation ethanol a year.

Laboratory trials of new products

In 2012, Abengoa's bioenergy arm embarked on a far-reaching process to create value for its shareholders. The company has identified opportunities that will enable it shortly to diversify bioproducts further and manufacture compounds and biofuels with improved value-added, thus generating greater environmental benefits and rewards.

The main objectives for 2013 and successive years are to press on with the commercial development and implementation of new products, which will be used over the coming years as a sustainable and competitive replacement for a large part of existing oil-based products. The company also intends to develop new business lines to valorize existing assets and continue with its policy of conducting business in line with best practices in risk management and process efficiency, making sustainability its upmost priority.

Recycling

Against an economic backdrop of financial instability in Spain and other European countries, Abengoa has managed to steer a steady path in its recycling business thanks to its well-diversified business activities and strong international presence.

The steel waste recycling business is currently the European market leader in the recycling of zinc waste, providing the steel industry with a high value-added environmental service.

Turning our attention to aluminum waste recycling, Abengoa has developed a one-stop recycling model that has made it a benchmark within the market and the company currently leads its European competitors in the treatment of salt slag.

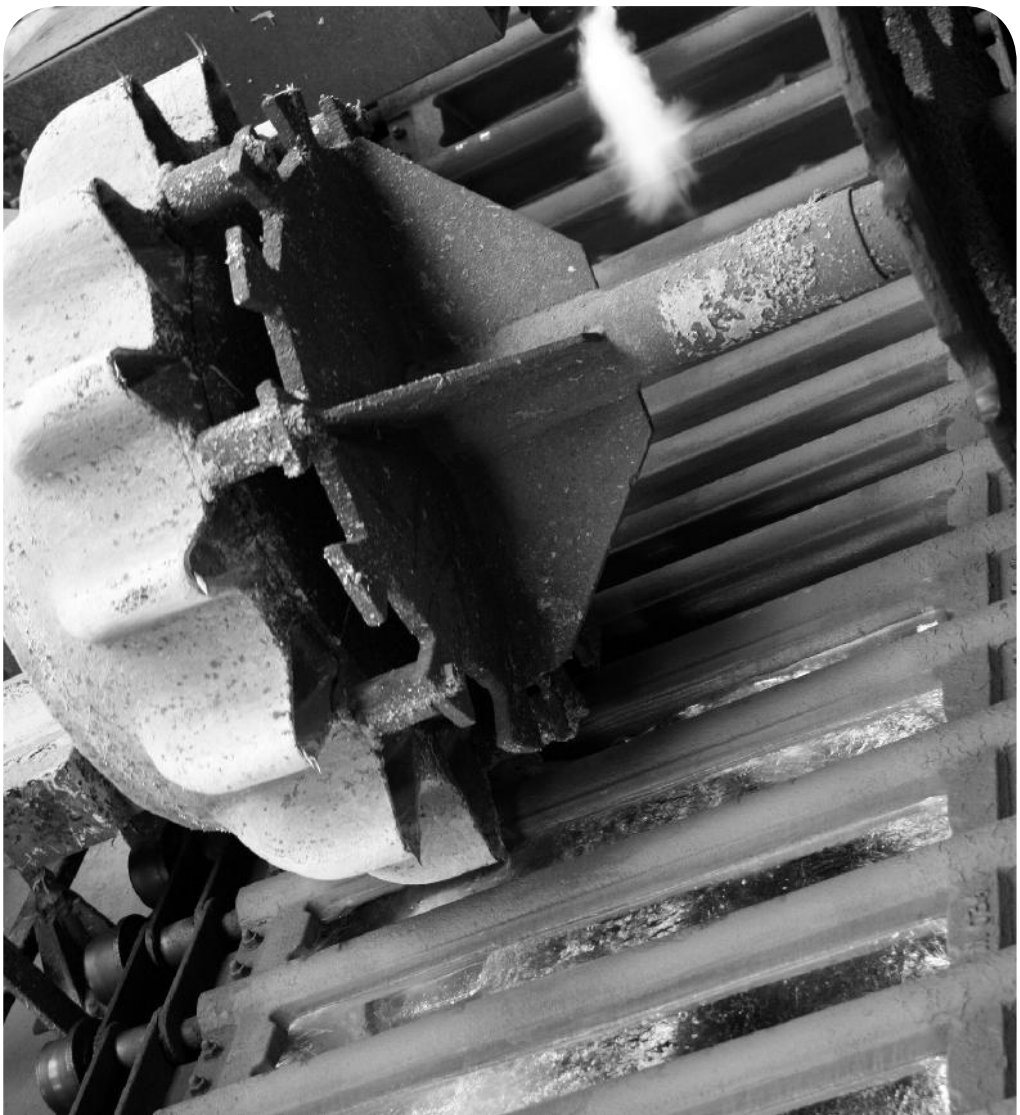
The industrial waste recycling business in Spain has been hit hard by shrinking waste generation brought on by the crisis.

Abengoa's mission is to provide technologically groundbreaking solutions in the recycling of industrial waste, thus contributing towards a more sustainable world. The company also aspires to become an international market leader in the recycling and management of industrial waste across its different lines of business.

This unflinching commitment is reflected in its lines of business:

- Galvanization and steel waste recycling: Recycling of common electric arc furnace steel dust. Recycling of stainless steel dust. Valorization of zinc waste produced from the galvanization process.
- Aluminum, salt slag and SPL recycling.

Aluminum pig



- Industrial waste management:
  - Spain
    - Full management of hazardous and non-hazardous industrial waste.
    - Industrial cleaning.
    - Soil management and decontamination.
    - Manufacture of low-density polyethylene pellets by recycling the film used for greenhouse coverings.
    - Collection, transportation and disposal of transformers, condensers and PCB-contaminated (polychlorinated biphenyl) materials.
    - Recovery and valorization of residual sulfur from the petrochemical industry for energy uses.

Industrial waste management facilities at Nerva (Spain)

  - Latin America
    - Transport, inertization, final disposal and incineration of industrial waste.
    - Physicochemical treatment of aqueous waste.
    - Recovery and distillation of solvents.
    - On-site industrial cleaning.
- Waste to Biofuels (W2B)
  - Using organic material and plastics taken from municipal solid waste to produce bioethanol and biodiesel, respectively.

