# **Industrial Engineering & Construction**

Abeinsa is Abengoa's leader in the business group dedicated to engineering, construction and maintenance of electrical, mechanical and instrumental infrastructures in the energy, industry, transportation and service sectors. It also promotes, builds and exploits conventional industrial power plants (co-generation and combined-cycle), renewable energy-based plants (bioethanol, biodiesel, biomass, wind, solar and geothermal), and manages networks and turnkey projects in telecommunications.

**Operating in 28 countries** 

With engineering ... we build and operate conventional and renewable energy power plants, power transmission systems and industrial infrastructures

www.abeinsa.com

# Sumary 2007

Abeinsa bases its growth on correct development of the integrated energy product and construction of bioenergy and solar thermal power plants, strong sustained growth in infrastructure activities with higher added value, and a high degree of internationalization. The company offers its customers integrated solutions in the Energy, Transportation, Telecommunications, Industry, Services and Environment sectors.

The company's success in recent years, accompanied by consolidation of growth, is due to higher customer satisfaction levels, advances in internationalization by means of innovative measures that improve profitability, and to the development of company human resources and social involvement.

In 2007, advances were made in environmental commitment through a considerable increase in R&D&I investments in fuel cell, hydrogen, CO<sub>2</sub>-capture, and energy efficiency activities through the subsidiary company Hynergreen Technologies. The aim is to assure a future in which energy supply will be secure and sustainable for everyone.

Through the company ZeroEmissions Technologies, Abeinsa grouped all the carbon trading and CDM project activities related to the Kyoto Protocol and provides global solutions to climate change through the promotion, development and trading of carbon credits, voluntary compensation of companies and innovation in greenhouse gas reduction technologies.

Furthermore, the company participates in Carbon Funds through a 23 M€ investment. This amount is scheduled for increase from 2008 to 2012. These funds are utilized to finance the acquisition of emission projects that contribute to reducing greenhouse gases in developing countries and in transition economies through clean development mechanisms and joint implementation projects in accordance with the Kyoto Protocol.

This growth in activity and international development has resulted in the company's position as a world leader in the fields in which it operates. In this sense, according to the data published in the Engineering New Record magazine, Abeinsa is ranked as No. 1 in



the world for international contracts related to the construction of electricity transmission and distribution infrastructures, and No. 2 in the construction of electric infrastructures.

This has been achieved thanks to the efforts of the company's entire professional team that in 2007 executed our construction and engineering projects, noteworthy among which are:

Construction of a 245 million-liter bioethanol production facility in Lacq (France).

Construction of a 200,000 ton biodiesel production plant in Algeciras (Spain).

Construction of the 37 km, 525 kV Bateias-Curitiba transmission line; Bateias 525/230 kV transformation substation; and Curitiba 525/230 kV transformation substation.

Execution of Package 2 of the SIEPAC project (Electric Interconnection System for Central American Countries) consisting of a 230-kV s/c transmission line.

Construction and operation of a 150 MW hybrid solar combined-cycle power plant in Hassi R'Mel (Algeria), where one of the world's largest natural gas reserves is located.

Construction, in Argentina, of the 181 km, 500 kV Mendoza-San Juan HV transmission line.

Construction of a second solar thermal tower technology power plant, with a nominal rating of 20 MW, at the Solar Platform in Sanlucar la Mayor (Seville).

The company's fulfillment of these, and many other, commitments has resulted in customers' complete trust in project execution and integrated solutions, which are adapted to their needs at all times.

Consequently, business operations have increased through the awarding of new contracts, noteworthy among which are the following:

Construction of a 470 MW hybrid solar combinedcycle power plant in Ani Beni Mathar (Morocco), 20 MW of which will come from the solar field system. The power plant will generate more than 3,800 GW of electricity per year.

Construction of three bioethanol plants in Europe (Holland, England and Germany). Each plant will have the capacity to produce up to 480,000 m<sup>3</sup> of bioethanol from corn or wheat per year.

Construction of two corn-to-bioethanol plants in the United States, with a production capacity of 88 million gallons. There is no other plant with a larger capacity anywhere in the world to date.

The concession contract for the new hospital and outpatient care facility, underground parking areas and complementary infrastructures for the Hospital Costa del Sol, in Marbella (Spain).

Construction of the conduction and distribution mains and complementary facilities to improve and assure the supply of drinkable water to the city of Montevideo (Uruguay) system until the year 2035. The project is known as the Sixth Pumping Line.



Construction of the expansion and upgrade of the drinkable water and sewage systems of Manchay-Lima (Peru).

