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Annual Report 2011 | Engineering and construction

Abengoa, with over seventy years of experience in the energy and water engineering and construction market, boasts a long track record in performing complex turnkey projects: CSP plants, hybrid solar-gas plants, conventional power plants and biofuel facilities; hydro infrastructures, including large-scale desalination plants; and power transmission lines, to name but a few fields of expertise.

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Key figures	2009	2010	2011	Var. 11-10 (%)
Revenue (€M)	1,683	2,302	3,526	53.2
Ebitda (M€)	227	259	438	68.9
Ebitda margin (%)	13.5	11.3	12.4	9.7

Our business

The fallout of the lingering economic gloom both in Spain and abroad is that banks are continuing to tighten their purse strings when it comes to lending and are demanding more for their money. The crisis has therefore restricted project start-ups and led to a slump in business, reflected by the widespread drop in viable opportunities.

Despite this widespread market instability, Abengoa’s Engineering and Construction Division has once again responded superbly on course with company strategy, closing the year with a total of €3,526 M in revenues, marking a 53.2 % increase in sales despite the precarious economic and financial climate, largely on the back of the company’s efforts to diversify business and territories and its promotional drive.

CSP tower
plant at Sanlúcar
la Mayor (Seville)



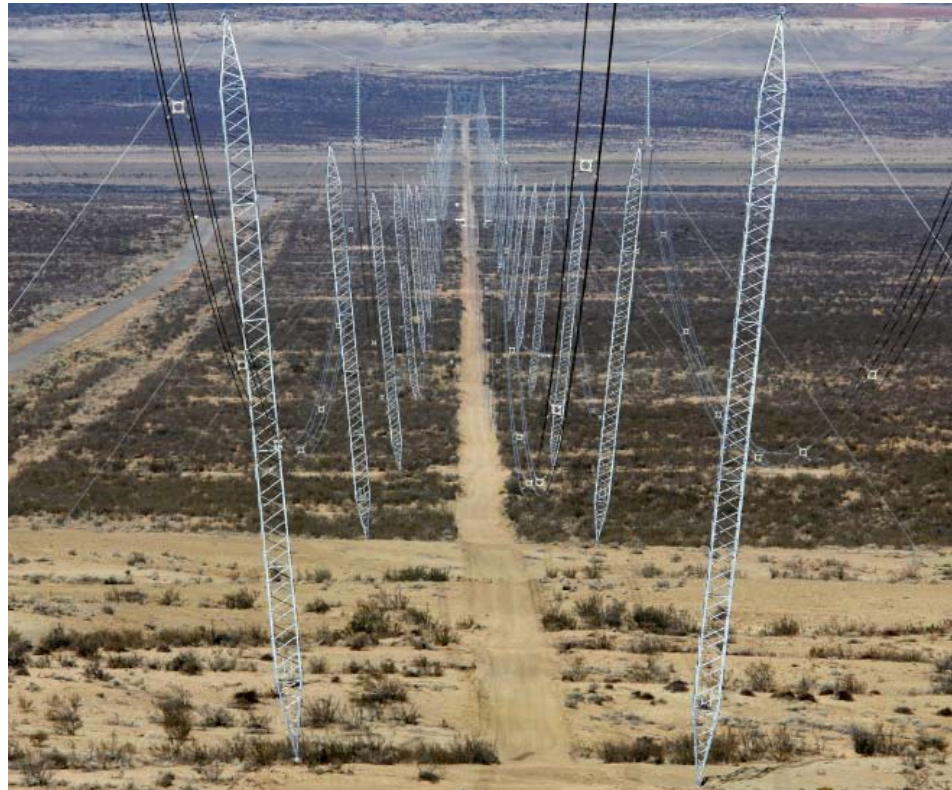
Abengoa offers its engineering and constructions customers a wide range of solutions relating to energy, transportation, telecommunications, industry, services and the environment. It provides groundbreaking solutions in clean energies and champions sustainable development by applying its considerable technological know-how to the following areas:

- Design and construction of electrical power plants based on renewable energies, capable of generating thousands of MWh (megawatts hour) of clean energy.
- Design and construction of biofuel plants to help combat climate change.
- Design and construction of cleaner and more efficient power plants.
- Design and construction of energy efficient power lines to help curb energy consumption.

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Comahue-Cuyo interconnection
Section of power line heading south



Transmission towers on the ATE IV line
Towers for the ATE IV Curitiba-Bateias power line



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 power facilities and waste treatment.
- Industrial infrastructures and installations associated with conventional and high-speed railway.
- Telecommunication systems.

Abengoa aims to become an international market leader in the engineering and construction of power and environmental infrastructures and industrial installations on the path towards sustainable development.

Engineering and Construction embraces activities in which the division has over seventy years of experience in the market. It specializes in the performance of complex turnkey projects (EPC: Engineering, Procurement and Construction): CSP plants, hybrid solar-gas plants, conventional power plants and biofuel facilities; hydro infrastructures, including large-scale desalination plants; power transmission lines and critical infrastructure control systems, among others.

The division has cemented its presence in no less than 32 countries on all continents, adapting its structure to meet local social, cultural and economic conditions but without ever losing sight of its corporate social responsibility with the surrounding area. It is therefore able to understand and adapt to the different needs of each community in which it carries out its different lines of business.

Abengoa's growth model is rooted in its market credibility, its technical, financial and managerial prowess, its ability to seek out and secure strategic alliances, its social responsibility and its technological leadership.

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The company expects to report high growth from its projected investments for the coming years. Its growth is based on leadership and knowledge of the contracts it secures and the associated risks, and also on its financial structure and strategic alliances.



Acceptance testing

Acceptance testing at the ABB factory (Asea Brown Boveri) in Ludvika (Sweden) on one of the seven 500 kV (HVDC) - 600 MW - 600 Tm converter transformers

The engineering and construction division bases its growth on a three-stage model that has proved hugely successful to date: the know-how acquired from third-party projects enables it to reduce the risks associated with new internal projects performed by the company itself (concessions), while the references obtained from these internal projects allow Abengoa to secure new third-party projects. This virtuous circle is one of the keys to Abengoa's success.

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In line with this vision, the engineering and construction division aims to cement this position of international leadership and extend it to the other sectors flagged as strategic priorities. The division's strategy for 2012 therefore involves:

- Maintaining its position of international leadership in the engineering and construction of power transmission lines and electrical infrastructures.
- Cementing its position as an international benchmark in EPC projects for renewable power plants, particularly in the fields of solar energy and biofuels.
- Honing its skills in the environment sector, focusing on both water and waste.
- Continuing to grow in the industrial installations sector, where it already boasts a solid international presence.