Abengoa currently has a strong international presence, carrying out its industrial waste recycling business at more than thirty facilities across twelve countries.

Abengoa manages, through the business units described below, over 2.2 Mt of waste, using more than 1.3 Mt of this in the production of new materials through recycling processes.

Steel and galvanization waste recycling business

Over the course of 2012, the company treated more than 532,684 t of common steel dust in Europe and Turkey and over 123,618 t of stainless steel dust, recovering the material to create high-value metals such as nickel and chrome.

Aerial view of Abengoa facilities at Duisburg (Germany)

From this volume the company obtained more than 188,314 t of Waelz oxide, very much on par with the amount produced in 2011. In tandem, the stainless steel dust recycling plants produced more than 61,882 t of nickel, chrome and other alloys, 56.6 % up on the figure for 2011.

The steel waste recycling division witnessed numerous milestones over the course of the year. In May 2012, the company's Waelz oxide leaching plant at Gravelines (France) entered into operation. The facility has been designed with a nominal treatment capacity of 100,000 t/year, enough to meet the future leaching needs for the Waelz oxide produced by plants in Germany and France.

Unveiling of the new Waelz oxide leaching plant at Gravelines (France)

In July 2012, Abengoa signed a commitment agreement with the Investment Support and Promotion Agency of the Turkish Ministry of the Presidency (ISPAT) to invest $120 M through a joint venture with the Canadian firm Silvermet Inc., the aim being to construct two new steel dust recycling plants in the regions of Adana and Izmir (Turkey), each to have a treatment capacity of 110,000 t.

Waelz furnace at Abengoa facilities in Iskenderun (Turkey)

As part of this growth strategy, an agreement was reached in September 2012 to acquire 55 % of the South Korean company Hankook R&M Co. Ltd. (HRM), which specializes in steel dust recycling. The company is constructing a plant in the city of Gyeongju, in the south-east of the country, with sufficient capacity to treat 110,000 t of steel dust produced by the main steel mills operating in the region. The new plant, which is scheduled to commence operations in the first quarter of 2013, will be operated by Abengoa and will feature technology developed and patented by Abengoa.

Lastly, and to better exploit existing synergies, August 2012 witnessed the administrative merging of the Befesa Zinc Amorebieta and Befesa Zinc Sondika plants, with the name of the resulting company becoming Befesa Zinc Óxido, S. A.

Construction work is set to start in 2013 on two steel dust recycling facilities in Turkey. The new steel dust recycling plant in South Korea will also be completed in 2013.

Aluminum, salt slag and SPL waste recycling

The company carries out the one-stop collection, transportation and recovery of aluminum waste and scrap, producing and selling secondary aluminum alloys and helping in particular to lower CO_2 emissions.

Aluminum bars

Abengoa has the capacity to treat 160,000 t/year of aluminum waste at two plants and 630,000 t/year of salt slag and SPL at five different plants.

The technology division specializes in the design, construction, assembly and start-up of plants and facilities for the aluminum industry. Its flagship products include automated lines for producing 5-25 kg aluminum ingots, casting wheels, rotary ovens, coolers and equipment for treating slag.

Within the aluminum, salt slag and SPL recycling business, the main highlight in 2012 was the closure of the aluminum alloy manufacturing section at the Valladolid plant and the resulting migration of production to the Erandio and Les Franqueses production centers, the aim being to make further gains in both efficiency and production.

Industrial waste recycling

Spain

Within this line of business, Abengoa carries out mechanical and chemical cleaning work, catalyzer and exchanger extraction, management of industrial waste (hazardous and non-hazardous), physicochemical treatment and inertization and stabilization treatments, as well as soil management and decontamination.

On-site cleaning of heat exchangers

The sulfur valorization business processed 58,941 t of sulfur over the year, producing 177,520 t of sulfuric acid.

In the plastics recycling business, Abengoa manufactures low-density polyethylene pellets by recycling the film used to cover greenhouses.

The company has been busy within the industrial waste recycling business in Spain, with highlights including the preoperational cleaning of the Solacor, Solaben and Helios solar power plants in Spain and the Shams-1 solar power plant in Abu Dhabi.

In addition, the new sulfur valorization plant at the Port of Bilbao was unveiled on October 17. The facility has the capacity to treat 120,000 t of sulfur to produce 350,000 t of sulfuric acid and oleum, enough to generate roughly 90,000 MWh of associated electricity each year. This new plant makes huge environmental inroads across the board, as it features highly efficient state-of-the-art technologies, many considered best available techniques according to BREF reference documents.

Latin America

In Argentina, the incineration business unit reported an 100 % year-on-year gain in the number of tons treated, while final waste disposal witnessed an increase of 4 %.

In Chile, the company managed 17,553 t of waste at its facilities in Sierra Gorda, 120 km from Antofagasta.

In Peru, 30,540 t of industrial waste were treated over the course of 2012.

Last but not least, waste treated in Mexico during 2012 amounted to 14,211 t.

Waste to Biofuels (W2B)

W2B technology involves obtaining energy from municipal solid waste (MSW) through fermentation and enzymatic hydrolysis treatment. This solution is not restricted to the treatment of the organic fraction of MSW, but also embraces all the other components, including those that can and those that cannot be recycled, along with other plastics, through the use of pyrolysis technologies to obtain biodiesel and energy valorization approaches to generate steam and electrical power.

Solar power

Since its inception, Abengoa´s solar business has acquired a wealth of experience along the different stages of the value chain within the solar thermal business and, by extension, within the industrial production segment.

PS20 heliostat field

Abengoa market leadership should enable us to offer the most competitive prices for solar power generation via our projects, while helping us to monetize investments in R&D+i by harnessing the growth of third-party businesses.

Abengoa´s solar business focuses its industrial production activity on:

- Marketing and supplying key components for our plants and third-party facilities. This is the case, for example, with our parabolic troughs, our troughs for industrial applications, our mirrors for parabolic trough and power tower plants, and our modules and systems for high concentration photovoltaic applications.
- Designing new solar thermal and photovoltaic components and technologies and defining future marketing strategies.
- Developing and honing operation and maintenance equipment.

