05.3 Industrial capital

Engineering and Construction

Engineering and industrial construction activity continues to be one of its greatest strengths for the organization. Thanks to large innovative projects in technology like the development of Atacama, one of the largest solar plants in Latin America, located in the desert of the same name, Abengoa has become one of the main international contractor companies in solar energy.

In terms of cogeneration, with completed projects and in constructions for a total of 10 GW, Abengoa occupies one of the first places for capacity at an international level.

With regard to the **singular building**, new projects in countries such as Uruguay and Denmark are highlighted. While, in the water sector, the company continues to focus its efforts on ensuring access to this resource for the population of various geographies with the development of new projects in countries such as India.

As far as the **markets**, the presence of Abengoa is emphasized in America, the main market for the company, where it has become the third international contractor in Latin America.

America

Canada

First large project for transmission and distribution in the country: 412 km of power transmission lines to connect the island of Newfoundland with Nova Scotia and with the North American electrical system for the first time in history.

The project is part of a plan to transport clean and renewable energy, increasing the renewable energy capacity between these Canadian provinces.

US

In 2015 the company achieved the award of the largest project for transmission line attained to date in the country: a 180 km and 500 kV line, which joins Delaney (California) and Rio Colorado (Arizona). The project shall be implemented in consortium with Starwood Energy.

Mexico

Abengoa, which in 2016 celebrates its 35 year presence in Mexico, is one of the leading companies in power generation in this geography. This position was consolidated in 2015 thanks to the awarding of projects such as the first wind farm that Abengoa shall develop in Mexico, being responsible for its engineering and construction. Tres Mesas wind farm is formed by 45 wind turbines with a total capacity of 148.5 MW, and shall **generate the energy equivalent to the annual consumption of approximately 71,000 homes**.

Tres Mesas wind farm

Mexico. Morelos Center

In this way, **Abengoa generates competitive, stable and sustainable energy**, helping the Mexican government to comply with its commitment to reduce greenhouse gas emission levels by 50 % by the year 2050.

The company continues very active in the transmission line business. In this area it has been awarded a new 21 km and 230 kV transmission network in Chihuahua, as well as four new substations in Sinaloa.

Under construction: the development of the third and the fourth line continues next to the Nuevo Pemex Gas Processor Complex in Tabasco, as well as the 924 MW combined cycle North III plant, located 30 km from Ciudad Juarez, and the 724 MW Morelos Center. In addition, the company continues with the work of the El Zapotillo Aqueduct: 140 km of piping that shall cross seven municipalities in the states of Jalisco and Guanajuato and that shall supply potable water to more than one million inhabitants. The project also includes a water treatment plant and a storage tank.

Brazil

The company, which is carrying out a disinvestment process in Brazil, shall continue with less activity, focused mainly on engineering and construction, although possibly maintaining some assets, yet to be determined.

Peru

The company has been awarded the **project to improve the water and sewerage service** in the Lima metropolitan area. The project includes the construction and start-up of three new deposits and the rehabilitation of another eleven, which shall have the capacity to store more than 7,600 m^3 of water. In addition the company shall be responsible for the installation of 128 km of pipes for drinking water, 110 km for the sewerage network and more than 12,700 connections which shall allow access to drinking water and drainage networks to 80,000 people in Lima.

Under construction: the construction of a 20 MW hydroelectric power plant, an efficient way to generate renewable energy that makes use of the topographical conditions of the territory. In addition, the company continues with the development of various projects for electromechanical assembly, among others for the mining sector, as well as the last awarded one by Southern Peru, as well as the work for the enlargement of Minera Shougang, which shall increase its production capacity of iron ore concentrate to 10 Mt per year.

Chile

In 2015 Abengoa completed a desalination plant with a capacity of 4,800 m^3/day in Mejillones, Chile, to generate energy from the Angamos power plant, which the customer is already operating.

Chile underground

Under construction: Abengoa is developing Atacama I, the largest solar platform in Latin America. Located in the desert of the same name, which has one of the highest levels of solar radiation in the world, it shall be formed by a photovoltaic plant with a 100 MW capacity and by the first solar thermal electric power plant in Latin America, with capacity of 110 MW and 17.5 h of heat storage.

The work also continues for the installation and assembly of the electrical system of the two new lines of the Santiago metro in Chile as well as several transmission and distribution projects.

Argentina

The Administration Trust Committee of Transport Works of Argentina has recently awarded Abengoa the expansion project of a transformer station in the province of Chaco, Argentina.

Under construction: the construction of several electric transmission projects continues, 325 km of lines of various voltages and distributed over several States to improve the energy infrastructure of the country.