The engineering and construction division also has a heavy international slant, with Abengoa targeting markets from across the globe:

- Latin America, where the sharp growth forecast for the coming years offers clear opportunities, especially given the company's excellent positioning within the region, with Abengoa being the region's fourth largest international contractor according to the ENR ranking.
- North America. Huge opportunity in the USA and Canada. This is in fact a key region where the company is currently expanding its presence: at present, more than ten Abengoa companies already have a permanent base in the region.
- Eastern Europe. Abengoa is firmly committed to this region, which promises much for the future.
- Middle East and Asia. Although Abengoa has less experience in these regions than in others, it expects to report heavy growth thanks to its know-how and prior experience in other territories.
- Other regions such as Australia, South Africa, Turkey, etc.

2011 in review

Abengoa's Engineering and Construction Division remains upbeat about its future growth, seeing as though the company's results have witnessed constant growth year after year and consistently outstrip the company's own expectations. It is continuing with its recent drive towards international expansion and growth, while cementing its leadership in those markets where it operates.

Ranked in 2011 as one of the world's leading construction firms in energy infrastructures according to the ENR (Engineering New Record) ranking, Abengoa is the world's largest international construction firm in power transmission and distribution, the largest for electrical infrastructures, and also the fourth largest contractor in Latin America. Moreover, it is already the sixth largest constructor of desalination plants according to the IDA Desalination Yearbook.

The talent and dedication displayed by the division's human team is one of the driving forces behind the company's success in executing its projects. Highlight projects for 2011 include:

- Ongoing construction of the Solana plant, which is set to become the world's largest solar power plant with 280 MW of installed capacity. The facility is located in Arizona and utilizes parabolic trough technology with thermal storage from molten salts, thus enabling the plant to increase the number of hours over which it can operate in daytime and also at night.
- Ongoing construction of the 100 MW Shams 1 CSP plant, the largest of its kind in the Middle East and located in the desert surrounding Abu Dhabi. Spanning 300 ha, the facility will curb annual CO₂ emissions by 175,000 t thanks to its nearly 600,000 m² of parabolic troughs.



Overhead shot of ongoing construction work on the Solana plant

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150 MW Hassi R'Mel hybrid ISCC plant in Algeria

- Work continuing on the El Carpio Solar Complex in Andalusia, the Castilla-La Mancha Solar Complex and the Extremadura Solar Complex. Each complex features two 50 MW power plants employing parabolic-trough technology.
- Completion and unveiling of the 150 MW hybrid solar-gas power plant in Hassi R'Mel (Algeria), one of the world's largest hybrid power plants. This groundbreaking facility is already exporting power to the national Algerian grid. With construction now completed, Abengoa has been tasked with the operation and maintenance of the plant for the coming 25 years.



- Another major milestone was the completion and commercial start-up of the 220 kV Carhuamayo-Cajamarca power line and associated substations in Peru. The project includes 670 km of line, two new substations and upgrades to five existing substations.
- Ongoing construction on the 600 kV direct current Porto Velho-Araraquara power line in Brazil. This is a truly groundbreaking milestone in that it is one of the world's longest direct current transmission lines at 2,350 km. Work is also continuing on the 230 kV Jauru-Porto Velho alternating current line as part of the Pre-Madeira project, which spans 987 km in total. Over the last ten years, Abengoa has constructed over 2,000 km of HV power lines and 21 substations. Abengoa currently has 4,000 km of lines (2,400 km being 600 kV direct current) and 16 substations under construction for concessionaire companies in which it holds a controlling stake.

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- Start-up of the 500 kV EHV (extra high-voltage) power line in Argentina between the Agua del Cajón transformer substation and the Rio Diamante transformer substation, spanning a grand total of 518.6 km.



Agua del Cajón
Agua del Cajón transformer substation in Argentina.

The satisfaction of our customers following successful completion of their projects has enabled Abengoa to secure and start up various new contracts, of which we would highlight:

- Construction underway on the Mojave facility, a new 250 MW CSP plant sited in the Mojave Desert and utilizing parabolic-trough technology. The facility is set to become one of the world's largest solar power plants.
- Work has also started on the world's first second-generation bioethanol plant intended for commercial use. The facility, which will run on cereal straw instead of grain, will produce 26 Mgal of bioethanol a year and 20 MW of electricity in the United States.
- In Peru, Abengoa has started work on the 500 kV Chilca – Marcona – Ocoña – Montalvo power line and associated substations, which includes the installation of two series compensation capacitors at the Ocoña substation. The 800 MW line is 872 km in length and has 1,200 MVA of transformation capacity.
- Abengoa has been awarded a 25-year contract to supply drinking water, with the project including the engineering and construction, and also operation, management and maintenance of the El Zapotillo-Los Altos de Jalisco-León aqueduct in Guanajuato, Mexico.
- Contract awarded for a water supply system in the city of Dogubayazit, Turkey, further consolidating Abengoa's presence in the country.
- Contract awarded towards the end of the year for two solar power plants in South Africa: a 100 MW plant employing parabolic-trough technology and a 50 MW plant featuring power tower technology, one of the largest of its kind worldwide.
- Contract awarded to the Spanish-Saudi consortium Al Shoula Group (which includes Abengoa) to construct a high-speed railway line connecting the cities of Medina, Jeddah and Mecca in Saudi Arabia.

220 kV Carhumayo-Cajamarca transmission line



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- A further highlight for 2011 was Abengoa’s new inroads in the wind energy sector, marking another bold step forward towards its objectives in this area. The company has been entrusted with the design, construction, operation and maintenance of a wind farm in Cuchilla de Peralta, Tacuarembó (Uruguay), with 50 MW of installed capacity. It has also secured contracts from Aneel (Brazilian Electrical Energy Agency) for three wind farms with a combined capacity of 64 MW, namely Santo Antonio Pádua, Sao Jorge and Sao Cristovão, all located in the municipality of Trairí in Ceará state (Brazil).

Our activities

Abengoa’s engineering and construction division is structured under the following five different lines of business:

Energy

This business line is primarily engaged in the design, engineering and construction of power generation plants and transmission systems.

Spain

The main projects undertaken at home in 2011 were as follows:

- Abengoa has completed work on the Ecija Solar Complex (Seville), featuring two 50 MW CSP power plants, namely Helioenergy 1 and Helioenergy 2, which are already supplying the commercial grid.

Helioenergy parabolic-trough solar field, Ecija (Seville)



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Pilot high-voltage line stringing by helicopter in Spain



- Ongoing work on eight 50 MW CSP power plants in the municipalities of Ecija and El Carpio in Andalusia, Logrosan in Extremadura, and in Ciudad Real, all employing parabolic-trough technology. As a whole, the power plants will generate enough electricity to supply over 200,000 homes and will slash yearly CO₂ emissions by over 250,000 t.
- Abengoa has been heavily involved with a number of the leading power utilities in Spain, and is also helping to construct electricity evacuation and transmission infrastructures for the solar power plants being promoted by Abengoa.
- Abengoa has been awarded a contract for the design, civil engineering, supply and start-up of three 400 kV distribution substations in Cerrato (Palencia).