Developing new technologies and components, which can be applied to the company's own plants and also sold to third parties, is one of the segments in which Abengoa´s solar business is basing the future growth of the business.

Thanks to its status as the world's leading company in terms of concentrating solar power in operation, Abengoa has built up a wealth of knowledge in plant operation and maintenance, enabling it to make groundbreaking improvements to plant design and operating methods. These advances, coupled with its heavy commitment to R&D+i, have made Abengoa a unique company capable of offering new tried and tested technological components that are highly efficient and competitive. The company is also able to generate added value by selling its "expert knowledge" on to third parties.

Significant milestones in industrial production for 2012 included:

- E2. New generation of parabolic trough structure.
  During 2012, Abengoa developed a new generation of parabolic trough, called E2.2, a major advance on the first generation of E2, which was in turn preceded by the ASTRO trough. This new generation features design improvements that allow for a more efficient installation and improved operational performance.
  The E2 trough is made up of between ten and twelve modules measuring twelve meters in length with approximately six meters of aperture area. The structure comprises tubular steel bars arranged into triangles, enabling it to resist the force generated by the wind blowing against the mirrors. This new design allows the force applied from the weight of the trough to pass through the structure's center of gravity, meaning that no internal torque is generated other than that produced by normal wind action.
- ASUP 140. Development of a new generation of heliostat.
  As a result of the ongoing drive to lower power generating costs, 2012 saw Abengoa unveil the new ASUP 140 heliostat. This model, based on the SL120 heliostat, offers a series of innovative features that combine to lower the costs of a solar field by approximately 30 %. In addition to these cost savings, the new design provides complete protection against rust and wear and improved mechanical resistance. Moreover, the hydraulic tracking system provides unrivalled precision and reliability, coupled with average annual availability of over 99 %. The new heliostat has been designed to use a new concept of facet, which combines a 2 mm sheet of glass with a foam support. The result is a solar field with reflectivity levels of over 95 %.
  The ASUP 140 has been validated through an exhaustive process that included wind tunnel testing, structural and optical trials and prototype field operation at the Solúcar Solar Platform.
  The new heliostat will be installed commercially at the Khi Solar 1 plant, our first 50 MW facility to employ superheated steam power tower technology in South Africa.

ASUP 140 heliostat

- Condor. New portable reflectometer for solar field characterization.
  The Condor is a groundbreaking device developed by Abengoa to measure reflectivity, offering operators a highly reliable means of characterizing reflectivity at solar fields.
  Covering six different wave lengths, the Condor is able to characterize all the states that a mirror can experience at a solar thermal power plant, while offering similar levels of precision along the entire reflectancy range. The Condor also offers excellent outdoor performance under very hot conditions with high levels of solar irradiation. Reliable and proper solar field characterization can help optimize cleaning work and, therefore, increase the plant's power generation.
  The company sold more than twenty Condor devices in 2012 and also staged a number of training sessions on how to use the equipment at the different solar platforms.

Condor reflectometer

- Cleaning truck.
  Abengoa and a specialist partner have continued to hone the design of the parabolic trough mirror cleaning vehicle. The truck has helped to streamline solar field maintenance work, while also shortening working shifts and reducing water consumption and the number of operators needed to carry out the maintenance work. This has brought about a marked increase in the performance of the solar field by reducing the resources needed to operate it.
  The main features of the vehicle include two cleaning arms, each controllable independently and with a 180 º operating range, thus enabling the operators to clean the entire reflective surface.
  Over 2012, Abengoa worked through its industrial partner on selling the vehicle to both the company's own plants and third-party plants, with over ten units supplied to different facilities.

Parabolic trough cleaning truck

- High concentration photovoltaic technology (HCPV).
  Abengoa has developed a new generation of high concentration photovoltaic technology that is proving enormously more efficient and much cheaper to install than its predecessor. This new photovoltaic technology offers a range of advantages, of which we would highlight:
  - The silicon has been replaced with a combination of semiconductors to increase cell efficiency by over 40 % and enhance cell performance under extreme climatic conditions.
  - High associated efficiency of over 30 % per module.

Abengoa has already conducted tests confirming the efficiency of the technology by installing three pilot plants at Puertollano with a combined total of 300 kW, meaning the technology is now optimally positioned for a marketing drive over the coming years.

New generation HCPV tracker

Included below are the key industrial production figures for 2012:

- The company supplied over 1,300,000 parabolic trough mirrors over the course of 2012, both within Spain -to plants operating at the Extremadura Solar Platform- and abroad -to the Solana and Mojave plants currently under construction in the United States, and to the Aguas Prietas facility in Mexico, as well as to other companies such as Lanco and Abhijeet in India.
- The company supplied more than 2,000 parabolic troughs of the different models currently on sale, including ASTRO and E2, to the plants operating at the Extremadura Solar Platform, to Aguas Prietas in Mexico, and to the Solana and Mojave plants in the United States.

E2 trough in place at the Solana solar field

The company supplied facilities in Chile, Brazil, Canada and the United States with parabolic troughs for industrial applications, totaling over 10 MW. Abengoa Solar, with the collaboration of Abengoa Chile, has designed, engineered and supplied parabolic troughs for the world's largest industrial solar steam complex and the first commercial solar thermal facility in Latin America. The plant is located in Antofagasta, Chile, and has a thermal capacity of 10 MW. Abengoa has also supplied troughs for a hot water installation on the premises of Kraft Foods in Brazil; for a small demonstration plant at Red River College of Applied Arts, Science and Technology in Winnipeg, Canada, with the plant up and running since July; and for two small 40 kW facilities at the premises of Cummins Power Generation in both Fridley and Shoreview, Minnesota.

Industrial parabolic trough

Turning our attention to operation and maintenance equipment, Abengoa supplied roughly 20 Condor reflectometers to different plants within Spain and abroad, while also carrying out a technology transfer to the Spanish National Center for Renewable Energies (CENER) and another to the National Renewable Energy Laboratory (NREL) in the United States. Ten mirror cleaning vehicles were also sold to various parabolic trough plants.