Construction of fire-fighting water systems at two of Pemex's refineries in Mexico.

Construction of three photovoltaic, 10 MW global rating power plants in Spain.

The main highlights for the year in the company's different fields of activity are described in more detail below.



# Energy

Activity in the energy sector focuses on providing integrated solutions through the promotion, pursuit of financing for, and engineering, construction and operation of new power plants and industrial facilities, with special emphasis on the solar and biofuel sectors, as well as on upgrading existing facilities.

Within this field of activity, focus is centered on the following products:

Promotion, design, engineering, construction, operation and maintenance of energy generation plants:

Bioethanol and Biodiesel Plants

Biomass Plants (forestry, agriculture)

Solar Thermal Power Plants (tower and parabolic trough)

**Conventional Power Plants** 

**Combined-Cycle Plants** 

**Cogeneration Plants** 

Research and development activities aimed at obtaining new methods of electricity production:

Design, development and construction of fuel cell and hydrogen-based electricity production systems.

Production, processing and storage of hydrogen as an energy vector.

Solutions in the fight against climate change.

Greenhouse gas emissions reduction and elimination.

Management of carbon credits, and investment in carbon funds.

### Abener Energía

Abener Energía, S.A. is the parent company in this sector. It consolidated its three business areas - Solar, Biofuels and Generation - in 2007, with the completion of emblematic projects, making it a reference worldwide in solar thermal power plant and biofuel facility construction.

If the PS10 plant was the company's first incursion into the solar thermal power plant construction market and key to its positioning as a reference company, in 2007 this line continued with the construction of the PS20 plant. Work continues on this 20 MW plant to schedule. The 161-meter tower was completed in the last guarter of the year. Completion of the entire plant is scheduled for June of 2008.

Another of the innovative technologies the company's activity currently focuses on is PTCs (Parabolic Trough Collectors). This technology is being utilized at the Solnova 1 and Solnova 3 power plants, on which construction commenced in mid-2007. Each is a 50 MW plant with 350 collectors that track the sun automatically.

The PS10, PS20, Solnova 1 and Solnova 3 plants will prevent the emission of 238,000 tons of CO<sub>2</sub> into the atmosphere. They are located at the Solar Platform in Sanlucar la Mayor, Seville (Spain).

ISCC (Integrated Solar Combined Cycle) technology is

and is being utilized on projects currently in progress

150 MW and 470 MW, respectively that integrate a

PTC solar field and a combined cycle. This initiative is

With respect to biofuels, our role as Europe's leader

in construction of bioethanol facilities stands out. Following a solid trajectory in Spain, Abener is

now consolidating its positioning in the European

bioethanol marketplace through construction of the three largest facilities to date – each with a capacity of 480,000 m<sup>3</sup> – in Holland, England and Germany. To

in Algeria and Morocco. The projects in guestion consist of the construction of two power plants, of

the first of its kind in the world.





this, the advances on the bioethanol project in Lacq (France), currently at the final stage of construction, must be added.

Simultaneous with the company's entry into Europe, it has set out to conquer the world's largest bioethanol marketplace: the United States. In this respect, it has already signed contracts for two 88 million-gallon (333,000 m<sup>3</sup>) projects.

The 200,000 ton annual production capacity biodiesel plant under construction in San Roque, Cadiz (Spain) is 60% completed and scheduled to be brought into operation in 2008.

In view of the above, 2007 represented an important turning point in Abener's expansion and growth. The company doubled its project portfolio and established itself very successfully in new markets such as central Europe, Africa and North America.

The most significant projects developed by Abener throughout 2007 are listed as follows:

#### <u>A 20 MW Solar Thermal Power Plant (tower technology)</u> in Seville (Spain)

Work was completed on construction of the tower, an extraordinary piece of engineering work, for the PS20 plant. It is 161 meters high and its spectacular design allows perfect integration into the natural surroundings of the area the plant is located in. The tower houses a solar receiver, 120 meters above ground level, designed to produce steam to drive a turbine for electricity generation purposes.

The 20 MW plant's more than 80 hectare solar field consists of over 1,250 heliostats that capture the sun's rays and project their reflection onto the receiver, thus enabling the production of 50.6 GWh of electricity per year for commercial use. Work on the PS20 plant is progressing according to schedule, with completion programmed for mid-2008.



#### 50 MW PTC technology Solar Thermal Power Plants in Seville (Spain)

Construction began on the Solnova 1 and Solnova 3 PTC (Parabolic Trough Collector) technology solar thermal power plants, each with 50 MW.