Europe

Highlight projects for the rest of Europe include:

- Ongoing work on the 150 kV Riba de Ave-Oleiros high-voltage line for REN (the Portuguese Electricity Grid).
- In 2011, Abengoa continued to provide engineering services to the client RTE EDF Transport, involving studies and projects to reinforce, adjust, restructure, change conductors and make other modifications to high-voltage overhead lines.
- Completed work on the 400 kV Lescovak-Macedonia Border line for the Serbian electricity utility EMS, thus paving the way for future interconnection between Serbia and Macedonia.

United States

Highlight projects for this particular region include the following:

- With an installed capacity of 280 MW, the Solana plant is set to become the world's largest solar power plant and features parabolic-trough technology with thermal storage based on molten salts, thereby enabling the facility to increase the number of hours over which it can operate in daytime and also at night. The facility will power 70,000 homes while curbing yearly CO₂ emissions by 475,000 t.



Construction of molten salt storage tanks at Solana, Arizona

- Construction is underway on the Mojave facility, a new CSP plant in the Mojave Desert (California). The facility will include two CSP plants, each with a net installed capacity of 140 MW for a combined useful power output of 250 MW. The Mojave project is also set to feature one of the world's largest parabolic-trough solar fields.

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- Start of construction on the world’s first second generation biomass-to-bioethanol plant in Hugoton, Kansas. The plant, which will produce 26 Mgal of cellulosic bioethanol per year, will harness Abengoa’s own enzymatic hydrolysis technology. The plant will run chiefly on agricultural waste, such as corn or sorghum stems, but can also use wheat straw, wild grass and even wood chippings. The facility will also generate 20 MW of electricity from biomass, enough power to meet its own energy needs and demand for ethanol production.
- Abengoa has strengthened ties and strategic alliances with North American engineering and construction companies interested in developing and promoting joint projects to meet the current demand for power transmission lines of certain North American utilities.

Mexico

The most significant projects in Mexico are detailed below:

- Turnkey contract, including one-stop engineering and construction, for a 640 MW combined cycle plant in the state of Morelos, Mexico. This electrical power plant of the Mexican Federal Electricity Commission will form part of the “Proyecto Integral Morelos” project, a key initiative in developing central Mexico.
- The Mexican CFE (Federal Electricity Commission) awarded an EPC contract to construct the 42.3 MW Baja California Sur IV internal combustion plant in the state of Baja California Sur.
- The CFE awarded Abengoa the Agua Prieta Phase 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 plant.
- Ongoing construction of the 300 MW cogeneration plant in Tabasco (Mexico) for the state-owned company Petróleos Mexicanos (PEMEX). The project encompasses both the construction and a 20-year operating concession for the plant. The new facility will be able to generate up to 800 t of steam to supply electricity to the New PEMEX Gas Processing Complex in Tabasco, while exporting surplus power into the Mexican national power grid.
- Abengoa secured the Agua Prieta II power line contract from the CFE, comprising three substations (including a total of nine feeders) and two power lines spanning 82.6 km and with voltages of 400 and 230 kV in the Mexican state of Sonora.
- Abengoa was awarded the substation 1116 “Transformación del Noreste” contract (phase 3), involving the construction of six 400 and 138 kV transmission lines for a total length of 85.6 km, and six substations with voltages of 400 and 138 kV, with a combined transformation capacity of 500 MVA and 14 feeders, all located in the Mexican state of Tamaulipas.

Substation constructed by Abengoa México



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- In the final quarter of the year, the company managed to secure the SE 1321 Distribución Noreste (phase 3) project, which includes the construction of a distribution substation with voltages of 115 kV and 13.8 kV, to be located in the Mexican state of Chihuahua.
- Continued work on the first phase of the substation and transmission line contract for the Baja California and North West areas, and also on the substation 1110 "Compensación capacitiva del Norte" project involving the construction and installation of three substations of 230, 115 and 69 kV.

Central America

- Siepac project (Central American Electrical Interconnection System), involving the construction of 950 km of 230 kV power lines across Nicaragua, Costa Rica and Panama and has now completed all of the Nicaragua section.

Peru

Detailed below are the main projects carried out in 2011 by Abengoa in Peru, Abengoa's engineering and construction company operating within the South American country:

- Start of work on the 220 kV Paragsha-Francoise power line and upgrade work on the Paragsha II substation and new Francoise substation, combined with a 30-year operation and maintenance agreement. The project embraces the engineering, study, procurement and construction of the roughly 55 km of high-voltage line, which will be strung at between 4,200 and 4,500 m above sea level within a timeframe of 540 days.
- Start of construction on the Chinalco project, which will involve the one-stop engineering, procurement and construction (civil and electromechanical work) of the 220 kV Pomacocha-Toromocho transmission line, the 23 kV Toromocho-Kingsmill distribution line and upgrades to the Pomacocha substation.
- Start of construction on the Cheves project, comprising the one-stop engineering, procurement and construction (civil and electromechanical work) of the 220 kV Cheves – Huacho transmission line (75 km) and upgrades to the Huacho substation.
- Construction continuing on the 500 kV Chilca – Marcona – Ocoña – Montalvo transmission line and three new substations in Peru, and 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.
- Completion of work on the 200 kV high – voltage Carhuamayo – Carhuaquero power line and associated substations in Peru. The project includes 670 km of line, two new substations and upgrades to five existing substations.
- Completion of work on the Tía María project, encompassing the study, engineering, procurement and construction of the 220 kV Montalvo-Tía María power transmission line and upgrades to the 220 kV Montalvo substation. The project covers roughly 101 km along the coastline of two southern regions, namely Arequipa and Moquegua, and includes one of the longest spans to be found on the country's transmission line network at 1,700 m.

220 kV transmission line between Montalvo and Tía María, Peru



500 kV transmission tower, ATE III Itacaiúnas (Pará)-Colinas (Tocantins)



Brazil

Listed below are the main projects performed over 2011 by Abengoa in Brazil:

- Completion of work on the ATE IV Canoinhas (Santa Catarina)-Sao Mateus (Pará) line.
- Completion of the ATE VI Doña Francisca (Rio Grande do Sul)-Santa Maria (Rio Grande do Sul) power line.
- Completion of the project to increase transformation capacity at the ATE VII Foz do Uguacú (Pará) substation.