In addition, Abengoa supplied the final four trackers to complete the installation of sixteen high concentration photovoltaic trackers at the Spanish Institute for Concentration Photovoltaics Systems (ISFOC), while also supplying trackers for pilot plants in Asia, the Middle East and South America.

Our progress made with proprietary technology has also enabled us to continue cutting generation costs and to monetize our investments in R&D+i through technology transfers to third parties for the construction of solar power plants. We are confident that this line of business will continue to generate significant revenue for the company over the coming years on the back of our proactive management of our technologies portfolio, which already features a number of new developments, coupled with a solid industrial protection strategy.

Last but not least, the company has reached a total of 743 MW in operation, a figure that will continue to grow over 2013 following the operational start-up of some of the 910 MW currently under construction. For this reason, streamlining the operation and maintenance of our plants is key to the success of the solar power business.

Since 2007, when our first commercial plant, PS10, was commissioned, and thanks to the steady start-up over the years of new solar power plants, embracing both power tower and parabolic trough technologies, we have been able to gradually optimize both plant start-up and operation and maintenance, responding well to what has become a very demanding process. Abengoa has implemented a standardized plant operation monitoring system, allowing us to track changes in key plant operating figures and carry out benchmarking. The company has also been harnessing synergies, enabling us to group plants together at solar platforms, or as part of large-scale international complexes. With the goal being continuous improvement and to learn from past experiences, Abengoa has rolled out training programs in O&M and on how to capitalize experience so that our operators can tackle the operation and maintenance of new plants with greater likelihood of success.

Abengoa will remain committed to innovation in 2013, specifically in those technologies flagged as key, with a view to keeping ahead of its competitors, while also lowering costs and making its technologies more efficient. It also intends to channel much of its resources into expanding its portfolio of components by seeking out new technological partners and strategic alliances with leading companies and institutions, shaping marketing strategies for its current portfolio of technologies and in development, and securing protection for its intellectual property, thus helping to ensure the ongoing technological and commercial leadership of Abengoa.

Hydrogen, energy crops and ocean energy

Hydrogen

Due to the financial crisis, many nations and governments have recently lowered their short-term projections for the hydrogen economy. That said, the number of emerging applications and niche markets related to hydrogen and fuel cells is on the up.

For as long as interest remains in the hydrogen economy and with the aim of providing sustainable methods for producing and utilizing this clean fuel, Abengoa has also centered its attention on these niche markets, offering solutions in sectors such as transport, mobile applications and cogeneration through the use of high-temperature fuel cells. It is therefore already focusing on seeking out markets for these technologies.

Abengoa has been able to take part in hydrogen projects in Spain, Holland and other European countries, collaborating with both domestic and international partners.

Our growth strategy rests on a number of cornerstones, such as: investing in research and development on the path to new technologies, forging strategic alliances with benchmark technological partners and agreements with suppliers to develop applications jointly, and performing projects in collaboration with our customers, thus enabling them to incorporate hydrogen and fuel cells into their products as soon as possible.

Abengoa's work in the hydrogen sector centers primarily on two key areas:

- Producing renewable hydrogen via technologies such as biofuel reforming, integrating renewable energy sources with electrolyzers, and utilizing thermochemical combined cycles with high-temperature solar thermal energy.
- Using hydrogen in fuel cells featuring different technologies, as well as in engines and hydrogen turbines.

Among the main projects for clients, we would highlight the developments made to the air-independent propulsion (AIP) system of the S-80 submarine, which the Spanish shipyard Navantia is developing for the Spanish Navy. Among the company's self-funded R&D projects, we would single out Procyon, which was started in 2012 with the aim of developing a 300 kV stationary cogeneration plant employing high-temperature fuel cells (molten carbonates), which will be built at Campus Palmas Altas, Abengoa's headquarters in Seville.

Fuel cell and hydrogen facility at Campus Palmas Altas (Seville)

Energy crops

The potential growth of the Uruguayan market remains huge for both Forestry Services and Biomass Trading, with the country boasting a booming forestry sector with growth in both plantations and industry.

On the international stage, we have focused on biomass for producing electrical power, an area in which we have detected major opportunities to expand further as a global biomass supplier.

Biomass (Uruguay)

Our vision is to become the global market leader in the sustainable production and sale of biomass, offering groundbreaking industrial solutions and creating value for our shareholders, customers and employees.

At present the main drive within the country has taken the form of new investments in the cellulose production area (Montes del Plata) and new biomass-to-energy generation projects, providing a further boost to both lines of business.

In the international arena, the need to replace fossil fuels, coupled with changes in the energy matrices of countries dependant on fuel imports, is opening the door to new energy sources, such as biomass obtained from energy crop plantations.

In Uruguay, the company has managed to cement its position of leadership in its two areas of business (Forestry Services and Biomass Trading) and has also established a foothold in the MdP cellulose plant through a goods yard operation agreement, a new area of business offering huge potential.

Internationally, we have generated heavy interest in our projects from some of the leading European electric utilities that consume pellets, and we are confident that a MoU will be signed with at least two of these as the first step towards long-term biomass supply agreements.

Although we have a long haul ahead of us, short-term growth projections look promising.

Forestry services:

- Harvest and extraction.
- Biomass logistics: loading, transport and goods yard operations.

Biomass production and trading worldwide:

- Energy crop plantations.
- Performance of industrial biomass processing projects.
- Biomass trading.

Within this constantly growing market, Abengoa has consolidated its two local forestry business lines and expects growth and profits to gather pace over the coming years.

Looking ahead, the outlook is very bright in these new areas and the company now intends to focus its efforts on capitalizing opportunities to benefit Abengoa as a whole.

Ocean energy

The electrical power generation potential of the oceans is huge, calculated at 93,100 TWh/year, and the International Energy Agency predicts that installed capacity in 2035 will reach 19 GW worldwide.

The current challenge facing the industry is getting past the pilot / demonstration phase. Once this has been achieved, we must make swift progress along the learning curve during commercial operation on the path to generating electricity at costs that prove competitive with those of conventional energy sources and more mature renewable sources, such as wind and solar power.