Uruguay

Abengoa, which has just celebrated its **35th anniversary of activity in Uruguay**, continues to participate in the major infrastructure projects in the country, like the new port terminal in Capurro, in a 50 % consortium, which shall have a 1,000 meter dock for industrial fishing vessels, or in the sanitation works for Ciudad de la Costa, which shall improve conditions of the city's inhabitants.

In addition, Abengoa shall develop the second phase of the Central Hospital of the Armed Forces of Montevideo. In particular, it shall be responsible for the complete development of a new building, the project, the foundations, the construction of the reinforced concrete structure and the finishes and related facilities. The new building shall have characteristics that are similar to those already built by Abengoa in the first phase: a 3,800 m^2 building.

Under construction: the construction of the Campo Palomas wind park continues. The park, awarded by the state company Usinas & Transmisiones Eléctricas (UTE), shall have a 70 MW capacity.

Furthermore, Abengoa is constructing the new convention center of Punta del Este and a 50,000 m^2 prison in Montevideo, the first public-private participation project in the country.

Europe

Hydrogen fueling station

Spain

In Seville, which is where the company's headquarters are located, in 2015 we celebrated the completion of the second hydrogen fueling station, capable of producing this clean fuel in situ from water and electricity. The station thus avoids CO_{2eq} emissions produced by the transport of this gas.

In addition, the company is going to participate in the construction of the **first agro-industrial biogas plant of Andalucia**, a renewable gas source used as fuel to generate electricity and heat.

On the other hand, Abengoa has been awarded two new projects in the railway sector: the first of them consists in the **installation and maintenance of protection, security and fixed telecommunication systems** in a 51 km road section between the provinces of Leon and Asturias. In the second, Abengoa shall be responsible for the **installation of a 65 km overhead contact line for the new high speed Madrid-Murcia line**.

Under construction: Abengoa continues with the development of several important projects in the transmission and distribution area, as it is one of the main companies in the sector in Spain.

France

Abengoa, which has been working with the French public operator responsible for transmission systems in France during the last twelve years, also carries out projects for the railway company in various regions of the country, such as the launch of the Béziers substation, to feed the Montpellier-Perpignan rail line.

Currently, Abengoa is the railway electrification company that has **the highest average customer satisfaction** so far this year, according to the evaluations that the French state company of railways makes to its suppliers.

United Kingdom

Under construction: the railway electrification of 250 km of track in the south of England continues.

Denmark

Abengoa has achieved its second project of singular buildings in the country. After the mechanical installations of the Niels Bohr building in the University of Copenhagen, the company shall be responsible for carrying the electromechanical installations in a new 56,000 m^2 hospital complex located in the town of Herlev.

Ukraine

Under construction: the construction of a 187 km line continues.

Africa

Morocco

Under construction: The company continues with the construction of the largest desalination plant in Morocco, with capacity to supply 100,000 m^3 of potable water per day to 500,000 inhabitants of Agadir, which shall solve the supply problems of one of the world's areas most affected by water shortage. Furthermore, Abengoa is carrying out various transmission and distribution projects.

South Africa

First large project of **transmission and distribution of the company in the country**.

Abengoa shall build its first two power transmission lines in South Africa. Both, with a capacity of 400 kV, add up to 174 km of lines and shall be developed for the main electricity company in the country.

Under construction: Abengoa is one of the main developers for solar power plants in the country, where it continues with the construction of its third thermosolar plant, using parabolic trough technology with a thermal storage system: Xina Solar One, for 100 MW, shall have the capacity to supply clean energy to 95,000 homes.

Abengoa began the construction of Xina Solar One in 2014. The plant is located in Pofadder, where KaXu Solar One is also found, also developed by the company and put into operation in March 2015.

Xina, for 100 MW, incorporates parabolic trough technology and a five hour thermal energy storage system using molten salts. Together, these two100 MW plants, shall be the largest solar complex in sub-Saharan Africa and the southern hemisphere.

Kenya

Under construction: construction continues on a 132 km line and substations associated to it.

South Africa. Xina solar one

Saudi Arabia. Meca medina

Asia

Turkey

Under construction: the construction of a 250 km drinking water supply network in Denizli continues.

Israel

Under construction: Abengoa is building a conventional 220 MW Generation Plant.

United Arab Emirates

Abengoa, which has been in the United Arab Emirates for ten years, has been awarded a new 23 km electric transmission line.

Saudi Arabia

Abengoa has been awarded a new project in Saudi Arabia, Waad Al Shamal, for the Saudi Electricity Company. This is a 1,270 MW solar-gas combined cycle power plant in which Abengoa, together with General Electric, shall be responsible for the engineering, construction and implementation of it.

Under construction: construction continues on the high speed Mecca - Medina line.

Oman

Abengoa shall be responsible for the construction, supply, installation and start-up of two new substations and more than 75 km of overhead transmission lines associated to them. It is anticipated that the project shall last for two years together with the subcontracting of local companies for certain jobs which shall generate employment in the area during the entire project.