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- Work continuing on the project to increase transformation capacity at the ATE III Itacaiúnas (Pará) substation.
- Completion of the turnkey EPC contract signed with Eletronorte to construct the Ribeiro Gonçalves (Piauí)-Balsas (Maranhão) transmission line, including the new Balsas substation and upgrades to the Ribeiro Gonçalves substation.
- Continuation of work on the turnkey EPC contract signed with Porto Velho Transmisora de Energía (subsidiary of Eletrosul) for Lot A of the Madeira project, involving the construction of a back-to-back station in Porto Velho (Rondônia).
- Work progressing on the turnkey EPC contract signed with Estação Transmisora de Energía (subsidiary of Eletronorte) for Lot C of the Madeira project, involving the construction of a rectifier station in Porto Velho (Rondônia) and the corresponding inverter station in Araraquara (Sao Paulo) at the two ends of one of the 600 kV direct current transmission lines forming part of the infrastructure in place to draw hydro power from the Madeira River.
- Work continuing on the turnkey EPC contract signed with Manaus Transmisora de Energía (consortium comprising Abengoa, Eletronorte and Chesf) for Lot C of the Manaus project, involving construction of the 500 kV Oriximiná (Pará)-Silva (Amazonas)-Lechuga (Amazonas) transmission line, and including the new Silves and Lechuga substations.
- Start of work on the turnkey EPC contract signed with Norte Brasil Transmisora de Energía (consortium comprising Abengoa, Eletronorte and Eletrosul) for Lot G of the Madeira project, involving construction of the 600 kV Porto Velho (Rondônia)-Araraquara (Sao Paulo) direct current line.
- Start of work on the turnkey EPC contract signed with Línea Verde Transmisora de Energía (consortium comprising Abengoa and Eletronorte) for the Pre-Madeira project, involving construction of the 230 kV Jauru (Mato Grosso)-Porto Velho (Rondônia) direct current line and including adaptation work on seven existing substations.
- Start-up of engineering and procurement for the 230 kV Itacaiúnas (Pará)-Carajás (Pará) power line. The corresponding contract was awarded at the last Aneel auction for transmission systems held in 2010, leading to the incorporation of the concessionaire company ATE VIII.
- EPC construction of wind farms to generate electricity for Abengoa concessionaire companies. Abengoa holds equity stakes in three future wind farms to be located in the state of Ceará as part of the Eólico Trairí II complex, which will boast a total installed capacity of 96.6 MW.

Chile

Abengoa successfully completed the following projects in 2011 in Chile:

- Chacaya Maitenes transmission line for the customer Pacific Hydro. This project involved the construction of an interconnection substation and upgrades to the Maitenes and Sauzal substations and the 2x220 kV power transmission line between the Chacayas and interconnection substations. The work required the company to configure the switching substation as a SF6 gas insulated substation (GIS), modify and extend the Maitenes and Sauzal substations and construct a 2x220 kV line between the Chacayas and switching substations.
- New 220 kV Agua Santa line bay at the San Luis substation. The project included the installation of a 110 kV position with its respective switch, along with output switch, two bar switches, three current transformers, three potential transformers and three lightning conductors.
- Work underway on the Cardones substation-Punta Totalillo substation power line project. The contract envisages construction of the first circuit of a 220 kV double circuit power transmission line spanning roughly 140 km. The ultimate aim of the project is to supply electricity to the Cerro Negro Norte mine and Totalillo desalination plant from the Cardones substation.



Work in progress on the Chacaya-Maitenes transmission line

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- El Tesoro CSP plant: this particular project embraces the construction, procurement, supply, commissioning, start-up, operation, and training of Minera El Tesoro workers in relation to the one-stop operation and maintenance of a solar energy plant capable of supplying at least 60% of the annual thermal power needs of the SX-EW (solvent extraction and electrowinning) process of the Minera El Tesoro mining company for a minimum period of 10 years, extendable to 20.

Uruguay

Highlight projects for this region include the following:

- Work underway on Abengoa’s new wind power business line in Uruguay, with Abengoa securing a contract to design, construct, operate and maintain a 50 MW wind farm in Cuchilla de Peralta-Tacuarembó for the Uruguayan National Authority for Power Generation and Transmission (UTE).
- Abengoa is performing the 500 kV substations project for the Uruguayan state-owned UTE. The project encompasses the supply and turnkey installation of two 500 kV stations, which will effectively connect the Punta del Tigre power line with the existing Uruguayan 500 kV power transmission grid.
- In relation to the frequency converter station project for UTE, Abengoa has been sub-contracted by Areva to carry out all the civil engineering and electromechanical assembly work on a frequency converter station capable of transmitting up to 500 MW between Uruguay and Brazil.
- Contract awarded for a 18.5 Mgal 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), producing 50,000 t of the DDGS (Distillers Dried Grains with Solubles) byproduct to be used in the production of animal feeds. 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 its raw material.

Argentina

The main contracts in progress or completed in 2011 by Abengoa in Argentina, are as follows:

- Completion of the 500 kV Comahue – Cuyo interconnection. This project interconnects since September the Agua de Cajón substation in the province of Neuquén with the Gran Mendoza transformer substation located roughly 707 km away in the province of Mendoza, requiring a 500/220 kV substation called Rio Diamante midway between the points. It is also worth noting that this project also envisaged an associated emissions control process to track CO₂ emissions for each line and transformer station, with the resulting report detailing both emissions generated by third-party supplies and those stemming from the company’s own work on the project.

Agua del Cajón substation, Argentina



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- 132 kV single-circuit high-voltage line between Estanislao del Campo and the Las Lomitas transformer station (Formosa province). The project is currently in progress and is expected to be completed and brought on line over the second half of 2012.

Africa

- Completion, unveiling and start-up of the 150 MW Hassi R'Mel hybrid solar/gas plant where Abengoa was tasked with the engineering, design and start-up of the hybrid plant, which combines a natural gas combined cycle (NGCC) and a solar field featuring 224 parabolic troughs, with enough capacity to generate up to 25 MW of energy.

Hassi R'Mel ISCC plant in Algeria



HV lines for the Moroccan motorway administrator



- In the energy sector Abengoa continues working on high-voltage transmission lines for Autoroutes du Maroc (ADM).
- Award of the KaXu Solar One plant, a 100 MW parabolic-trough solar plant with a storage capacity of 3 hours and to rest on 1,100 ha of land. The facility will be sited near the city of Pofadder, to the north of the Northern Cape province in South Africa.
- Abengoa also secured a contract to construct the 50 MW Khi Solar One power tower solar plant in South Africa, one of the largest of its kind in the world. The facility, with two hours of thermal storage, will sit on 600 ha of land close to Upington, also in the province of Northern Cape.

Middle East

- Abengoa continues to work on Shams 1, the largest CSP plant in the Middle East located in the desert on the outskirts of Abu Dhabi. The facility has an installed capacity of 100 MW and employs parabolic-trough technology. It features more than 700 troughs, comprising 12 mirror modules covering a total area of 300 ha. Thanks to the nearly 600,000 m² of parabolic troughs, the plant generates enough electricity to power 62,000 homes, while curbing yearly CO₂ emissions by 175,000 t.
- Also in the United Arab Emirates, Abengoa remains involved in the project to install the 132 kV Fujairah-Tawyeen and Fujairah-Dibba power lines for Transco, with work expected to culminate in 2012.
- Continued construction work on the 132 kV high-voltage power line in Qurayyat for the SEC (Saudi Electricity Company). The company is also constructing the Jeddah and Riyadh GIS (Gas Insulated Substations), both 380 MW and 132/13.8 kV, again for the SEC.