Both plants have 360 collectors, each with a useful reflective surface area of more than 800 m<sup>2</sup>. The collectors are parabolic-shaped mirror structures that track the sun azimuthally and concentrate its radiations onto a pipe with a heat-carrying fluid which circulates inside.

Solnova 1 and 3 will each produce an estimated 114 GWh per year of electricity, equivalent to the consumption needs of almost 30,000 homes. Moreover, thanks to PTC technology, they will prevent annual emissions of almost 90,000 tons of  $CO_2$ .

#### <u>ISCC technology Solar Thermal Power Plant at Ain Beni</u> <u>Mathar (Morocco)</u>

The company was awarded the contract for the world's first project to integrate a PTC solar field and a combined cycle.

Ain Beni Mathar is a 470 MW hybrid power plant, of which 20 MW are generated by a solar field with 183,000 m<sup>2</sup> in useful reflective surface area. The installation also includes a combined cycle. The plant's annual electricity production will exceed 3,800 GW.



#### <u>ISCC technology Solar Thermal Power Plant at Hassi</u> <u>R' Mel (Algeria)</u>

This is the second ISCC technology power plant project to be undertaken by Abener. The groundbreaking ceremony was held in the last quarter of 2007.

The 150 MW plant consists of a 183,000 m<sup>2</sup> useful reflective surface area PTC solar field that achieves an output of 20 MW, thereby contributing approximately 5% of the total electric energy produced.

There is also a combined cycle consisting of one steam and two gas turbines, and heat recovery, post-combustion boilers.

# Bioethanol Plant in Lacq (France)

The 200,000 m<sup>3</sup> bioethanol-from-grain production plant is in the final stage of construction. In addition to bioethanol, DGS is obtained via a fermentation, distillation and dehydration process. DGS is a product utilized as animal feed and production is around 150,000 tons per year.

This was the company's first incursion into continental Europe following a consolidated trajectory as the leading builder of bioethanol plants in Spain.

# <u>Bioethanol Plants in Europe (Holland, England and Germany)</u>

Abener continues its expansion in Europe with the construction of three major bioethanol production plants.

Construction has begun on three bioethanol plants with an overall production capacity of up to 480,000 m<sup>3</sup>, from corn or wheat, in Holland, England and Germany. DGS (370,000 tons/year) is also obtained as a by-product.

With these projects, the company has strengthened its position as Europe's leading builder of bioethanol plants.



#### **Bioethanol Production Plants in the USA**

During the course of the year Abener entered the world's largest bioethanol market through contracts to construct two of the largest capacity plants in the United States, in Indiana and Illinois. Each will produce 88 million gallons (333,000 m<sup>3</sup>) per year of bioethanol from corn.

#### Biodiesel Production Plant in San Roque, Cadiz (Spain)

Work was completed, in the last quarter of 2007, on the storage yard, the most relevant area of the entire plant, not only because of its function, but also because it takes up more than half the terrain.

Plant start-up is scheduled for April, 2008.

Using crude vegetable oils, the plant will produce 200,000 tons of biodiesel per year, and some 21,000 tons of pharmaceutical glycerin as a by-product.



# Cogeneration in Brazil

Abener's activity was completed with its entry into the Brazilian market through the execution of two 70 MW cogeneration projects, integrated into two plants for ethanol and sugar production. The electric energy generated will be utilized by the main plant, and surplus energy will be exported and sold to the grid.

Both plants are scheduled for completion in mid-2009.

#### Operation and Maintenance

The Operation and Maintenance (O&M) line of business for generation plants includes preventive, programmed and corrective maintenance of equipment and systems, as well as operation of the same to achieve facility reliability and ensure compliance with design specifications in terms of power, availability and load factor.

These services are being provided at nine different plants, and technical support for O&M operations is also being provided at another cogeneration plant.

These plants are located in six provinces of three different Autonomous Regions. Their total installed output is 177 MW.

It is worth highlighting that two of these plants sell their surplus energy in the electric energy production market (the so-called "electric pool"). Management of the sale of this energy to maximize earnings in accordance with market regulations, and of other new products such as the quarterly auction of distributors for supply at a fee, were incorporated as additional tasks to those executed by the O&M Division. This Division also provides energy management services for three of the Bioenergy Business Unit's plants, as well as another external facility. The global managed energy figure for these facilities is 1,444 GWh per year.

In 2007, the PS10 Solar Thermal Tower Technology Power Plant was commissioned. Furthermore, the Division has been successfully carrying out O&M at the Seville PV plant. Both plants are located on land



at the Solar Platform in Sanlucar la Mayor (Seville, Spain).