Under construction: the construction continues on what was the first transmission project of the company in the country.

India

Abengoa, which has just celebrated its 20th year anniversary of activity in India, was recently awarded a new project in the country, which shall allow the supply of water to the capital of the state of Uttarakhand.

Over the last 20 years the company has developed more than 1,600 km of lines in the country. Among the projects executed by Abengoa in India, is the first transmission line in concession of the company in this geography; the electrification of more than 500 km of railways and the largest desalination plant with reverse osmosis technology of the country. In 2015, moreover, it put the highest voltage line in the country into operation.

Sri Lanka

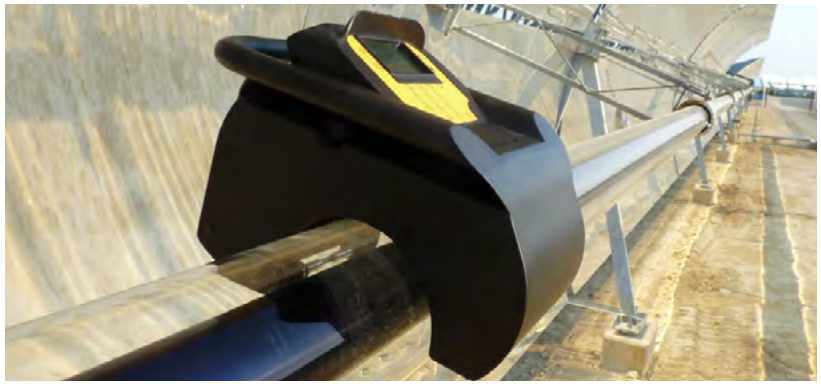
Abengoa has completed the construction of a water treatment plant with a capacity to treat 13,000 m^3 of water per day The project has included the construction of the water catchment systems of the river Kalu Ganga, a 2,500 m^3 storage tank and about 20 km of piping for the distribution of the water treated in the plant.

Auxiliary manufacturing

Abengoa, through its business model, has committed to vertical integration as a strategy to generate the maximum value to its customers.

The wide experience and involvement of the company in the stages of development, industrialization, operation and maintenance of a product or technology, makes continuous generation of new areas of business possible through the identification of the market needs. Thus, in a very short time Abengoa has created a vast portfolio of products and services available to its customers, especially in the business for metal structures, capital sources and solar thermal energy, which optimize the operation and maintenance of the plants, increase their production and improve their management.

Technology is the fundamental support in this business and growth model. Abengoa believes in research and development as the seed that shall provide excellence in the medium and long term. Therefore to do this it commits to a portfolio of its own solar technology, as well as to developments with specialist companies in the sector through strategic alliances. To achieve such a technology portfolio, Abengoa has made an important investment both economically and in human capital, obtaining a return thanks to the success of the technology in the market, which recognizes the high value added of products and services.



Mini incus: the tool that helps optimize the operation of parabolic trough solar thermal plants

As a result, Abengoa is positioned along the entire value chain of the solar technology, both thermosolar and photovoltaic, from the creation and the development of the most advanced technologies, the commercialization of mature technology and the provision of both products for the operation, maintenance and optimization of solar plants as of components required for the construction of a solar plant, guaranteeing the greatest services in the market.

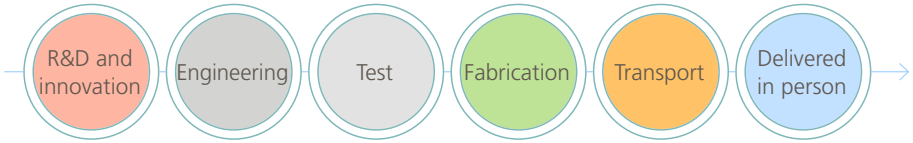
The manufacture of the following products should also be mentioned:

Metallic structures

Abengoa has three production centers where metal structures are designed, tested and manufactured metal structures for transmission lines, substations, concentrating solar power plants, photovoltaics, wind towers and telecommunications.

The three centers, located in Spain, Mexico and India, have a common way of working and add up to a global capacity to produce 150,000 t of metallic structures per year. In its 40 years of experience, Abengoa has manufactured more than 1.5 Mt of metal structures.

Abengoa offers an integrated service, covering the entire value chain, from engineering to manufacturing, including load tests of structures of up to 72 meters in its own center, where the performance of the tower is checked on a real scale through the application of loads similar to those that it shall endure in its real site.



This last year, is highlighted the design, manufacture and supply of 6,300 t of tower structures for the restitution of the electric supply due to a hurricane in Baja California (Mexico), among others.