The main target markets for Abengoa's ocean energy business are those offering the best quality wave energy resources. The United Kingdom currently leads the way in ocean energy. As well as having one of the planet's best wave power resources, it also offers at present the best tariff conditions for expanding the industry. Australia could also be an interesting proposition for staging the first demonstration plants.

Also in the picture are niche markets, such as oil & gas platforms, and other unique applications, such as port signaling buoys, scientific marine instrumentation, offshore aquaculture, etc. The use of water desalination devices is another interesting option.

Abengoa's overriding objective in the field of ocean energy is to cover the entire value chain (technology, promotion, financing, engineering, construction, operation and maintenance) at ocean power parks harnessing the hydrokinetic resource (waves and current).

Abengoa aims to set itself up as an international benchmark for both technology and EPC within the marine energy sector.

Abengoa's ocean energy division operates out of Spain, but already has a presence -directly or through alliances or agreements with partners- in the United Kingdom, Ireland and the United States.

The company boasts a young and highly dynamic team with considerable experience in other areas of the company. Furthermore, in 2012 Abengoa Seapower recruited a number of specialists to further strengthen its human capital.

2013 will be a key year in setting up and shaping this new business at Abengoa. As well as filling out the initial human team, the company will lay the foundations, through technological / strategic projects and alliances, for:

- Developing a proprietary technology.
- Collaborating on an advanced wave technology concept.
- Acquiring capacities in managing offshore projects.
- Engaging in engineering projects.
- Developing a pipeline of company-specific projects through initial prospection work.

New business line specializing in marine energy

We would highlight the following milestones:

- Development of a collaborative venture with the Irish company Wavebob Ltd. in order to research, develop and market wave power generation systems.
- Conducting work within Nautimus, the first initiative for engineering, procurement and construction (EPC) services to support the development and implementation of wave power and marine current projects alongside the Swedish electrical utility Vattenfall and the British engineering firm Babcock.

Ocean energy business is currently structured into four different activities:

- R&D, developing technology through a host of different programs and alliances, such as the Tecoagua, Genera and Ecoboya projects with public entities and private companies.
- Engineering, in which the company is developing the expertise and know-how required to tackle EPC projects for ocean energy parks and other related offshore ventures in the near future.
- Development, in which we intend to develop our parks of tomorrow.
- Business development, in which we analyze markets and pick out opportunities, helping to develop industry on an international scale.

07

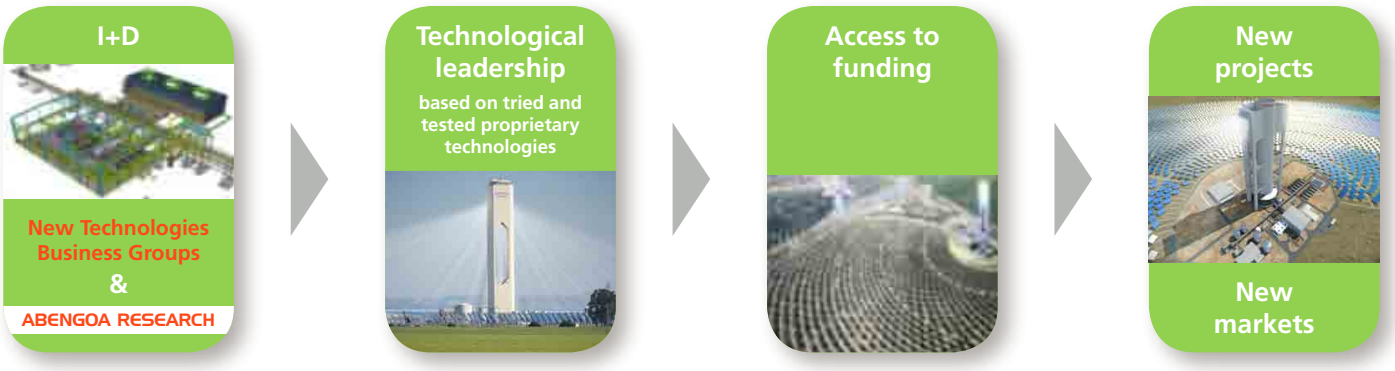
Abengoa and innovation

Key figures	2012	2011	2010	Chg. 12-11 (%)
Patents applied for (cumulative)	203	153	113	33 %
Number of doctorate holders	50	36	22	39 %

R&D+i as a growth driver

R&D drives Abengoa forward towards technological leadership

Abengoa has set itself up as a technological company and, as such, research, development and innovation (R&D+i) is what drives it forward as the company relies on proven and tested proprietary technology to penetrate new markets and regions. At Abengoa, technological leadership is what affords the company its competitive edge. It is also highly valued by lenders and is one of the key factors that investors look for.

