Solar

At Abengoa Solar, we develop and apply technologies for generating electrical energy with the Sun. To this end, we promote, build and operate concentrated solar energy and photovoltaic electricity plants and develop and commercialize the technologies needed to do so (R&D&I).

Groundbreaking international leaders in large solar energy and industrial steam plants


With the sun … we produce thermoelectric and photovoltaic electric energy
www.abengoasolar.es

Solar

In 2007, we completed construction of the world's first solar tower plant , with an installed capacity of 11 MW, as well as the first commercial concentration photovoltaic plant, with an installed capacity of 1.2 MW. These plants are located in Sanlucar la Mayor (Seville) and are part of the Solucar Platform, which will have an installed capacity of over 300 MW.

In 2007, we began construction for 130 MW in solar plants in Spain, including two 50 MW parabolic trough plants, and a 20 MW tower plant at the Solucar Platform, as well as several photovoltaic plants in Spain.

In 2007 we started construction on our first plants outside of Spain, including the Integrated Solar Combined Cycle plants in Algeria and Morocco, as well as solar industrial steam systems in the United States.

Abengoa is a pioneer and international leader in the development of solar technologies and their application in large-scale electric generation plants.

Our Business

At Abengoa Solar, like the rest of Abengoa, we develop innovative solutions for halting climate change to ensure sustainability. Specifically, we develop technologies that allow generation of electricity and clean industrial energy with the sun, and we apply those technologies to the plants and facilities we design, build and operate and which, in most cases, we own as well.

At Abengoa we believe that solar energy has the characteristics required for resolving, to a significant extent, our society's need for clean and efficient energy sources. Each year, the sun casts down on the earth an amount of energy which surpasses the energy needs of our planet many times over, and proven commercial technologies for harnessing this energy in an efficient way are available today. Our mission is to contribute to meeting an increasingly higher percentage of our society's energy needs through solar-based energy.

To this end, at Abengoa Solar we conduct our activities using the two main existing solar technologies. First, we work with Concentrated Solar energy (CSP) technology to capture the direct radiation from the sun to generate steam and drive a conventional turbine or to use this energy directly in industrial processes, usually in large plants that make up part of a power network. Secondly, we work with photovoltaic technologies that capture the sun's energy for direct generation of electricity thanks to the use of materials which utilize the so-called photovoltaic effect.

We make use of these technologies in four basic lines of activity. The first activity we carry out at Abengoa Solar is the promotion, construction and operation of Concentration Solar energy (CSP) plants. We currently design, build and operate efficient and reliable central receiving systems (tower and heliostats) and parabolic trough collectors, with or without storage, as well as personalized industrialized facilities for producing heat and electricity. In each case, we use our own technology in both the design and operation of the plant. This activity is currently under development in various geographical locations, including Spain, northern Africa, the Middle East and the United States of America.

Our second activity involves the promotion, construction and operation of photovoltaic plants and facilities. We are currently working on facilities using a wide variety of technologies, including one and two-axis trackers and plants with concentration systems.

Our third activity is research and development for improving current technologies and developing new ones. To achieve this, we have research centers in Madrid, Seville and Denver, in the United States. We believe that in a high-growth market like that of solar energy R&D investment is crucial in order to ensure enhancement of today's technologies. In fact, we have an R&D group with over 20 years of experience in solar energy, with the capability of developing our own technology in our main business areas. The group works in collaboration with the world's main research institutes, including Ciemat, DLR, Fraunhofer, ISE and NREL. Finally, we manufacture and commercialize the technologies we develop, in some cases with third parties. We are currently designing and manufacturing key elements like heliostats and parabolic trough collectors

Progress in 2007

The year 2007 represented a key year in the evolution of our business, paving the way toward high, sustained and global growth of our business:

- In 2007 we started up PS10, our first Concentrated Solar energy (CSP) plant. This plant has an installed capacity of 11 MW and is located at the Solucar Platform in Sanlucar la Mayor (Seville). It is the world's first tower technology commercial facility, and represents a milestone, not only for Abengoa Solar, but for the entire solar energy sector as well.
- The Solucar Platform was inaugurated in 2007 as well. With 300 MW of installed capacity, it will be the largest solar Platform in the world.
- The world's second largest commercial tower, PS20, has reached a height of 165 meters and is heading towards its completion at the end of 2008.
- Construction began on our first two parabolic trough plants, each with 50 MW and located at the Solucar Platform.
- Over the course of 2007 we built up a portfolio of projects under promotion in Spain which will allow us to meet our goals for solar plant construction over the next few years. Within this portfolio several projects have key permits, so we may confirm that construction will be underway in the short term, including the Solucar Platform and two 50 MW plants in the town of Ecija (Seville).
- With respect to photovoltaics, Seville PV, our first plant, completed its first year of production, demonstrating the commercial viability of the low-concentration technology utilized. Construction was also completed on the second Copero plant in Seville, and construction of three other plants is underway.
- Within our international activities, in collaboration with Engineering and Industrial Building Group, the construction of the world's first two Integrate Solar Combined Cycle (ISCC) plants, that integrated a cycle of natural gas with a parabolic trough field, is underway. The plants are located in Algeria and Morocco.
- In the United States, we continued to build systems for supplying industrial steam to our clients throughout 2007. During the second half of the year we completed our largest project to date for Frito-Lay in California.
- In R&D&I, the Solucar Platform became one of the world's main solar energy research centers in 2007. The Platform now has various groundbreaking research facilities which are either operative or under construction, including a high-temperature tower, a parabolic trough plant for direct generation of steam, a Stirling dish facility and diverse photovoltaic concentration technologies.
- Finally, in 2007, Solucar TR, a new parabolic trough design, was created and validated. It allows improvements in production of the previous generation at a much lower cost, and is manufactured by Eucomsa and Comemsa, companies that make up part of the Solar Business Unit.

1. Promotion, construction and operation of Concentrated Solar energy plants.

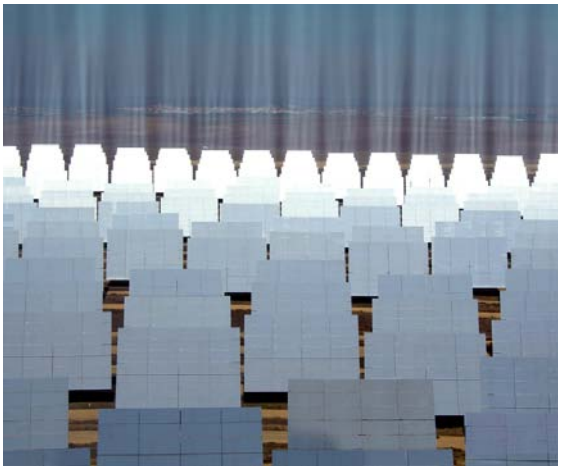
In 2007, the Concentrated Solar energy (CSP) promotion market experienced tremendous growth, which seems to be the prelude for an implementation phase of this technology in various geographical locations. This growth is based on four essential factors:

- The increase in the economic cost of conventional energy sources due to high oil and gas prices.
- Acknowledgment by the societies in which we operate of the hidden costs of fossil energies arising from the emissions they produce.
- The cost reduction of solar energy and increased understanding of available options.
- Approval in various countries as a result of these three factors of regulatory frameworks favorable to the introduction of concentrated solar energy technologies and the support of specific projects.

This has driven the Concentrated Solar energy (CSP) market from one construction project in 2006 to eight solar and two Integrated Combined Cycle (ISCC) plants in 2007. The Spanish market served as a forerunner in 2007 with a regulatory framework that permits guaranteed tariffs for 500 MW. However, significant initiatives in other places have been observed, which lead to optimism regarding the future of large Concentrated Solar energy (CSP) plants.

Within this context, at Abengoa Solar we are strongly committed to the development of the Concentrated Solar energy (CSP) market, and we currently have 11 MW in operation, 160 MW under construction, and several hundred more at the advanced promotional stage:

- PS10, the world's first commercial tower plant in use, and Spain's first plant connected to the power grid, is backed by the premiums set forth by Royal Decree 661/2007. The year 2007 served to demonstrate the commercial viability of tower technology and to place ourselves at the world's forefront in this technology of enormous potential.