Capital goods

In the equipment manufacturing sector, Abengoa is an international reference in the supply of low and medium voltage equipment, electronics and integrated electronics, and supply of electrical rooms.

With more than 70 years' experience in the international supply of electrical equipment and with three production centers totaling a 25,000 m^2 surface area, Abengoa designs and manufactures equipment adapted to the needs of each project in the sectors of energy generation, oil&gas, petrochemical, defense, traffic and transport, rail and air-aerospace, ans is able to carry out the mechanical and electrical design, selection and collection of components, manufacturing, testing and assistances to the installation and start up in any part of the world.

Among the most outstanding projects carried out in the last year, should be mentioned:

- **Modular equipment for energy storage systems**, with a demonstrative project in operation in the facilities of Torrecuéllar (Seville). It has also been responsible for the manufacture of prototypes for the supply system for the Scout armored vehicle.
- **Low and medium voltage equipment** for internal projects in Mexico and South Africa, as well as modular compartments of turbine control for third party projects in Australia, Vietnam, Saudi Arabia or Iraq.
- **Control boxes** for the trams of Mostaganem and Ouarla, in Algeria, and manufacture of electrical boxes shipped for the high-speed Meca-Medina train.

Concessional type infrastructures

Africa

Ghana

In February 2015 Abengoa began the commercial operation of adesalination plant in Accra in concession, with capacity to produce 60,000 m^3 of drinking water per day, i.e. the sufficient amount to **supply the 500,000 residents** of Accra and its surroundings.

Algeria

Furthermore, a desalination plant in Ténès, with a production capacity of 200,000 m^3/day, also entered into commercial operation in June. Abengoa manages the concessions of Skikda (100,000 m^3/day) and Honaine (200,000 m^3/day) for Atlantica Yield.

Accra desalination plant, in Ghana

Ténès desalination plant, in Algeria

Asia

India

Abengoa has a desalination concession in Chennai, with a capacity of 100,000 m³/day and that is in operation since 2010.

India. Chennai desalination plant

Industrial Production

Solar

Abengoa's long experience in performing operating and maintenance tasks plus the strength of the R&D and innovation area in the field solar have enabled the company to develop a complete range of products and tools that it currently uses in its plants and that are sold to third parties.

These products, which are the result of the needs identified in the daily operation of the plants, include management tools such as the control software Solar Field Maintenance Application (SFMA, due to its acronym in English) and others intended for maintenance.

One of these tools is the **Condor reflectometer**, designed to measure the reflectivity of the solar field mirrors in just ten seconds with a high level of reliability and accuracy. The **Portable Mini Incus spectrophotometer** should also be mentioned, a computer that allows the cleanliness strategy to be optimized and validates the performance of the pipes of the parabolic trough solar plants, which allows a greater control in the monitoring of the solar field.

For its part, the Thermohook thermometer is a unique tool capable of measuring the temperature outside and inside of the tube at the same time. This allows for a comprehensive and individualized control of the performance of each module, manifold and loop, detecting possible defects or loss of vacuum in the tubes as well as inconsistencies in the distribution of temperatures of the solar field.

Condor reflectometer

Abengoa develops tools like the Condor reflectometer that allow the operation of solar plants to be optimized.

Thermohook thermometer

Thermohook is a tool developed by Abengoa as a response to the own needs in the operation of parabolic trough plants.

Bioenergy

Abengoa is the leader in the production of biofuels in Europe (with a capacity of 1,500 ML) and one of the major producers in the United States (1,440 ML) and Brazil (255 ML), with a **total installed production capacity of 3,195 ML** distributed among 14 plants located in five different countries on three continents.

In particular, it produces, thanks to its own technology, biofuels (bioethanol and biodiesel), as well as other chemical bioproducts using biomass (grain, sugar cane, cellulosic biomass, oilseeds and solid waste) as raw material.

In the biofuel area, Abengoa is working mainly in the following projects:

US

Abengoa's second generation technology (2G) uses an innovative approach to diversify resources of raw materials from which to produce biofuels and bioproducts. Using enzymatic hydrolysis (HE) technology developed by Abengoa, the biomass (agricultural waste) is transformed into renewable sugars that, after fermentation, produce the resulting bioethanol.

Its maximum exponent is the 2G bioethanol commercial plant in Hugoton (Kansas, United States). This plant started operating in 2014 with a production capacity of 25 Mgal per year. In order to produce biofuels, it uses second generation biomass as a raw material, i.e. non-edible agricultural waste (maize stubble and wheat straw) that do not compete with the grain destined for human consumption or animal feed.

This cutting-edge technology facility also has an electrical cogeneration plant that allows it to operate as a producer of self-sufficient renewable energy. Through the use of the residual solids from the biomass to bioethanol conversion process, the plant generates 21 MW of electricity - enough to cover its own needs and export the surplus clean and renewable electricity to the local network of Stevens County.