100 MW CSP plant in Abu Dhabi.

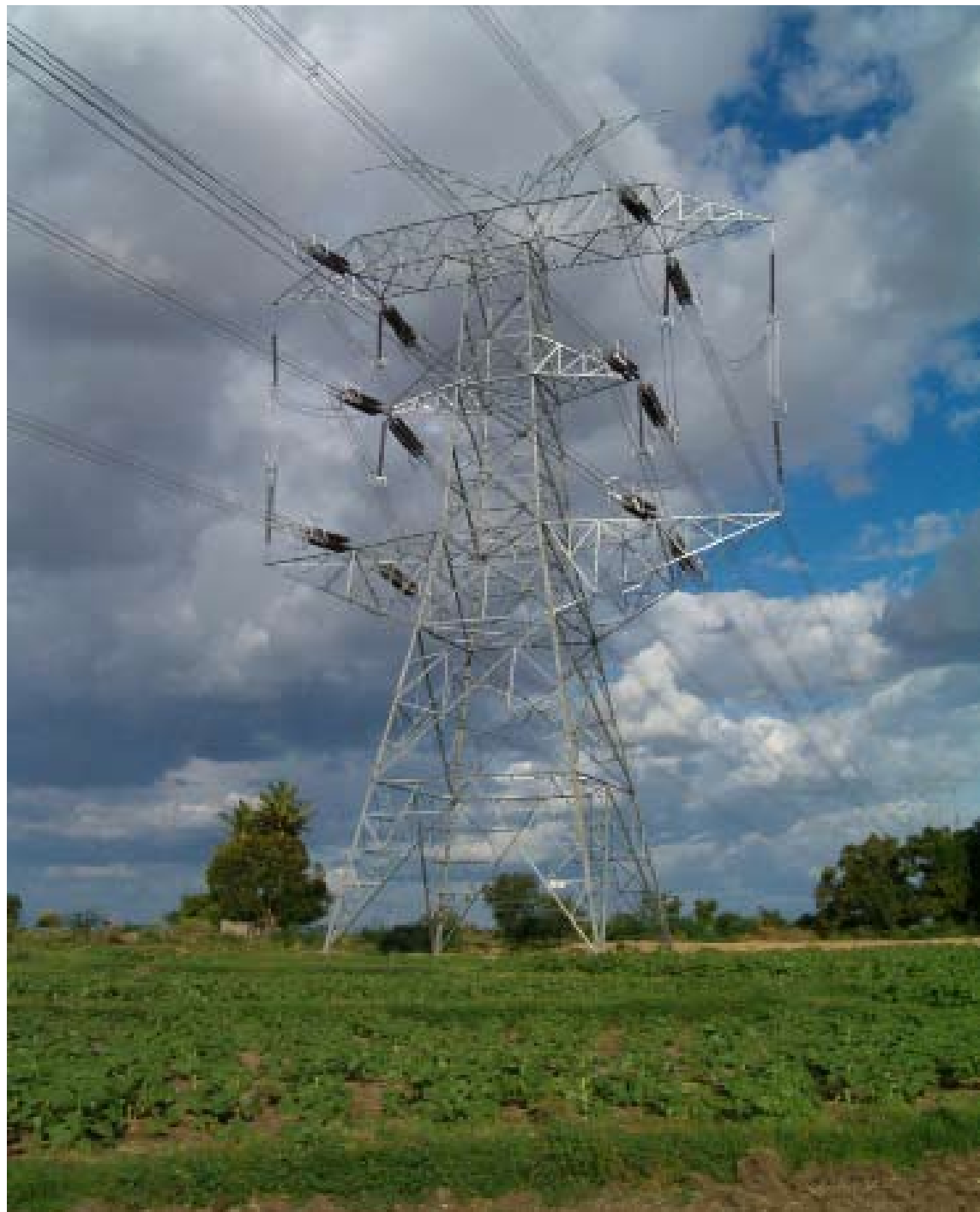
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India

- Abengoa has completed work on the 3 MW solar field for the Indian Institute of Technology Bombay (IITB). The start-up of this facility will enable the IITB to act as a base and platform for future technological research and development.
- Over 2011, Abengoa continued work on the two 400 km stretches of the 765 kV Biswanath Chariyali-Agra direct current line. Moreover, and with a view to expanding operations in the power transmission line sector, the company has been striving to gain direct entry into other state-owned electrical utilities, thus allowing it to eliminate its dependence on other tower manufacturers by creating its own production plant.
- Ongoing construction of a 20 kW photovoltaic plant.

Transmission tower for the line between Biswanath Chariyali and Agra.



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Environment

Environmental business encompasses the design, engineering and construction of water treatment and desalination plants, hydro projects and waste treatment facilities.

Spain

The main projects undertaken over the year within Spain were as follows:

- Completed construction of the Bajo Almanzora desalination plant in Almeria. The facility will be capable of producing up to 60,000 m³ of water per day. It employs reverse osmosis technology, with capacity to supply up to 20 h³ per year, 15 of which will be used for irrigating the local area, with the rest intended for human consumption.
- Construction underway on the waste treatment plant in the Port of Bilbao (Spain). The facility will be able to treat 120,000 t of sulfur while producing 350,000 t of sulfuric acid and oleum, effectively meaning it will be able to generate roughly 90,000 MW per year of electricity.
- Ongoing work to improve the water supply to the city of Caceres from the Portaje dam, the aim of the project being to meet the water supply needs of 150,000 inhabitants. The project envisages three pumping stations and over 65 km of water pipes with diameters ranging from 1,000 to 1,200 mm. Once completed, the piping will be able to transport a maximum of 1,500 L/s.

Turkey

The following key project was a particular highlight in Turkey:

- The Turkish Ministry for the Environment and Urban Planning entrusted Abengoa with the development of the water supply system for the city of Dogubayazit in eastern Turkey, very close to the border with Iran, with total project investment topping €22.5 M. The project includes the construction of a drinking water plant featuring a physicochemical process, which will boast a treatment capacity approaching 35,000 m³ per day, enough to supply water to 175,000 people, along with two reservoirs with a combined volume of 7,000 m³ and 400 km of piping. The contract will help to develop the area, which will now enjoy a guaranteed supply of drinking water all year round.

Mexico

The company has been awarded the following key project in Mexico:

- Abengoa has secured the contract to construct the El Zapotillo aqueduct, which will provide an efficient, sustainable and safe means of supplying drinking water to just shy of one and a half million inhabitants. The engineering work includes the construction of 139 km of large diameter piping; pumping stations with a total installed capacity of 24,000 kW; a drinking water treatment plant of 3,800 L/s; a 100,000 m³ capacity storage tank; and a 40 km distribution circuit within the municipality of León.



Drinking water and sewerage systems commissioned by Sedapal for the areas of Pariachi, La Gloria, San Juan, Horacio Zevallos and annexed territories.