- PS20, the world's second largest tower plant, is currently under construction, implementing a series of improvements over PS10 in key elements such as the receiver.
- Solnova 1 and 3, 50 MW parabolic trough technology plants, each located at the Solucar Platform, construction of which began in 2007 using our own technology and engineering.
- We have five 50 MW plants at a very advanced stage of promotion, three at the Solucar Platform and two in the town of Ecija, as well as two 20 MW tower plants at the Solucar Platform and in Almaden (Ciudad Real), respectively.
- Beyond the Spanish borders, we have teams directing the promotion of projects in various geographical locations, including the United States, northern Africa and the Middle East. We are currently constructing Integrated Solar Combined Cycle (ISCC) plants in Algeria and Morocco using gas and solar combined cycle technology, and solar industrial steams systems in the United States.

PS10 Plant

Its solar field, with 624 heliostats of 120 m2 each, is especially noteworthy. It concentrates solar radiation on the receiver that is located at the top of a 120-meter-high tower to produce steam and drive a turbine joined to the electrical generator connected to the power network.

The plant will generate 24 GW hour of clean energy per year, enough to supply power to 5,500 homes, reducing CO2 emissions by 6,700 tons a year. The plant also has a storage system of almost an hour in duration which allows management of cloudy spells without having to shut down and then restart the plant. It is, in fact, the world's first solar plant with a built-in storage system.

In June of 2007 the plant excelled in its first operating tests in accordance with the contracts signed with the finance banks, and since then has continued to show even better results. Since operation began, PS10, has not only met electricity production goals, but has also served for us at Abengoa Solar as a learning tool for the next tower technology plants.

PS20 Plant

With 20 MW of power, PS20 will be able to supply electricity to 10,000 homes. It will generate 44 GW of power, and reduce CO_2 emissions into the atmosphere by 12,100 tons per year. The plant is made up of 1,255 heliostats and a 160-meter-high tower.

This plant is backed by Abengoa Solar's accumulative experience in the construction and operation of these kinds of plants, and includes several enhancements in design that will lead to obtaining higher efficiency than at PS10 for this second generation of power plants.

Each plant has 54,000 square meters of collectors. A collector has an opening of six meters and a surface area of almost 150 square meters. The entire facility will take up an area of 120 hectares and will permit production of 115 GW hour of power, which will supply 25,700 homes and reduce CO_2 emissions by 31,400 tons annually.

Solnova 1 and Solnova 3 Plants

In 2007, we began construction on our first two parabolic trough plants at the Solucar Platform (Seville).

The technology consists of concentrating solar radiation by means of high-precision curved mirrors on a heat-absorbing pipe, through which a liquid flows that reaches high temperatures. This fluid allows steam to be produced which is forwarded to a turbogenerator where it expands in order to produce energy.

Helioenergy 1 and Helioenergy 2 Plants.

These are Concentration Solar energy (CSP) plant under development in the town of Ecija (Seville), using parabolic trough technology, each with 50 MW.

They will allow power supply to almost 25,700 homes and reduce CO_2 emissions by 31,400 tons per year.

Almaden Solar Plant

A Concentrated Solar energy plant under development, utilizing tower technology. It will be located in Almaden (Ciudad Read) and will have a nominal output capacity of 20 MW. The promoting company represents a joint venture between Abengoa Solar, Sepides and the IDAE.

It will generate over 40 GW hour of power, reducing CO_2 emissions into the atmosphere by over 12,100 tons per year.

United States

In 2007 we set up a team in Denver (Colorado) with the capability of offering solar-based industrial steam solutions for clients currently using steam of fossil origin. We thus offer a wide range of options that fully cover industrial and commercial applications, from heating water to generating steam or air conditioning. We install these systems all over the world thanks to the standard modulable system we designed.

Example: Frito-Lay – Modesto, California
This is largest operating solar industrial steam system in the United States. It is made up of 5,056 square meters of parabolic trough collectors situated on a piece of land adjacent to Frito-Lay's snack factory in Modesto, California.

The collectors will operate at temperatures of up to 250 degrees centigrade to produce steam. The steam is transferred to a plant where it is used to heat the oil for potato chips and other snacks.
Our system is backed by collaboration from the Energy Commission of California under the PIER (Public Interest Energy Research) Program.

In addition, we are studying the possibilities for developing electrical energy plants in the United States.

International

Beyond Spain and the United States, we have a team that is developing opportunities in other countries. It has the capability of offering and designing the best technical solution for each market and specific need. Throughout 2007, contracts were signed for two large Solar Combined Cycle (ISCC) plants. These projects represent the first in the world to combine solar energy and natural gas in the same electricity production cycle. By combining both energy sources, we achieve lower natural gas consumption and therefore a reduction in CO_2 emissions into the atmosphere as well.