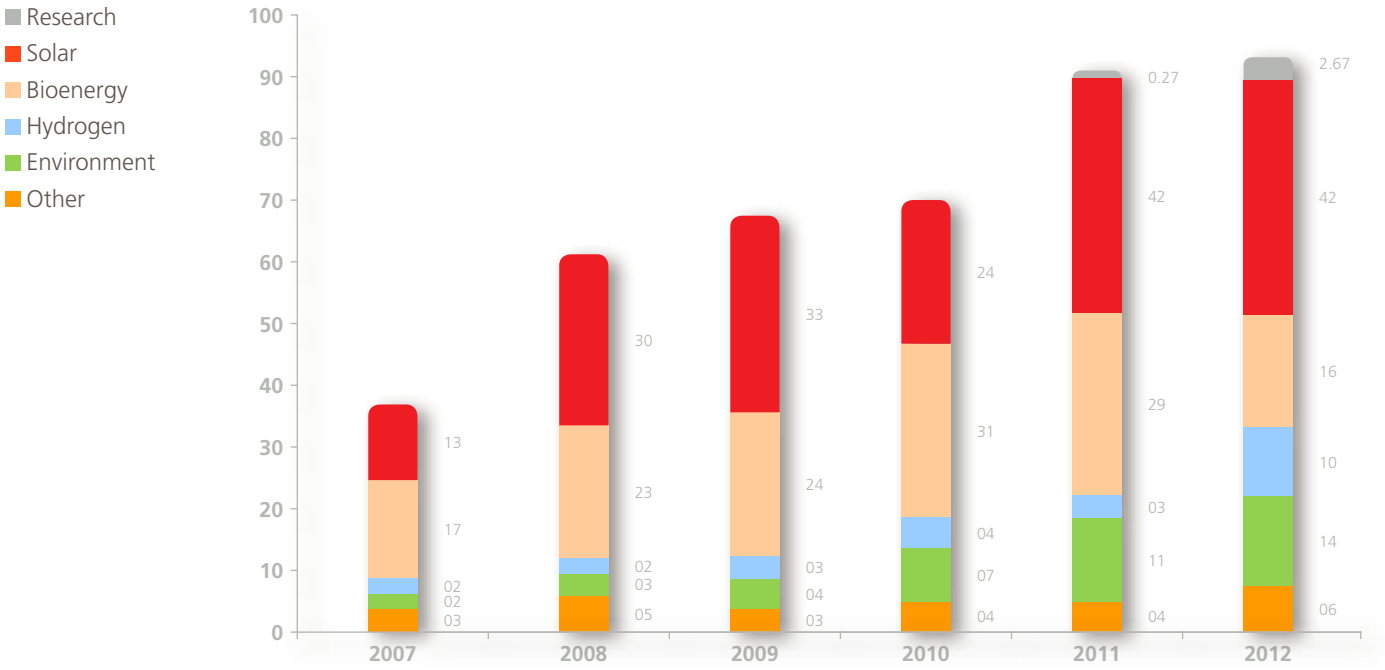


R&D+i investment in 2012 amounted to €91,3 M, marking a 0.6 % year-on-year increase, accounting for approximately 1.2 % of revenue and placing annual growth in investment at 20.7 %. This figure does not factor in investment in innovation, which, though not readily quantifiable, is a key element of Abengoa's strategy.

Most of the company's investment in R&D+i is channeled into developing technology within the energy and environment business lines. This has enabled us to create new value-added products and processes while improving upon existing ones.

The table below shows how Abengoa's investment in R&D has evolved over recent years by sector.

Abengoa remains committed to R&D+i, ramping up its investment year after year



R&D+i management at Abengoa mirrors the global strategy of the company as a whole and of each business unit and has three aims: new products, new processes and improvements to existing assets through R&D+i programs.

The R&D+i projects undertaken by Abengoa are continuously reviewed and updated through an efficient management system, which employs systematic company-wide tools with which all members of the company are fully familiar. The main tools used by Abengoa include R&D+i assessment, the Stage-Gate process, and the creation of a patents office and technological surveillance within the company. This all helps to improve decision-making processes by creating a pipeline of performing projects and ensuring that resources are swiftly earmarked to the most attractive projects.

Abengoa Research

Abengoa Research, created in February 2011, is engaged in technological research and development activities within the fields of energy and sustainable development. This research center, a forerunner in private research in Spain, is intended as a top-rank science and technology center, valorizing our accumulated knowledge by developing existing and future real applications. By engaging in R&D, Abengoa Research seeks to expand upon existing knowledge while generating new approaches, rooted in our scientific knowledge of the state of the art and the multidisciplinary skill sets of our human team.

The company's specific objectives are akin to those of a research center but are tailored to Abengoa's strategy and geared towards the present and future business needs and interests of the company. This includes generating and exploiting patents and other intellectual and industrial property and conducting studies, preparing reports and performing scientific-technical projects.

Projects to date have focused on the areas of research in which Abengoa is currently interested: solar power, bioenergy, water, waste, hydrogen, ocean energy, and so on. The center has also been working on an Abengoa-specific strategic technology agenda for the coming years in relation to the areas described above.

This agenda includes seven programs and 26 lines of research, under which the company has already rolled out a number of specific research projects, which are continuously reviewed to bring them in line with Abengoa's changing needs.

Technological agenda
Abengoa Research

Physico-chemical engineering

- Production of carbon-based added value materials and lignin recovery
- Biofuel production

Biotechnology and microorganisms

- Synthetic biology in the design of microbial cell factories
- Bioremediation
- Production of biofuels from microorganisms

Ocean and atmospheric engineering

- Aerodynamics and aeroelasticity
- Fluid, structure and soil interaction in ocean engineering
- Pollution analysis and contamination control

Thermophysical problems and systems

- HTF and TES solutions
- Transport phenomena in complex fluids
- Advanced Solar Energy Systems
- Hydrogen storage and CO_2 capture

Technological agenda
Abengoa Research

Structural materials and systems	Functional materials and smart systems	Electrical engineering
▪ Damage Tolerance Design and Structural Health Monitoring ▪ Surface protective coatings and corrosion ▪ Self healing materials ▪ Virtual materials design and characterization	▪ Smart surfaces ▪ Materials for membranes and porous systems ▪ Nanostructured thin films ▪ Smart fluids ▪ Conducting polymers	▪ Distributed power systems ▪ Electrical energy storage ▪ Power electronics based power processing ▪ Smart grids ▪ Sensing and control of complex systems. Sensor networks ▪ Thermoelectricity

Abengoa Research has been tasked with working alongside the different Abengoa companies engaged in R&D+i, providing basic research solutions, helping to disseminate research findings throughout the international scientific community and developing disruptive technologies likely to have a major impact in the future. Through this invaluable work, Abengoa Research aims to ensure continued growth for the company while helping it cement its position of international leadership.

R&D+i projects in 2012

Included below is a brief description of the main R&D projects undertaken by Abengoa companies over the course of 2012:

Waste to Biofuel

The aim of this project is to provide a one-stop solution to one of the greatest problems of the twenty-first century, namely the increase in municipal solid waste. To achieve this, Abengoa combines various different treatments, including hydrolysis and fermentation of organic material to produce ethanol, depolymerization of common plastic to produce diesel and recycling of materials for subsequent reuse.

Zinc recovery

By applying a reducing agent (hydrogen or syngas) to the waste generated during the Waelz recycling process, the company is able to reduce the amount of toxic waste generated by the process while increasing the yield of zinc recovered from steel dust.