Peru

Detailed below are the main projects to have been performed in Peru:

- Award and start-up of engineering work to extend and improve the drinking water and sewerage system for the Pachacútec macro-project. The project encompasses the design, supply, land preparation and construction of the entire water and sewerage system, including a 430 L/s wastewater treatment plant. It is the largest water and sewerage project currently underway in Peru and will benefit an estimated 200,000 people.

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- Start of construction to expand and improve the drinking water and sewerage system of the Pariachi area for Sedapal. The project embraces the design, supply, land preparation and construction of the entire water and sewerage system, including drilling, boreholes and the installation of pressurized pipelines. The initiative also envisages the construction and outfitting of a 420 L/s activated sludge treatment plant in the area of Santa Clara, the water from which will be reused to irrigate short-stemmed plants.
- Completion of construction work to improve the drinking water and sewerage systems for Piura-Castilla Contract 3 A. The project involved the construction of a sewage treatment plant with an average flow rate of 200 L/s, a perimeter enclosure for the El Indio lagoon and a wastewater analysis laboratory. It also required the company to restore primary and secondary drinking water and sewerage networks, including household connection points for the area, and to install 23,500 household meters with meter boxes and accessories.
- Abengoa, through a consortium with Graña y Montero, are continuing work on the La Tomilla II water treatment plant in the city of Arequipa for Sociedad Minera Cerro (Contract Lots 1 and 2). The project includes a water intake for the Chili river, an 11 km pipe, 2 tunnels spanning 1,270 and 190 m, a 167 m vertical shaft, and a water treatment plant capable of treating 1,575 L/s.



Construction of a liquid industrial waste treatment facility at the Quilicura plant in Chile

Chile

Highlight projects in the country include:

- Execution of the Gran Alimentadora Valparaíso pipe laying project, which required the company to relay 700 mm piping along the section between km 2,850 and km 5,528.
- Construction also got underway in 2011 on the liquid industrial waste treatment facility at Quilicura plant, requiring civil engineering work and assembly of the industrial water treatment facility. The project also envisages the Santa Cruz reservoir, which will involve the construction of a 1,100 m³ reservoir capable of supplying water to 35,000 local residents.

Uruguay

Highlight projects performed by Abengoa in Uruguay include:

- Completion of pumping line six for the State Department of Sanitary Works, including the design, supply and laying of 47 km of ductile cast piping with diameters of between 800 and 1,200 mm and 40 km of piping with diameters of between 350 and 800 mm.
- Abengoa continues to provide Montevideo City Hall with urban waste collection and cleaning services, which are carried out through the Cap consortium (Consortio Ambiental del Plata).

Argentina

Key projects performed in 2011 by Abengoa in Argentina include:

- Extension of the sewage system in San Vicente (Buenos Aires) to cover over 20 km of sewage network and 1,000 household connection points, and extension of the drinking water network in the localities of Pehuajó and 9 de Julio (both in Buenos Aires), requiring over 19 km of drinking water infrastructure, 1 pumping station, 20 collecting wells and 21 connections to existing infrastructure.

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China

Detailed below is a hugely important project currently in progress in China:

- Ongoing work on the Qingdao seawater desalination plant, at which Abengoa have successfully completed the outfitting and assembly work. The facility will be capable of desalinating 100,000 m³ of water per day and will supply drinking water to 500,000 people. The plant utilizes reverse osmosis technology and includes innovative design features, both during pretreatment (ultrafiltration membranes) and in terms of its centralized pumping system, rendering the facility more energy-efficient.

Outfitting

This particular line of business encompasses industrial and infrastructure engineering, construction and maintenance relating to:

- Industrial plants.
- Electrical and mechanical installations.
- Custom construction work.

Detailed below are the most significant contracts secured and/or performed in this particular field:

Spain

Highlight projects for 2011 in Spain include:

- Maintenance of the HV installations at the new Heineken brewery and also with the restoration of Hotel Alfonso XIII (both in Seville). It has also been commissioned by Adif (Spanish national railway administrator) to carry out work on various stations due to the remodeling of the Camas-Salteras stretch of the Seville-Huelva commuter railway line.
- Remodeling of the El Algar pumping station in Alicante, and is now starting to reroute the overhead lines affected by the new high-speed AVE railway network. It is also working on the Font de la Figuera stretch of the A33 highway for Acciona.
- Abengoa has been awarded the contract for HV lines in north Catalonia, which envisages repair, construction and replacement work and voltage changes, among others. In the field of transport communications, the department is helping to maintain line 9 of Barcelona Subway through a consortium with five other leading companies from the sector.
- Ongoing work on the framework substation agreement for Iberdrola. Similarly, the department has successfully completed the links for the 13.2 kV high/medium voltage line from Billabona-Aia and from Lesaka-Bera under the framework distribution agreement for the province of Gipuzkoa.
- Key contracts awarded include electrical installations at five stations on Line 6 of the Madrid Subway, fire protection work, energy control for the Mutua Madrileña building at 50 Paseo de la Castellana, Madrid, and electrical installation work for the Helios 1 and 2 concentrating solar power plants in Ciudad Real.
- Development and construction of new vehicles projects for the PSA Peugeot Citroen factory in Vigo, installation work at plants operating in the power, wood, and metal processing and integrator sectors and construction of custom buildings, industrial estates, road lighting and video surveillance systems.



Osmosis racks at the Qingdao desalination plant in China



Ducting of high-voltage cables in Puigreig street, Barcelona

Work to widen the La Cabada – Cantabria road



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Mutua Madrileña building on Paseo de la Castellana, Madrid



Moving of VOR regulator rooms at Ibiza Airport



- Civil engineering work on the project to move VOR regulator rooms at Ibiza Airport.

Mexico

The most significant projects undertaken by Abengoa in México are detailed below:

- Project to construct four three-phase separators at the Bellota-Jujo Integrated Asset on PEMEX facilities occupied by the prospecting and production division in the municipalities of Cárdenas and Cunduacan (state of Tabasco).
- Construction, integration, appraisal, testing, training and start-up of a 34.5 kV synchronization bus at Thermal Power Plant 1 of the Francisco I Madero refinery in Tamaulipas.

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- Contract for the part supply, installation and start-up of a 143 kW electrical power generation facility property of ABB at its San Luis Potosí plant.
- Construction of the Centro Cultural Mexiquense Bicentenario (cultural center). The complex occupies 17 ha 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, halls, open-air theater, concert hall with seating for 1,200 people, cafeteria, restaurant and parking for over 1,000 vehicles. The impressive facility will welcome more than six million local inhabitants. Coaben is now to operate the center under a concession for the coming 20 years.

Brazil

Focusing on outfitting, the following projects are worthy of particular note in Brazil:

- Turnkey construction of an office building located in Barra de Tijuca, with a floor area of 8,070 m² structured in 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.
- Currently constructing the valve rooms and service areas of the Araraquara II substation, including foundations (7,500 m³), assembly of metal structures (670 t), assembly of precast structures (1,400 m³) and the masonry and finishes for the buildings.