The projects underway in Algeria and Morocco have made Abengoa forerunners in the design and engineering of combined-cycle hybrid solar fields.

First Integrated Solar Combined Cycle (ISCC) plant, in Algeria

In the first half of 2007 the foundation stone was laid at the Hassi-R´mel parabolic trough plant. This project is being carried out in conjunction with Abener, part of the Engineering and Industrial Construction Business Unit, Abengoa Solar and NEAL (New Energy Algeria).

The project involves the construction of a hybrid plant with a capacity of 150 MW, of which 20 MW will be supplied from a solar field with over 180,000 m^2 of usable reflecting surface area.

Second Integrated Solar Combined Cycle (ISCC) plant, in Morocco

In the second half of 2007, Abengoa, through Abener and in collaboration with Abengoa Solar, signed the contract with the Moroccan client ONE (Office National de l'Electricité), for the construction of a 470 MW hybrid plant using combined cycle technology with a solar field of parabolic troughs of 20 MW.

2. Promotion, construction and operation of photovoltaic facilities

The market for promoting photovoltaic technology continued to show very high growth in principal countries, highlighting Europe and, more specifically, Spain, as true driving forces of this growth. Growth occurred in both the market of photovoltaic roofing and covering, as well as facilities connected to the power network.

This growth was made possible thanks to current tariffs in several markets, including Spain. In the latter case, these tariffs allowed construction of plants using conventional and even "old" technologies, for all kinds of businesses both with and without experience and knowledge of the sector, which therefore led to real saturation in the sector. Tougher tariffs are anticipated in 2008, as already announced in Germany and possibly in Spain.

Within this context, at Abengoa Solar we have allocated to photovoltaics a small percentage of our investments, focusing our efforts on developing and testing technologies that will allow us to be competitive in the long term.

Throughout 2007 we promoted and built plants connected to power networks, utilizing the most advanced technologies, both in photovoltaic modules as well as sun-tracking systems to suitably orient panels and obtain higher efficiency and profitability. We are convinced that this strategy will allow us to be competitive in the long run. Thus, in 2007, we made great technological efforts to increase the productivity of current systems.

PV Seville Plant

Abengoa Solar created a company with 20% of its shares held by the Institute for Innovation and Development of Andalusia (IDEA) for the construction of PV Seville.

This is the first commercial low-concentration photovoltaic plant in the world. With a power output capacity of 1.2 MW, it is located at the Solucar Platform in Sanlucar la Mayor.

The plant was started up in May of 2006 and since then its operation and exploitation have surpassed the estimated design values. PV Seville has 154 trackers covering 12 hectares of land.

This plant has the capacity to generate 2.1 GW hour of clean energy per year, enough to supply electricity to 650 homes, with CO2 emissions reductions of 1,800 tons each year.

Copero PV Facilities

This is a series of ten photovoltaic facilities with a total of one MW built within Emasesa's Wastewater Purifying Station (EDAR) in the El Copero area of the town of Dos Hermanas (Seville). Ownership of the plants is split 50-50% between Emasesa and Abengoa Solar.

The total surface area takes up 93,800 m^2, where 63 two-axis trackers have been installed, each of approximately 120 m^2, with a total surface area of 7,686 m^2 and a total power output capacity of 972,720 kWp.

Photovoltaic plants under construction

We are currently building three plants, two utilizing two-axis solar tracking systems, each with 1.9 MW, and a 5.7 MW plant which uses a one-axis tracking system (orientation towards the sun in its East-West path).

3. Supply of key components

At Abengoa Solar, we develop our own technology, design our plants and we ensure reliable, quality supply of key elements that will determine the cost and production of our facilities. In order to meet this goal, we managed to assure the supply of most key components in 2007:

- For concentrated solar energy plant with tower technology, we design our own heliostats and manufacture them in our own or at third-party facilities. With respect to receivers, we work in conjunction with specialized companies in order to make the designs required for each of our plants a reality.
- For concentrated solar energy plants with trough technology, we design our collectors and they are manufactured for us by Eucomsa and Comemsa, part of the Abengoa group. Cylindrical-parabolic mirrors are made by the Rioglass Solar company with whom we signed a commercial agreement which permits us to guarantee the supply of this key component of much higher quality than in mirrors that are available on the market to date. This translates into lower assembly costs and less breakage in the field. Finally, with respect to receiving pipes, in 2007 we met our needs for the next two years.