Being one of the first plants of commercial-scale bioethanol in its category in the United States, Hugoton contributes to the recent impetus of the industry and serves as a showcase for cellulosic bioethanol as a source of sustainable and alternative fuel that reduces greenhouse gas emissions significantly and helps to increase energy independence.

Similarly, the plant has been crucial to demonstrate that the cellulosic bioethanol industry can operate at a commercial level and still today, is an excellent tool for the optimization and improvement of production processes. The Hugoton plant represents a platform for Abengoa to continue developing new bioproducts in the future that reduce the consumption of oil, by directly replacing bioplastics, biochemical or aviation fuel.

Europe

Production of second generation bioethanol (2G) from Municipal Solid Waste (MSW)

The objective of the **waste-to-biofuels** project (**W2B** - from Waste to biofuels) is **to develop a comprehensive solution for the management of municipal solid waste (MSW)**, which allows a larger quantity of waste to be converted into biofuel and energy and reduces the amount of waste ending up in a landfill. This offers a more sustainable and efficient alternative to the traditional waste management, which goes beyond depositing waste in landfills.

Thanks to an important technological effort, Abengoa has adapted and transformed the second generation pilot plant that it developed in Salamanca, which employed cellulose biomass as the raw material for the production of second-generation bioethanol, in a demonstration plant that uses the organic fraction of MSW as raw material for the production of second-generation ethanol.

In the W2B Project the pretreatment and conversion processes for biofuels are being adapted and improved to validate the pre-industrial scale technology in order to convert the design into a commercial-scale plant.

Abengoa's W2B Plant in Salamanca, Spain

The city of Salamanca supplies the MSW to the demonstration plant. The waste is separated and classified in their different fractions: ferrous materials, non-ferrous metals, aluminum, plastics, textiles and organic fiber. Subsequently, the organic fiber is processed to obtain second generation ethanol.

Brazil

Hybridization of 1G and 2G bioethanol plants in Brazil

Abengoa is adapting its second-generation technology with its own enzymatic hydrolysis (HE) technology to expand into other markets such as Brazil. The company has used this approach to increase the capacity of the already existing facilities without the need for an expansion of agricultural land. This adaptation shall employ HE technology for the treatment of bagasse and the stubble from the sugar cane in order to produce second-generation bioethanol, reflecting the desire of Abengoa to expand its portfolio and capture the growing market for second-generation fuels in Brazil.

Sugarcane

This new project that entails the installation of new second generation lines that use Abengoa's enzymatic hydrolysis technology, shall add value to the already existing plants. The renovated facilities shall have the capacity to process dry biomass (bagasse or sugar cane stubble) that shall result in the production of about 70 ML of bioethanol.

Other projects

Project for the development of technology for the production of n-biobutanol using catalysis

Abengoa has satisfactorily completed the development of a very efficient catalytic technology for the production of n-butanol, and other byproducts such as n-octanol and n-decanol from bioethanol. These products are widely used in the chemical industry. Some of the main applications of butanol are the manufacture of acrylate for coatings, paints and varnishes, or the production of acetate and glycol esters. Likewise, octanol and n-decanol are special chemicals with a high market value.

Abengoa has obtained several patents in this area, it has finished the scale to pilot plant and is developing an engineering package for the first commercial plant. All this validated by Nexant as an independent engineering firm.

This technology converts n-butanol in a competitive and renewable alternative to butanol from fossil origin, reducing the CO_2 footprint from end users.

Optimization of enzymes for the production of 2G ethanol in York, USA and Salamanca

Abengoa has a Dyadic license for the use and modification of an organism that produces enzymes that allow the conversion of cellulose into simple sugars: a critical and necessary step in enzymatic hydrolysis technology.

Abengoa researches for the progress of enzymatic hydrolysis

A large team of highly qualified chemical and biochemical engineers work in the development of this technology, focusing on adapting the organism to produce an optimal enzyme cocktail and in the fermentation process required to collect it on an industrial scale. The pilot facility of York, Nebraska, US and the demonstration plant in Salamanca (Spain) are crucial for the development of enzymes and allow Abengoa to have a global test platform.

The work process set out in Abengoa has led to the reformulation and evaluation of new enzyme cocktails, through the identification of genes and the codification of enzymes with a high-performance profile. The development of more effective combinations of enzymes and lower cost is of strategic interest for the competitiveness of the second-generation technology. Currently the enzymatic cocktail developed in Abengoa presents a saccharification power similar to other commercial solutions available on the market. However, work is still continuing on the improvement of this cocktail and in its commercial-scale production in order to ensure a consistent and efficient supply of enzymes for our operations in the Hugoton plant.