Chile

In outfitting, Abengoa started work on the following project in Chile:

- Design and construction of the infrastructure for the new TK04 electric mining loop to power the drilling and excavation machines that are to extract ore from the future pit of the Minera Quadra Chile mining company facing the settlement of Sierra Gorda. The project also includes the design, construction, assembly and start-up of infrastructure for the 220 kV system of the Sierra Gorda substation.

Operators constructing a power transmission line



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Engineering and construction

Uruguay

Listed below are the main projects to have been undertaken in this particular field:

- Construction of a diesel oil desulfurization plant, gasoline desulfurization plant and sulfur recovery plant for the National Department of Fuel, Alcohol and Portland Cement (Ancap). Abengoa has been tasked with the corresponding civil engineering and electromechanical assembly work within the La Teja refinery in Montevideo.



Desulfurization plant at La Teja Refinery

- Start of construction on the Montes del Plata cellulose pulp plant, including civil engineering and mechanical and electrical assembly of both the processing and water treatment facilities.
- Abengoa is currently expanding the Sanatorio Americano hospital. The work has required the company to erect a new building of nearly 8,000 m² to house an ER area, surgical blocks and admission halls.
- On a final note, we would highlight the construction of two new bridges over the Yaguarí and Santa Lucía rivers, spanning 148 m and 650 m, respectively, as part of the national road network.

North Africa

Abengoa has been the key player in this region:

- In the industrial sector, Abengoa has continued to cement its position in the Moroccan market by assisting with the industrial assembly of the new Renault factory in Tangier, and carrying out installation work on the new steelworks of Maghreb Steel.

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Middle East

We would highlight the following projects in this region:

- Abengoa has signed a number of contracts relating to the Shams 1 CSP plant, with the commissioned work including electrical installation, laying of 220 kV and 11 kV cable and telecommunications.

Transportation

This line of business embraces the design, supply, assembly and maintenance of conventional and high-speed railway installations.

Spain

In the field of transportation, the following projects are worthy of particular note at home:

- The Spanish administrator of railway infrastructure (Adif) has continued to place its trust in Abengoa's railway department by commissioning it with various new projects, including rail voltage work, extending the reach of the Camas-Salteras stretch of the Seville to Benacazon commuter railway, eliminating critical points and serious defects on the Seville commuter railway network and renovating Castejon station. Similarly, Abengoa has continued to play a prominent role in maintaining most of the high-speed lines through contracts for the Madrid-East Coast, Madrid-Barcelona and Madrid-Valladolid links.
- In addition, thanks to the unrivalled performance and quality of Abengoa's cutting-edge machinery, particularly its line stringing train, the company was called into action to string the catenary system on the new high-speed Vigo-A Coruña line.



Catenary line installed by Abengoa



Automatic gate at the high-speed train station on the Beijing – Shanghai line

International market

- Towards the end of the year, Abengoa accomplished one of its most impressive milestones for the year by entering the consortium of Spanish companies entrusted with the Mecca-Medina high-speed railway line, which will connect the cities of Medina, Jeddah and Mecca in Saudi Arabia. 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 twelve years.
- A further milestone was its penetration of the French rail electrification market, having secured from Société Nationale des Chemins de Fer Français (SNCF) a contract to upgrade the catenary systems at Lourches and Cambrai stations and to remodel the catenary system for the railway stations in Lille.
- First rail electrification contract for Central Organisation for Railway Electrification (CORE).
- Lastly, manufacturing of 1,200 automatic gate machines (AGMs) for the high-speed Beijing-Shanghai train stations and X-ray scanners to be installed at a number of different Chinese airports and stations.

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Services

This business line brings together EPC projects for telecommunications and the production and supply of auxiliary and insulation equipment and materials.

Spain

At home, highlight projects for 2011 included:

- Abengoa has continued work on the 2007-2012 Global Customer Loop Contract with Telefónica de España S.A.U., with implantation ongoing in the provinces of Alicante, Badajoz, Barcelona, Cadiz, Jaen, Madrid, Seville, Tenerife and Valencia. Over the year, the company carried out the associated installation work for 292,000 new customer subscriptions and repaired over 410,000 faults for Telefónica.

The contract envisages the ongoing implementation of FTTH (Fiber To The Home) networks. Infrastructure installation for 2011 extended to 138,500 properties in Madrid and Barcelona, which are fed by 212 km of fiber optic cable (between 64 and 256 fibers) on the trunk network and nearly 242 km of 32-fiber or less cables on the access network towards the end user. Over 11,000 customers have signed up for voice, data and, in certain cases, video services provided directly through fiber optic cables.

- Deployment of state-of-the-art mobile telephony technologies for both technology firms (Huawei-NSN) and operators (Vodafone-Orange); third year of maintenance on Orange's fixed and mobile telephony network; final stage of GSM-R deployment for the Barcelona commuter railway network; and communications on the Opera – Principe Pio branch of the Madrid Subway system.
- Supplied the Spanish electricity grid operator (REE) with auxiliary services cabinets and protection relay frames, among other items. It has also been involved in the new Nuevo Pemex electrical cogeneration plant in Mexico, developing the main MV and LV switchboards. In the solar market, the necessary equipment has been supplied for the Solacor, Solaben and Helios solar power plants, while in the aerospace market, we would highlight the manufacture of earth-based satellite test benches for Crisa EADS – Astrium.
- Upgrades to the Repsol refinery in Cartagena (Murcia) through the supply of power cables and instrumentation, lighting, trays, conduits, junction boxes, compression glands, control stations, power outlets, panels, capacitor batteries and direct current supply boxes. In relation to the Fuel Oil Reduction Unit project for Petronor, Repsol's refinery in Bilbao, Abengoa was awarded a one-stop agreement to supply all the associated electrical materials and instrumentation assembly work.



Operator carrying out maintenance work



Repsol refinery in Bilbao

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- Contract by Navantia S.A. to supply the Vortex panels for the new S-80 submarine, which will be fitted on the first four S-80 type submarines Navantia is currently building for the Spanish Navy. Abengoa has also conducted a pilot test at a Madrid Subway station involving the installation of 75 LED tubes. So far, the results of the tests have been positive.
- Supply of the power transformers for the Helienergy, Solacor, Solaben and Helios CSP plants, as well as many other plant components, such as uninterruptible power supply systems, sampling systems, cables and equipment. The company will also be responsible for overseeing the assembly work.
- Completed construction of the pedestrian and cycle path access route to the Campus Palmas Altas in Seville, Abengoa's headquarters, which were designed by the architect Richard Rogers and the Spanish firm Vidal y Asociados Arquitectos. The walkover connects Campus Palmas Altas to the district of Los Bermejales, without affecting the existing SE-30 ring road.