The O&M operations carried out at the PS10 plant were a challenge for the Division. The Division demonstrated its capacity by integrating its experience in operation and maintenance of conventional cogeneration plants into this new electric energy generation technology, the commercial operation of which is unique worldwide.

The experience gained at PS10 has resulted in a team of specialists from Abener participating, in 2007, in the start-up works for the PS10 Repowering Project and providing assistance for the construction of the PS20 Solar Thermal Tower Technology Power Plant, both of which are also located at the Solar Platform in Sanlucar la Mayor, Seville (Spain).

#### Hynergreen

Hynergreen Technologies, S.A. (Hynergreen) is the Abengoa-owned company dedicated to hydrogen as an energy vector, and fuel cells as electric energy production systems. Committed to the environment and sustainability, the company offers solutions, based on the aforementioned technologies, for different sectors, thanks to its constant R&D&I activities. Throughout 2007, Hynergreen increased its investments in R&D&I considerably in order to allow it to continue to hold a leading position, both nationally and internationally, in the fields in which it operates. A large part of this research effort was channeled through the company's Fuel Cell Testing and Characterization and Advanced Hydrogen Technologies Laboratory in Seville.

Some examples of projects undertaken, in full or in part, during the year are listed below:

#### Aquila project:

The objective of the 24-month Aquila project is to analyze different options for distributed and environmentally sustainable electric energy generation aboard aircraft utilizing different technology fuel cells, and to also study both the possibility of carrying stored hydrogen and that of producing it on board while the aircraft consumes it, utilizing different alternatives for the purpose. Through the project, the company has also studied the performance of different devices when subjected to typical aircraft conditions. This project receives funding from the Agency for Innovation and Development of Andalusia (IDEA) and the Technology Corporation of Andalusia (CTA).

#### EPiCo project:

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The main objective of the 42-month EPiCo project is to coordinate the efforts of researchers from the main Spanish companies involved in developing different types of polymer membrane (PEM) fuel cells, each of which is then proven in different applications developed for the purpose. A total of 5 partners are participating in EPiCo: Ajusa, Cegasa, Cidetec, INTA and Hynergreen. The project is being funded by the Ministry of Education and Science, which considers it a scientific-technological Project of Singular and Strategic Nature (PSSN).



#### PlasmaGen project:

The PlasmaGen project, completed in 2007 following two years of work, aimed at the roll-out of a reforming process based on plasma technologies as a means of producing hydrogen in a cleaner and more efficient way. During the project, the company proved different technologies that have led to attainment of a more efficient and larger-scale process. The project received funding from the Agency for Innovation and Development of Andalusia (IDEA).

#### Hercules project:

The objective is to establish a renewable hydrogen service station in Sanlucar la Mayor (Seville), where the hydrogen is to be produced with solar energy; in addition, a fuel cell-powered electric vehicle is under development. This vehicle uses the hydrogen supplied at the service station. The project's global budget exceeds 9 M€ and is backed by the Agency for Innovation and Development of Andalusia (IDEA) and the Ministry of Education and Science, catalogued as a scientific-technological project of Singular and Strategic Nature. The Hercules project is an Andalusian initiative globally coordinated by Hynergreen and promoted by a total of 8 partners. Five companies, a public agency and two research centers are collaborating: Hynergreen, Solucar R&D, Santana Motor, Carburos Metálicos, GreenPower, the Energy Agency of Andalusia, Inta and Aicia. The project commenced in January, 2006 and is scheduled to last 42 months. Throughout 2007 the consortium has been working on developing a test bench where the technologies developed for the vehicle will be assessed and work began on design of both the renewable hydrogen production plant and the service station.

This year, Hynergreen invested almost  $\in$  2 M in Research and Development, double the previous year's figure. This allowed the company to undertake different types of projects, at both national and international level.

Among the most significant lines of R&D&I are the renewable hydrogen production technologies (mainly from biofuels and solar energy, both photovoltaic and thermal), storage and processing of the same (with developments in carbon and metal hydride structure storage systems), and ancillary systems for fuel cells with power conditioners, controllers, and cooling circuits, among others.

The company received collaboration from different Spanish, European and American research centers, Public Research Bodies (PRBs) and universities in these activities. Collaboration from these institutions has, on many occasions, resulted in long-term agreements that have led to a large number of publications, participations in conferences and, in some cases, patents.