Abengoa has developed these enzymes, together with the enzymatic hydrolysis technology to be used, both in company's facilities as in third party plants, for bioethanol production.

Development of bioproducts

Abengoa has developed a **unique platform** to **produce sugars** from biomass in its first and second generation plants. The company is currently developing innovative technologies through the use of microorganisms to produce different bioproducts from these sugars. Aware of the industrial value that these solutions represent, Abengoa is acting to protect these intellectual developments and industrial technologies, generating a solid patent portfolio. The company aims to increase the value of its plants with this program using recently created products that are expected to replace a large part of products that come from oil, but in a sustainable and economically competitive manner.

Through the incorporation of the bioproducts in the production process of the Company's plants, a new field of applications is opened up with different end-uses, both in the chemical sector (high volume products, specialty chemicals, biomaterial/plastic applications, construction, etc.) and in the energy sector (advanced biofuels, especially for aviation).

At the close of this report, the bioenergy activities were included within the part of assets subject to disinvestment in the framework of the reconversion process in which Abengoa finds itself, materialised in the Business Plan and Financial Restructuring Proposal submitted in March 2016.

Operation and Maintenance (O&M)

Abengoa provides operation and maintenance services in the field of energy, water and the environment. With an experience of more than 15 years in this activity, it performs corrective, preventive and predictive maintenance, as well as computer assisted maintenance management in electric and thermal energy production power plants, hydraulic infrastructures and waste treatment, closing the company's value chain.

The operation and maintenance prolongs the useful life of the assets up to 20 years. Design and build with an operator vision is a competitive advantage for Abengoa.

Abengoa has consolidated its position as a leader in the operation and maintenance (O&M) of solar plants. In particular, it has an installed capacity of 1,603 MW in commercial operation, both of thermal solar plants as well as photovoltaic plants which position it as the company with the greatest installed thermosolar capacity in the world. In addition, this capacity covers all technologies present on the market, from parabolic trough technology to hybrid plants, passing through tower technology, in which Abengoa is a pioneer[1].

The valuable experience gained over the last decade with the exploitation of these solar energy assets, have allowed Abengoa to accumulate greater knowledge in the market in operation of solar plants. Thanks to this "*know-how*" and the technological development that it entails, Abengoa has developed a world-renowned operation and maintenance equipment that makes it possible for plants that operate to achieve and even exceed the guaranteed production. That is why operation and maintenance has become the fundamental line of the solar business.

The operation and maintenance of solar plants is one of Abengoa's fundamental lines of business

Note 1 Capacity installed at December 2015. In April 2016, Abengoa sold four photovoltaic plants with a total capacity of 11 MW.

In the last year, a cross sectional area has been created dedicated specifically to manage the O&M of all Abengoa solar assets. Furthermore, services are also offered to other companies such as work for consulting, implementation of plants or audits to third parties.

The developed products are the result of the extensive experience gained with the operation and maintenance of the plants

Abengoa assumes responsibility for the maintenance and operation of machines and equipment for maximum productivity, profitability and safety in the plant.

The company has a wide experience in the efficient management of buildings. According to the characteristics of the project, the management focused on ancillary services can be carried out, which includes services such as cleaning and safety maintenance of infrastructures or gardening.

The company also offers medical equipment for hospitals and may be responsible for its integration, maintenance and start-up. It can also include ancillary medical services such as laboratories, blood banks or medicinal gases

On the other hand, Abengoa has attained great experience in projects for buildings intended for judicial services. The work that the company carries out includes electrical and safety facilities (access control, security cameras, etc.), mechanical installations such as plumbing and sanitation, installation work of the ventilation and heating systems, in addition to the construction and start-up of the projects.

America

United States

Solana

With a 280 MW of parabolic trough technology power and located near Phoenix (Arizona), the Solana thermosolar plant has already fulfilled two years of commercial operation. Its six hour molten salt thermal storage system ensures energy production during the night or during periods without sun, adding value to the plant and contributing effectively to the manageability of the electrical system.

Solana has a thermal storage system that ensures the manageability of the plant

Mojave Solar

Located in the Mojave Desert (California), this 280 MW parabolic trough technology plant entered into operation at the end of 2014. Like the rest of Abengoa's thermal solar plants, Mojave has achieved and exceeded the guaranteed production.

In addition, in the T&D sector, Abengoa shall be responsible for the operation and maintenance of the new transmission line awarded this year in the US and that will link Delaney (California) and Rio Colorado (Arizona).

The operation and maintenance equipment ensures that its plants achieve and even exceed guaranteed production

Mexico

The company operates the **largest cogeneration plant of the country** (300 MW) at full capacity, which supplies electricity and steam to the Nuevo Pemex Gas Processor Complex. Currently, Abengoa is building, as its own development, two additional plants next to it (the efficient cogeneration A3T plant for 265 MW and the combined cycle ACC4T plant for 680 MW), so that as a group 1,245 MW shall be attained. Abengoa shall perform the operation of this asset for 20 years.