Solar field at the 50 MW Helienergy Ecija CSP plant



Europe

- Upgrade the Galp refinery in Sines, Portugal. The project will entail heat insulation work covering roughly 120 km of piping, and fireproofing of 15,000 m² of metallic structure and 10,000 m of cable trays.
- In relation to the project to restructure the Sines refinery (Portugal) of Galp Energia, Abengoa was awarded a contract to supply the power cables and instrumentation, grounding, lighting, compression glands, junction boxes, switching stations, power outlets, signaling and beacons, local panels and pressurizing material.

United States

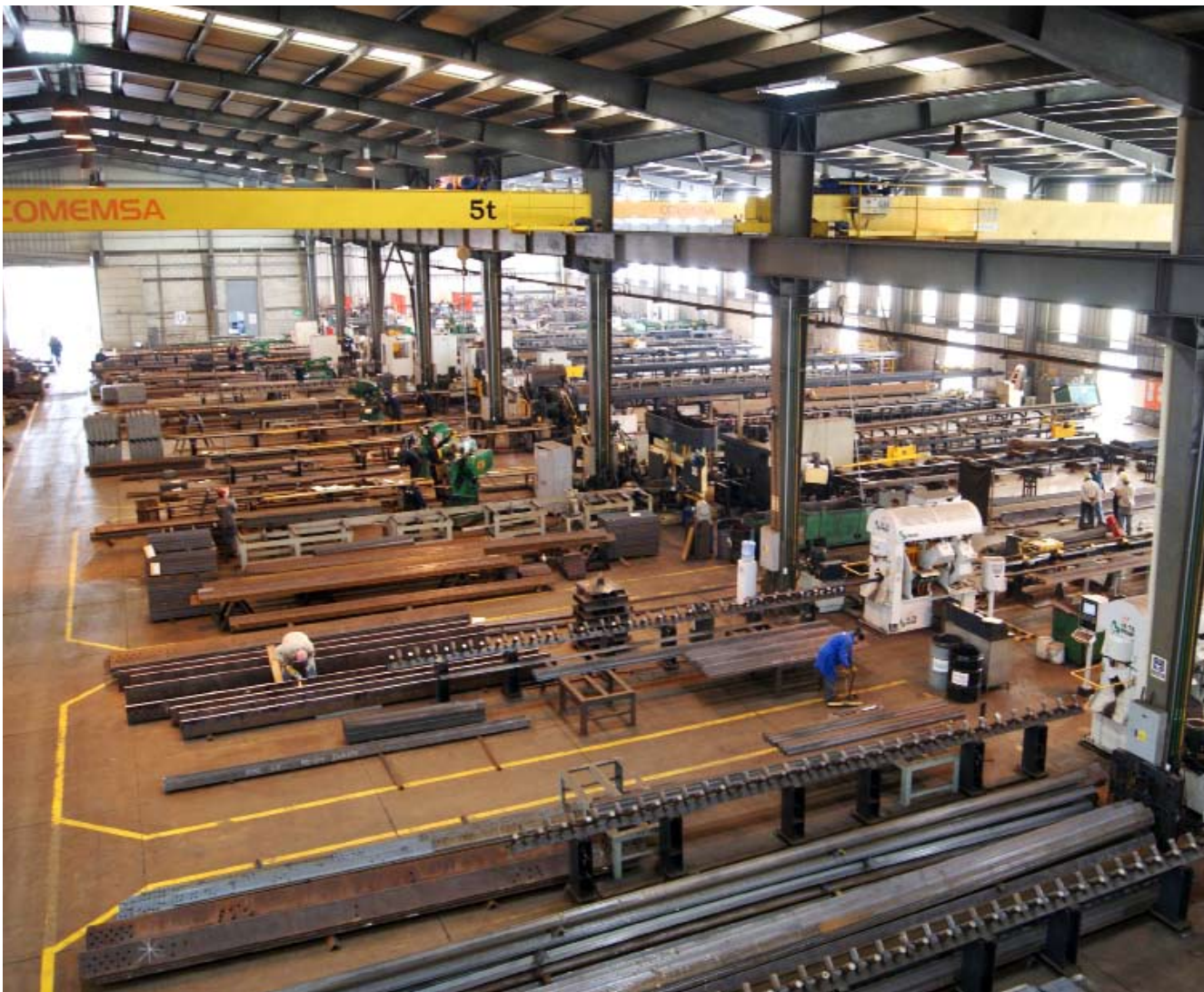
- Supply and start-up the main power transformers (200 MVA) and auxiliary transformers (58 MVA) for the Solana solar power plant in Arizona. Nicsa was also chosen under the same project as the one-stop supplier of cable and fiber optic, medium-voltage speed variators, busbar ducts and transformers.

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Construction factory for power transmission lines

- Supply of structures for the Solana plant in Arizona, which is scheduled for completion in 2012. The company has also completed a number of smaller projects in Mexico and structures are now being delivered under the 2010 contracts signed in North America with Southern California Edison (California) and Public Service Electric and Gas (New Jersey). Comemsa has also supplied the structures for the Shams 1 CSP plant in Abu Dhabi.
- The company was also awarded a contract by Sharyland Projects in Texas to supply the structures for five power transmission lines as part of the Competitive Renewable Energy Zones project. The contract includes design engineering and testing on five different types of structure.



Mexico

- As an integral part of the project to upgrade the Manzanillo thermal power plant for the Mexican Federal Electricity Commission (CFE), Abengoa has been awarded a contract for the medium-voltage cables and instrumentation, cable trays, electrical assembly material, intercommunication system, public address system and telephony.
- For the Tabasco Cogeneration Project for Pemex, Abengoa has been commissioned to supply medium-voltage (MV) and low-voltage (LV) instrumentation cables, direct current systems, lightning conductors and electrical assembly material.

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Transportation of power transformers for the Pemex Cogeneration Plant.

- Abengoa’s structures plant has been increased through an investment of over \$20 M so as to be able to supply the vast amount of structure required for the Solana CSP plant in Arizona, estimated at over 50,000 t, and also for the similarly sized plant to be constructed in Mojave, California. Thanks to these upgrades, Abengoa now has the necessary production capacity to tackle the large-scale transmission line projects currently materializing in the United States, along with the solar facilities that Abengoa intends to construct in the country.

Workshop for galvanized structures



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Midal coils for the Madeira project (Brazil)



GSM mobile telephony localization for Meditel

Peru

- Supply and deliver current measurement transformers and lightning conductors for the Chilca – Montalvo – Caravelli project. It was also awarded a joint contract with Edelnor (Endesa’s subsidiary in Peru) for the supply and local transportation in Peru of LV and MV power cables.

Brazil

We would highlight the following key projects in Brazil:

- Supply and delivery to on-site warehouses in the Amazon region of 10,000 t of bare conductor costing approximately \$33 M as part of Abengoa’s Madeira project.

North Africa

- Continuing to construct GSM mobile telephony localizations and lay fiber optic cable for the country’s second and third largest telephony operators (Meditel and Wana), thus further cementing its position as a benchmark company in the development of telecommunications infrastructures in Morocco.