Hynergreen participates in associations and platforms to collaborate in the timely development of the technologies its work focuses on. It does so with the aim of promoting standardization, diffusion and implementation of fuel cells and hydrogen as an energy vector. Some noteworthy examples in 2007 are as follows:

The company participates actively on the Technical Subcommittee for Fuel Cell Standardization under the auspices of Aenor's Technical Committee for Standardization of Electric Energy Production (AEN/ CTN206/SC105), where it coordinates several work groups.



It participates in the Spanish Hydrogen Association (AeH2), where it is the Board's Speaker on Engineering.

It holds vice-chairmanship of the Spanish Fuel Cell Association (Appice).

The company chairs the Spanish Hydrogen and Fuel Cell Technology Platform backed by the Ministry of Education and Science. The objective of this platform is to facilitate and accelerate the development and use, in Spain, of different technology fuel cell and hydrogen-based systems for application in transportation, and the stationary and portable sector, while taking the entire chain of R&D&I into consideration.

It participates on the Advisory Council of the European Hydrogen and Fuel Cell Technology Platform promoted by the European Commission.

It is a founding member of Industry Grouping which, together with the European Commission, will launch the Fuel Cells and Hydrogen Joint Technology Initiative (JTI) in 2008.

Finally, Hynergreen is proving its worth as a Technological Knowledge Agent of the Network of Technological Spaces of Andalusia (Reta).



#### **ZeroEmissions Technologies**

2007 saw the definitive constitution and launching of the company ZeroEmissions as Abengoa's Carbon Business Unit. The company is now responsible for the carbon trading and CDM project activities associated with the Kyoto Protocol that Abengoa has been carrying out since 2005.

ZeroEmissions contributes global solutions to Climate Change through the promotion, development and commercialization of carbon credits, voluntary compensation of GHG emissions and innovation in greenhouse gas reduction technologies. The company is present in Spain, Brazil and China.

The Kyoto Protocol represents the global commitment undertaken to reduce emissions of gases that contribute to the greenhouse effect, which is one of the main causes of the Climate Change our planet is experiencing. ZeroEmissions develops its activity through the utilization of different tools and actions aimed at attaining reduction of the emissions of industrialized countries.

Significant among the main activities carried out this year was the signing of a contract to provide consultancy services for a Clean Development Mechanism (CDM) project for a chemical sector company in China. ZeroEmissions will execute the entire process to register one of this company's projects as a CDM and obtain the emission reduction certificates: from the project feasibility study, preparation of documentation and registration at the United Nations, to commercialization of the Certified Emission Reductions (CERs). This contract includes the signing of an ERPA (Emissions Reduction Purchase Agreement) under which the Chinese company is committed to achieving a reduction of greenhouse gas emissions and to selling the company the certification for these emission reductions in the form of CERs. This represents a further step in the development of ZeroEmissions, as China is a strategic enclave in this sector.

Furthermore, ZeroEmissions is to undertake an energy efficiency CDM project at the Chennai desalination plant (India), currently under construction by Befesa CTA. The installation of frequency converters to



reduce electricity consumption will result in an estimated savings of 120,000 tons of CO<sub>2</sub> emissions over ten years.

The company's voluntary compensation of emissions activity commenced this year with neutralization of the emissions from: the World Solar energy Conference, held in Seville, in October, the Expoenergético energy trade fair, held in Valencia, in November, and Abengoa's Investors' Forum, held in Madrid in November. In these cases an inventory of the emissions associated with the events was made and compensation was obtained through carbon credits from the Spanish Carbon Fund, a World Bank initiative ZeroEmissions is participating in.

Finally, and in relation to ZeroEmissions' participation in the international carbon market, the company's presence in some carbon funds is of note. These funds are utilized to finance the purchase of emissions from projects that contribute to reducing greenhouse gas emissions in developing countries and transition economies through Clean Development Mechanism and Joint Implementation (CDM JI) projects, in accordance with the Kyoto Protocol.

The funds in which the company is currently participating are the Spanish Corporate Carbon Fund, the first mixed capital (public and private) fund managed in Spain; the Spanish Carbon Fund, created by the Spanish Government and the World Bank, in which the company is ranked fifth from the private sector, preceded only by the four large Spanish electricity companies; the Multilateral Carbon Credit Fund, promoted by the European Investment Bank and European Bank for Reconstruction and Development; and the Biocarbon Fund, promoted by the World Bank, where it is Europe's sole participating industrial and technology company.

# Installations

Activity in the installations area is focused on engineering, construction and maintenance of electrical and mechanical infrastructures and instrumentation for the energy, industry, transportation and service sectors; installation of refractory insulation and passive fire protection.