Solugas

Abengoa is working on the third generation of solar thermal power tower technology, which will be able to compete with combined cycle gas turbine plants. A demonstration plant featuring hybrid solar-gas power technology has already been operating since May 2012.

Pilot Solugas plant located at the Solúcar Platform, the world's largest solar R&D+i center

CRS Molten Salts

Abengoa's aim with this project is to demonstrate the viability and efficiency of generating super-heated steam by passing molten salts through a steam generator. The demonstration plant has been in operation since May 2012.

Biofuel reforming for hydrogen production

One the techniques used to obtain renewable hydrogen is biofuel reforming, whereby biofuel molecules are broken down by mixing biofuel with water steam or oxygen, or a mixture of both, in the presence of a catalyst and at a high temperature, in turn generated by combusting part of the biofuel or another waste.

Remineralization

During the desalination process, remineralization is commonly used to make water produced through reverse osmosis technology drinkable and to ensure the quality of the end product.

Ocean energy

Ocean waves and currents provide a source of renewable energy from which we can generate electrical power. Abengoa is strategically involved in the development of this technology, which has considerable future potential.

Energy storage

Energy storage can herald major improvements to the global energy system and can be deployed from initial generation through to final consumption, embracing the entire distribution and control system.

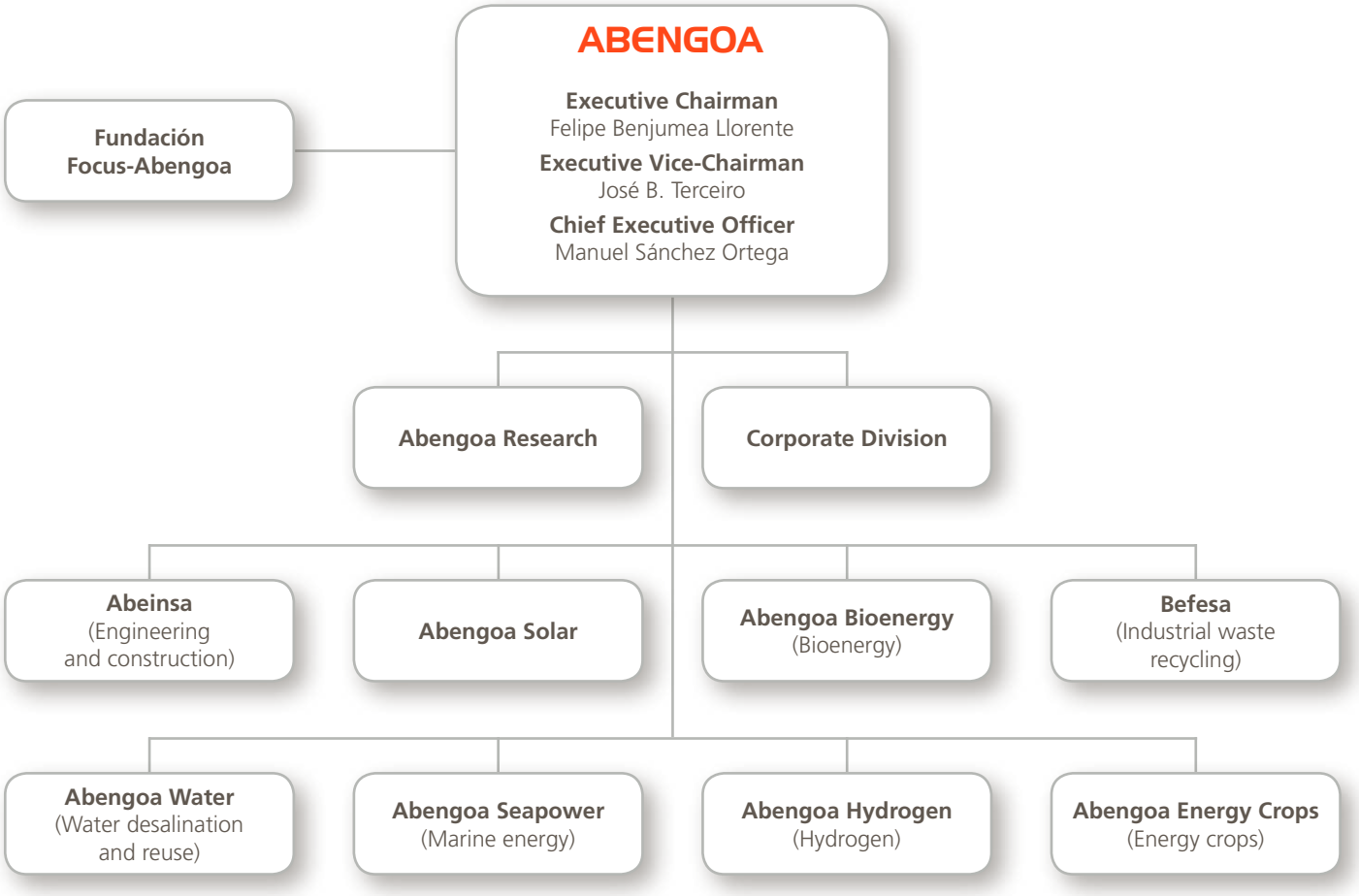
Butanol

Butanol has an energy content similar to that of gasoline and is one of the areas in which Abengoa is currently working within the field of biofuels. It has the advantage that the same infrastructures as those for conventional fuels can be used, thus eliminating the need for new plants and processes to bring it to the market.