Predictive online maintenance is carried out on this asset, which is to monitor the operation of all components of the plants to anticipate problems and take action to address them before they occur.

Mexico. A3T

Abengoa operates the Mexiquense Bicentenary Cultural Center in Texcoco, one of the most important cultural centers in Mexico Built by the company and inaugurated in 2011, it is a 35,000 m^2 center in which all kinds of cultural events are organized - exhibitions, concerts, theater, courses, conferences, attended by an annual average of 300,000 people.

Abengoa is responsible for all the management services of the center for 21 years in consortium with the Higa Group, from storage, mail services, general maintenance services for facilities, parking, security and support staff in all the cultural activities that are organized in the center, among many others.

Brazil

The company, which is carrying out a disinvestment process in Brazil, shall continue with less activity, focused mainly on engineering and construction, although it may possibly maintain the operation and maintenance of some asset, yet to be determined.

Uruguay

Uruguay penitentiary center

Abengoa shall be responsible for operating a prison facility of 42,000 m^2 in Montevideo, distributed in 25 buildings. The project is being developed under the modality of public-private partnership participation (PPP). The company is responsible for the operation of the center, which includes the general maintenance of the infrastructures, equipment, security systems and catering services, laundry and cleaning.

In addition, the company shall operate the convention center of Punta del Este, currently under construction.

Punta del Este Convention Center

Abengoa operates two 100 MW wind farms in Uruguay. A third currently under construction, for which it shall also be responsible for the operation and maintenance, for which it has with a highly qualified team.

Peru

Abengoa is responsible for the O&M of almost 1,800 km of transmission lines in Peru, between which should be highlighted the 500 kV line which is the country's longest, **ABY Transmission south**, linking the regions of Lima, Ica, Arequipa and Moquegua. The O&M service covers the concession facilities for public and private service.

Maintenance of a transmission line is a crucial part of its operation and can lengthen its life up to 50 years. In 2015, the cleaning was carried out of the line's insulators on the 500 kV energized line with pressurized water, among other works,

Peru. Transmission line

Chile

The company has carried out various maintenance works, with energized or live lines, without "switching off" the line.

Europe

Spain

Solúcar Platform

This platform located in Sanlúcar la Mayor (Seville) is the Abengoa's technological center par excellence as it hosts all kinds of commercial technologies, both thermosolar as well as photovoltaic, as well as pilot plants where to check the new lines of research, development and innovation that serve the company as a lever for growth.

These facilities, totaling 183 installed commercial MW, include tower technologies, with the first two commercial plants of this type in the world, as well as three parabolic trough technology plants of 50 MW each. In addition, Solúcar tests new tower solutions, storage, high-concentration photovoltaic and other types of innovative solar technologies.

The Solucar Platform is Abengoa's technological center par excellence

The pilot plants housed on the platform have served and currently serve Abengoa to develop and consolidate knowledge in the O&M of new technologies, before starting the operation of commercial plants, ensuring their production from the first moment. The almost ten years of experience in the operation and maintenance of this platform have created the base from which Abengoa has been able to position itself as a leader in the exploitation of solar energy power plants.

Extremadura solar platform

This platform brings together 200 MW of parabolic trough technology, divided into four plants of 50 MW each and that form the Solaben units, which integrates the largest solar platform in Europe. Thanks to the work of operation and maintenance that Abengoa performs on this platform, a core of development has been created in the region with skilled employment and important socio-economic benefits for the whole area.

Écija Solar Platform

This complex has two parabolic trough plants of 50 MW each: Helioenergy 1 and Helioenergy 2.

The Extremadura Solar Platform is the largest solar thermal electric plant in Europe

Castilla-La Mancha Solar Platform

The complex, located between the municipalities of Arenas de San Juan, Villarta de San Juan and Puerto Lápice in the province of Ciudad Real, has two identical parabolic trough plants of 50 MW each: Helios I and Helios II, which are operated entirely by Abengoa.

El Carpio Solar Platform

This platform located in the municipality of El Carpio (Córdoba) is formed by two parabolic trough technology plants of 50 MW each.

Photovoltaic plants

Abengoa has five photovoltaic plants in commercial operation in Spain, with a total power of approximately 12 MW, in which it combines several types of technologies with different types of monitoring systems developed by the company. These plants, all located in Andalusia, combine conventional photovoltaic and concentration technologies, as well as tracking systems to one and two axis. These technologies allow the exploitation of plants to be optimized as their efficiency is considerably higher than in conventional photovoltaic plants.