This line of activity is led by the Inabensa Installations Company and encompasses the core activities involved in electrical and mechanical installations, instrumentation, high voltage lines, railways, maintenance, communications, and manufacturing of control cabinets and boards. Abengoa has been a pioneer in this area since 1941, as well as in insulation and refractory assembly and passive fire production.

The main products we develop are the following:

Electric Installations: Hydroelectric, thermal and combined-cycle plants, substations, airport and industrial infrastructures, singular buildings, maritime and railway transportation, residential areas and industrial parks.

Mechanical Installations: Systems associated with power and gas plants and the chemical and petrochemical industry.

Insulation, Refractory Lining and Passive Fire Protection.

Instrumentation and Maintenance: Chemical and gas production plants, nuclear and thermal power plants, state bodies and singular buildings.

High Voltage Lines: Construction and maintenance of power transmission lines, underground circuit-laying, live line works and stringing of fiber optic cable.

Railway Installations: Catenary installation.

Singular Building Construction: State-of-the-art hospital facilities and teaching centers.

Significant in 2007 were activities in service concessions, with special emphasis on the award, under a concession agreement, of the new hospital building, outpatient care facility, underground parking and complementary infrastructure of the



Hospital Costa del Sol, in Marbella. Work was also completed on the Hospital del Tajo in Aranjuez for the Community of Madrid, where we began providing services last September.

In the development of new products in the solar sector, we were awarded a contract for the photovoltaic plant located atop the main Expo Zaragoza building and for the plants at the San Juan de Dios Hospitals, in Malaga, and in Las Palmas on the Great Canary Island. We also began the construction of three photovoltaic plants, with a total output capacity of 8 MW, developed by Inabensa; completion is scheduled for mid-2008.

In the international area, we continued with our consolidation in markets we consider strategic. In terms of most prominent activities, we must point out the award of the construction of Batch II of the Electrical Interconnection System for countries in Central America (Siepac), a project involving the execution of 950 km of 230 kV transmission line throughout Nicaragua, Costa Rica and Panama. In Batch I of this project, Inabensa is in charge of executing 278 km of 230 kV transmission line in Guatemala.





Our subsidiaries abroad, Inabensa Bharat (India), Inabensa France, Inabensa Maroc and Inabensa Abu Dhabi all significantly met their objectives, based both on customer satisfaction and the work conducted.

Along the same lines, within our strategy of internal expansion, the Manufacturing Division, put into production, through our Inabensa Tianjin subsidiary, a new workshop for manufacturing electronics and electrical panels.

# Communications

Our business in telecommunications is focused mainly on the integration of networks and turnkey projects.



#### Marketing and auxiliary manufacturing

In this area, we market products related to the activities described above, and we manufacture auxiliary elements for the energy and telecommunications sectors.

It is worthwhile to mention our outsourcing services in storage facilities and purchasing logistics, which, together with the execution of new turnkey projects, allows us to ensure future growth.

We manufacture reticulated steel structures (pylons for power lines, telecommunications towers and substations) and thin plate-derived products (panels, signals and telephone booths), structures for parabolic trough collector system thermosolar plants, as well as photovoltaic plants.

In 2007, at **Nicsa** we maintained our position in Spain and we reinforced our international presence as a supplier of electrical, instrumentation and communications material for the chemical and petrochemical industry, combined-cycle and nuclear power plants, and mining and heavy industry in general.

Over the course of the year, the following business areas were created: Environment, Renewables and Strategic Development.



In 2007, through our **Abentel** subsidiary, we conducted our traditional activities and external plant maintenance, as well as supply and maintenance of customer loops and equipment. In the latter area of operations, there was a significant increase in supply and maintenance of wideband ADSL and the entire range of associated products.

During the year, we renewed our contract with Telefónica de España, S.A.U. for a five-year period, thus maintaining the leading position in contract volume and presence in nine provinces.

Our commitment to improvement group consolidation merits special mention, as an efficient way of increasing productivity, quality and customer service.

Through Inabensa's Telecommunications Division we also deliver engineering services and telecommunications network integration (stationary and cellular phone lines, CATV, radio, via satellite, etc.) and products and services for the deployment, installation and exploitation of telecommunications networks (design and engineering, infrastructure construction and testing, operation and maintenance). At **Abencor**, we maintained positive growth in the markets in which we operate, in both the energy and transportation sectors, and in alternative energy sources and the industrial segments, which has helped us to surpass the previous year's performance, both in terms of contracting and in profits, thanks to our customer-focused structure and the increase in the number of suppliers who entrust us with the distribution of their products.