08

Organizational structure & management team

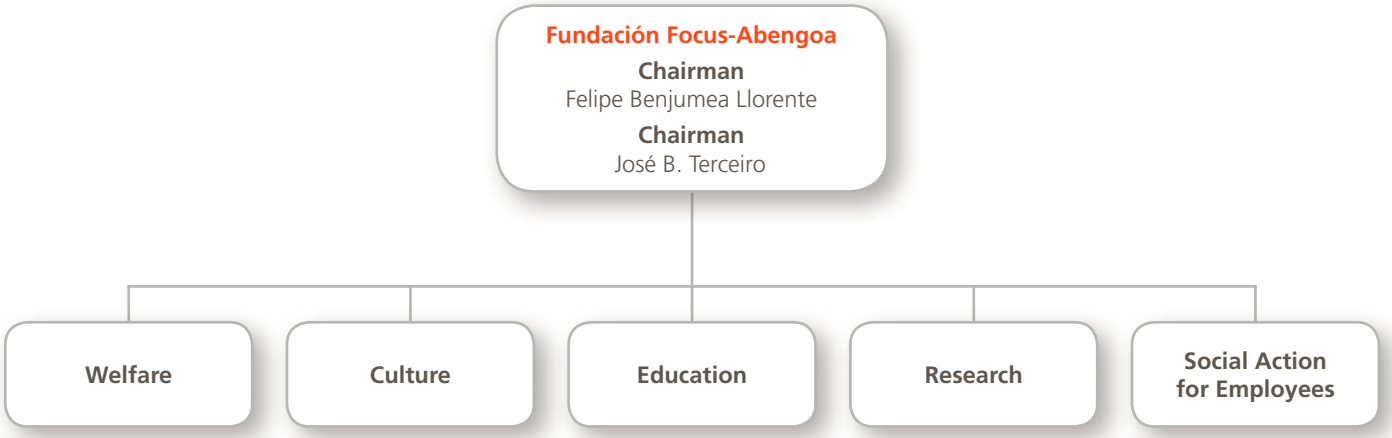
Management structure at Abengoa



	Engineering and construction	Infrastructures under concession	Industrial production
Abeinsa	x	x	
Abengoa Solar		x	x
Abengoa Bioenergy			x
Befesa			x
Abengoa Water		x	
Abengoa Seapower			x
Abengoa Hydrogen			x
Abengoa Energy Crops			x

Management structure	Head	Address	Telephone and fax
Executive Chairman	Felipe Benjumea Llorente	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 T. +34 954 93 71 12
Executive Vice-Chairman	José B. Terceiro	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. + 34 954 93 70 05
Chief Executive Officer	Manuel Sánchez Ortega	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 954 93 70 05
Institutional Relations, Assistant to the Chairman	Germán Bejarano García	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 914 48 65 64
Technical General Secretary	José Domínguez Abascal	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
General Secretary	Miguel Ángel Jiménez-Velasco Mazarío	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Communications	Patricia Malo de Molina Meléndez	Gral. Martínez Campos, 15-7º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Risk Management	Rogelio Bautista Guardeño	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Corporate Social Responsibility	María Victoria Sánchez Jiménez	Gral. Martínez Campos, 15-7º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Legal Services	José Fernando Cerro Redondo	Gral. Martínez Campos, 15-7º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Economics and Finance	Vicente Jorro de Inza	Gral. Martínez Campos, 15-6º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 78 20
Corporate Financing	Jesús Ángel García-Quílez Gómez	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Structured Financing	María Olimpia Montero Sánchez	Gral. Martínez Campos, 15-6º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 78 20
Derivatives	Salvador Balboa Linares	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Concessions	Eduard Soler Babot	Gral. Martínez Campos, 15-7º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Investor Relations and Reporting	Bárbara Zubiría Furest	Gral. Martínez Campos, 15-7º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Consolidation	Enrique Borrajo Lovera	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Internal Audit	L. Enrique Pizarro Maqueda	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Strategic Development	Izaskun Artucha Corta	Castellana 31 - 5º 28046 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 913 19 66 77
Planning and Control	Juan Carlos Jiménez Lora	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Appointments and Compensation	José Marcos Romero	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Human Resources	Álvaro Polo Guerrero	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
IT Systems	Enrique Aroca Moreno	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F: +34 955 41 33 73
Organization, Quality and Budget	Luis Fernández Mateo	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Abengoa Research	Manuel Doblaré Castellano	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Solarframe (Abengoa Research)	Enrique Moreno Benítez	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71

Management structure	Head	Address	Telephone and fax
Engineering and Construction	Alfonso González Domínguez	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 954 93 70 05
Solar	Santiago Seage	Paseo de la Castellana, 31-5º, 28046 Madrid (Spain)	T. +34 954 93 71 11 F. +34 913 19 66 77
Bioenergy	Javier Garoz Neira	1909 K Street, NW, Suite 840 Washington DC, 20006 (USA)	T. +34 954 93 71 11 F. +34 914 48 40 25
Industrial Waste Recycling	Javier Molina Montes	Paseo de la Castellana, 31-3º, 28046 Madrid (Spain)	T. +34 954 93 71 11 F. +34 913 10 50 39
Water Desalination and Reuse	Carlos Cosín Fernández	C/ Ombú 3, Edificio Torre Urbis, 28045 Madrid (Spain)	T. +34 954 93 71 11 F. +34 915 28 43 17
Marine Energy	Javier Camacho Donézar	Gral. Martínez Campos, 15-5º 28010 Madrid (Spain)	T. +34 954 93 71 11 F. + 34 914 48 40 25
Hydrogen	Javier Brey Sánchez	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas) 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 73
Energy Crops	Guillermo Rucks Lombardi	Avenida Uruguay, 1283, 11100 Montevideo (Uruguay)	T. +59 829 02 21 20 F. +59 829 02 09 19



Management structure	Head	Address	Telephone and fax
Chairman	Felipe Benjumea Llorente	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas), 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 954 93 70 05
Chairman	José B. Terceiro	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas), 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 954 93 70 05
Vice-Chairman	Juan Antonio Carrillo Salcedo (*)	Plaza de los Venerables, 8, 41004 Seville (Spain)	T. +34 954 56 26 96 F. +34 954 56 45 95
Secretary	Miguel Ángel Jiménez-Velasco Mazarío	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas), 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
Manager	Juan Carlos Jiménez Lora	Campus Palmas Altas, Energía Solar, 1 (Palmas Altas), 41014 Seville (Spain)	T. +34 954 93 71 11 F. +34 955 41 33 71
General Director	Anabel Morillo León	Plaza de los Venerables, 8, 41004 Seville (Spain)	T. +34 954 93 71 11 F. +34 954 56 45 95

(*) Passed away on January 19, 2013 (R.I.P.)