At the close of this report, Abengoa has sold four of these photovoltaic solar plants located in the provinces of Seville: Casaquemada, of 1.88 MW, located in the Solúcar platform in Sanlúcar la Mayor; Las Cabezas, of 5.70 MW, in the Cabezas de San Juan; and Copero, of 0.90 MW, in Dos Hermanas; and in the province Jaén, in Linares, another of 1.89 MW.

Almeria desalination plant

Abengoa has the the operation and maintenance contract for a desalination plant in Almeria, with a capacity for desalinating water of 50,000 m^3/day, it has reverse osmosis technology and is in operation since January 2005.

Spain. Desalination plant in Almeria

Spain. Cartagena desalination plant

Spain. Hospital del Tajo

Abengoa operates the first ISCC plant to enter into commercial operation in the world and that generates 10 % of the electricity consumed in Morocco

Cartagena desalination plant

Abengoa is responsible for the operation and maintenance of the desalination plant in Cartagena, with a capacity of 72,000 m^3/day, also with reverse osmosis technology and which entered into commercial operation in January 2005. After technical improvements carried out last year, this plant increased its capacity from 65,000 m^3/day to 72,000 m^3/day.

Villaricos Cogeneration

Cogeneration, located in Almeria and with 21.7 MW of power, has been operated by Abengoa since 1999.

Hospital del Tajo, in Madrid (58,000 m^2) and Hospital Costa del Sol, in Malaga (56,700 m^2).

Courts of Olot, Cerdanyola and Santa Coloma de Gramanet. Since 2005, Abengoa is responsible for the integral maintenance of these three courts in Catalonia, which total a surface area of more than 19,000 m^2.

Denmark

Abengoa shall be responsible for the maintenance of the electrical and mechanical facilities for two years of Niels Bohr building of the University of Coppenhague, whose electrification is currently being carried out at the moment.

Africa

United Arab Emirates

Shams-1

The Shams-1 plant, in the desert of Abu Dhabi, has a power of 100 MW. Shams-1 is a reference in the region by being the first with thermosolar technology in the Middle East and avoids the emission of approximately 175,000 t of carbon dioxide per year. Abengoa had been carrying out the operation and maintenance of the plant for more than two years, which has allowed it to acquire unique experience in this region, preparing the O&M team to work in desert environments with the special environmental conditions that this implies.

Morocco

Abengoa has renewed for a further five years the operation and maintenance of the Ain Beni Mathar plant, which has maintained in operation since 2010, the first ISCC plant (Integrated Solar Combined Cycle - due to its acronym in English -) that came into commercial operation in the world and that generates 10 % of the electricity consumed in Morocco. A team of professionals, mostly from the region, controls the operation of the 472 MW plant on a daily basis, which combines solar power, natural gas and steam.

Algeria

Hassi R'Mel

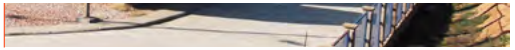
This hybrid power plant that combines solar technology with a combined gas cycle, is located at Hassi R'Mel (Algeria). It has an installed capacity of 150 MW since 2011, of which 20 MW come from a solar field of parabolic trough collectors. This plant makes Abengoa a pioneer in the exploitation of thermal solar plants in the north of Africa, in addition to establishing the company's capability to be able to successfully operate and maintain plants with innovative technologies such as is the solar-gas hybridization.

Abengoa is a pioneer in the development of hybrid plants that incorporate a solar contribution in combined natural gas cycle plants

Skikda

Abengoa is responsible for the operation and maintenance of the desalination plant in Skikda, in Algeria, owned by Atlantica Yield, with 100,000 m^3/day capacity and reverse osmosis technology.

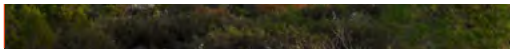
Algeria. Skidda desalination plant



Honaine

The plant, based on reverse osmosis technology, has a capacity of 200,000 m^3/day to supply a million people and is in operation and maintenance since September 2011.

Algeria. Honaine desalination plant



South Africa

KaXu Solar One

KaXu Solar One, developed by Abengoa, is the first solar thermal electric plant in commercial operation in South Africa and is located near the city of Pofadder, in the north of Northern Cape Province. It has a 100 MW capacity of parabolic trough technology, as well as three hours of molten salt thermal storage to ensure the manageability of the energy transferred to the network. Its operation, carried out by Abengoa, began in early 2015 and has helped to develop a network of local services in the region.

South Africa. KaXu Solar One solar thermal electric plant

Asia

India

Abengoa shall be responsible for the operation and maintenance for 25 years of 134 km of lines that are currently under construction located in the state of Gujerat.

United Arab Emirates

Finally, in November 2015, a pilot project for desalination of 1,000 m^3/day was launched in Ghantoot, Abu Dhabi.