At **Eucomsa** we experienced an increase in activity in 2007 with respect to previous fiscal years, which is reflected in our strategic plan for the coming years, taking very positive perspectives into account for our operations in the solar energy sector.

In other more traditional sectors we must highlight the supply of cellular telephone towers, as well as the testing conducted on metal towers.

Through **Comemsa**, the business activities underway for private industry in the Mexican market allowed us to continue our activity levels in 2007, having supplied structures for diverse national projects, and increasing projected exportation in the United States, Guatemala and Nicaragua.

#### Latin America

In Latin America – a strategic market in which we have had a stable presence for over 40 years through companies located in Argentina, Brazil, Chile, Mexico, Peru and Uruguay - we conduct business activities in the construction market, mainly in the energy and infrastructure segments.

An important part of the business is focused on activities involving high-voltage line concessions, where Abeinsa is dedicated to construction and operation.

With respect to our subsidiary in Argentina, **Teyma Abengoa**, we must highlight the completion of construction on the 181 km of 500 kV interconnection between Mendoza and San Juan, which allowed us to establish ourselves as a reference for this product in Argentina.

Countr	y Project	Localization	Lenght (Kms)	Investment (M USD)	Stake	Situation	Project Financing	Client
Brazil	Expansión	Minas Gerais	575	170	25%	Operation (Dec-02)	BOOT	Transener
Brazil	NTE	Noreste	386	179	50%	Operation (Jan-04)	BOOT	Chesf & NTE
Brazil	ETIM	Minas Gerais	212	89	25%	Operation (Jul-04)	BOOT	Transener
Brazil	STE	Río Grande Do Sul	389	102	50%	Operation (Jul-04)	BOOT	Transener
Brazil	ATE I	Sao Paulo & Paraná	370	260	100%	Operation (Oct-05)	BOOT	Transener
Brazil	ATE II	Colinas Sobradinho	937	508	100%	Operation (Dec-07)	BOOT	Transener
Brazil	ATEIII	Itacaunas, Colinas Carajas	459	292	100%	Construction (Mar-08)	BOOT	
Brazil	ATE IV, V, VI y VII	Sao Mateus, Londrina, Campos	463	280	100%	Construction (Jul-08)	BOOT	-
		Novos & Foz do Iguaçú						
Total			3,791	1,880				
Chile	Araucana (Aelsa)	Sic 8ª Región	54	8	20%	Operation (Nov-96)	BOOT	Endesa
Chile	Abenor	Sing 2ª Región	100	9	20%	Operation (Jan-96)	BOOT	Codelco
Chile	Huepil	Sic 8 <sup>a</sup> Región	141	38	20%	Operation (Jun-03)	BOOT	Endesa
Chile	Palmucho	Sic 8ª Región	11	10	100%	Operation (Nov-07)	BOOT	Endesa
Total			306	65				
Peru	Redesur	South of Peru	431	80	20%	Operation (Mar-01)	BOOT	Público
Total			431	80				
Total			4,528	2,025				

At **Abengoa Chile**, we continued to grow in our market, working for companies in the mining (Codelco, Compañía Minera Inés de Collahuasi, Atacama Minerals), electric (Transelec, Endesa Chile, Chilectra, Colbún), water (Esval, Empresa de Obras Sanitarias del Bío-Bío, Aguas Araucaria), and the industrial segments.

In 2007, at **Teyma Uruguay**, we began the process of structuring activities toward a holding type of organization, in which the parent company delivers four lines of business: Uruguay Construction, International Construction, Forestry Services and Environmental Services.

Thanks to this new structure, we maintained growth in our activities with traditional clients in Uruguay and began our involvement in commitment to international clients, through the development of projects in Europe, northern Africa and Brazil.

**Abengoa Mexico** continued in 2007 to be one of the main integrating companies for the Federal Energy Commission, Mexican Petroleum, the National Water Commission (through its operating bodies) and Private Initiative. Throughout the year we consolidated our level of competence and quality, as well as the degree of compliance of our clients.



At **Abengoa Peru** we significantly increased our level of activity with respect to previous years, achieving our consolidation among the main actors in the country's infrastructure development.

Significant in 2007 was the contract with Sedapal to expand and improve the potable water and sewage systems of Manchay-Lima. This project will provide potable water and sewer systems to a population of almost 50,000 inhabitants with limited resources, with its subsequent positive impact on health and quality of life for these people.

At **Bargoa** we manufacture auxiliary telecommunications products, thanks to an engineering department that allows us to develop products to meet the technical requirements of our customers.

We carry out projects involved in the manufacturing of molds, including manufacture of materials and testing as well.

Throughout the year we continued with our investment plan for developing products, increasing our productivity with respect to the previous year at the same time.

At **Abengoa Brazil** we own the concession of 2,869 km of high voltage lines in use and 922 additional km which are under construction, which represents an investment of \$1,880 M.

Commercial start-up of ATE II took place this past year, allowing us to strengthen our presence in the northern and northeast regions of the country, developing infrastructures in an area of scarce investment.

In addition, four new concession contracts were signed in 2007 for a total of 463 km in transmission lines.

In this line of activity, we build turnkey plants for transmission lines and transformer stations of up to 500 kV. Since 2001 we have built 1,800 km of 500 kV transmission line and 200 km of 230 kV line and their associated stations.



We also started up the implementation of the centralized operation center of our network in Rio de Janeiro. This system will improve the quality of operational services and will reduce costs and risks associated with local operation of the installations.





# Research, development and innovation

The chief characteristic of sustainability is that it must be sustainable for all, for every inhabitant of our planet. And to assure that this is so, at Abengoa we are convinced that the right path to follow is that of Research, Development and Technological Innovation, in order to improve the use of natural resources, helping them to reach all places and ensuring respect for the Environment.

Therefore, through our different subsidiaries, we are currently developing strategic lines in areas such as energy efficiency,  $CO_2$  capture and storage, development of communications infrastructures, and establishing new energy vectors, such as hydrogen and its use in fuel cells. The synergy among these lines, and their application to our daily activities, help us to obtain better service for our clients and increasingly more technologically advanced and innovative products. In this way we contribute to building a better society and a secure future for everyone.

Over the course of the year 2007, some examples of the projects and initiatives described above are the following:

- In the area of Energy Efficiency, we developed converters and other systems associated with electric power for transportation and, specifically, for aviation, with the aim of introducing new, more efficient technologies to this sector.
- With respect to technology for capturing and storing CO<sub>2</sub>, we must point out our participation, through Inabensa, in the Cenit CO<sub>2</sub> (National Strategic Consortium for Technical Research in CO<sub>2</sub>) project, which aims to establish the technological, scientific and knowledge bases for the transportation, storage, valorization and use of CO<sub>2</sub>. Other projects are under development at the same time as well, both in Spain and internationally, that complement our work in this area, examples of which are the PSECO<sub>2</sub>. NanoGLOWA and DeCO<sub>2</sub> projects. We are confident that in the near future we will be able to offer much more efficient electrical energy plants with a significantly lower level of contamination.

• Worthy of mention in the communications segment is the work being conducted by Inabensa in the development of new products and services: in the interest of the integration of patients with Alzheimer's disease; in the search for more advanced home care assistance methods and enhancing quality of life for people with disabilities. Thus, the Wi-Pac, Ada or Inredis projects, funded by different public institutions and carried out in collaboration with healthcare institutions contribute towards making day-to-day life of those affected easier, through the use of wireless localizers, personal assistance systems, interfaces for relating to the surroundings and custom-made communications networks. Inabensa has also developed projects



involving sensor network applications for the fishing sector, or to facilitate remote access to digital information.

- Through ZeroEmissions, we have conducted activities in identifying and evaluating technologies to allow us to reduce greenhouse gas emissions: through technological monitoring tasks, project proposals for reducing emissions, preliminary studies on technical and economic viability, and follow-up on the implementation of identified measures. In this context, we must point out the project for reducing emissions carried out in Sanlucar la Mayor, which will later be extended to other municipalities.
- Finally, in the area of hydrogen and fuel cells, our Hynergreen Technologies subsidiary has been working on the development of new systems for producing clean hydrogen, with special emphasis on hydrogen from solar energy, biofuels or biomass, and on new applications for fuel cells in the transportation sector. Furthermore, deeper research has been conducted on new systems for secure hydrogen storage. An example of an application for all of this is found in the Hercules project, which aims to develop a fuel-cell-powered vehicle and implement, in the province of Seville, a solar energy-based renewable hydrogen service station.

In the development of all of our R&D&I projects, at Abeinsa we rely on strategic agreements and alliances with major universities and research centers, both Spanish and international. In many cases this has led to exchanges of research personnel, the development of new inventions, patent applications, and participation in numerous conferences and specialized publications. This continuous effort to explore scientific and technological knowledge has made Abeinsa a symbol of innovation, here in our own country and around the world, in the sectors in which we conduct our activities.