Research, Development and Innovation

At Abengoa Solar, we believe that investment in R&D&I is vital in order to be able to offer the best solar energy-based solutions for contributing to the fight against climate change and ensuring sustainability. This is why we are making high investment efforts in order to lead, through our own resources and by means of agreements with leading institutions, a highly ambitious program in research and development.

Our program has two goals:
1. To lead in the development of the generation and storage technologies we consider most advantageous for the future.
2. To understand all solar technologies to a considerable degree.

Thus, in 2007, our R&D&I area had the twofold objective of improving current technologies and developing more efficient new technologies. In order to reach these goals we set up a group of over thirty people with work centers in Sanlucar la Mayor (Seville), Madrid and Denver (Colorado). We also collaborate with research institutes and specialized universities in each of the technologies we are working on, including Ciemat (Spain), CNRS (France), DLR (Germany) and NREL (U.S.).

In 2007, we made progress in our main projects and launched other new ones:

- Design, testing and validation of new parabolic trough collectors. In Spain, we developed the Solucar TR collector, which significant reduces manufacturing costs, decreases manufacturing times, simplifies transportation and facilitates and reduces plant assembly costs. To do this, several designs were made, two were selected for producing prototypes that were tested on the test block at Eucomsa, part of the Abengoa Group and, finally, one was chosen as the reference design. Meanwhile, in the United States, and in collaboration with NREL, we are developing another collector based on those we currently use for industrial facilities.
- Enhancement of parabolic trough technologies. In 2007, production began at our demonstration plant at the Solucar Platform, the first parabolic trough plant outside the United States. This facility will permit optimization of the technology we will use at our Solnova 1 and 3 and future plants, as well as identify possible improvements in optics and components such as structures, supports, mirrors, ball joints, flexible joints and pipes. In 2007 construction also began on a parabolic trough demonstration plant for direct steam generation. This facility will allow validation of the concept of using water as the heat transfer fluid.
- Improvements in tower technologies. Throughout 2007 construction progressed on the demonstration high-temperature tower with approximately 2 MW of power. This plant is being built based on the experience with PS10 and PS20, and will allow production of superheated steam, leading to significant improvements in turbine efficiency.
- Other generation technologies. As a part of our 2007 R&D efforts, we designed and built several Stirling dishes on the Solucar Platform. Our goal was to obtain direct experience in design, construction and operation with the aim of

validating the potential of this technology for the future. Stirling dishes have the advantage of their modularity, the possibility to be used for distributed generation given that they do not require a turbine; however, costs are currently much higher than those of other technologies.

- Improving storage technologies. Storage is essential for increasing the availability of thermal solar energy plants, to allow increased annual capacity and efficiency in the energy conversion cycle, thus reducing the number of plant start-ups. In 2007, in collaboration with various research centers, we launched a project for developing new energy storage technologies that can be applied to solar plants. Through this project we are working toward validating technologies that are close to commercialization as well as those that will require significant development in the coming years. One of the concepts with potential in which Abengoa Solar has been working over the past few years is storage by means of the latent heat of phase-changing materials (PCM), such as molten salts in tanks with different temperature stages (the Distor concept) and electrical storage.
- Photovoltaic concentration, in which we continued to work on low, medium and high concentration photovoltaic systems. In 2007 the production of various concentration systems installed on the Solucar Platform was analyzed, including low concentration systems and high concentration systems via dish as well as point focus. A research program was also started up that focuses on developing concentration systems for the future.
- In 2007 the photovoltaic laboratory was started up. This is where we test and measure the performance of all types of photovoltaic systems under real operating conditions using different tracking systems. The project aims to create an experimental tool for analyzing the energy production costs of different technologies and configurations, preventing and solving problems during the life of the photovoltaic systems, and identifying optimal technologies and configurations for different kinds of facilities. The photovoltaic laboratory was installed on the Solucar Platform, with the infrastructures and equipment needed to measure and analyze photovoltaic devices and systems.

U.S. Abengoa Solar R&D Activities

In the year 2007 we launched our first research projects in the United States from our facilities in Denver (Colorado) and in collaboration with the most relevant U.S. research centers.

In thermosolar technology, we were selected by the U.S. Department of Energy to execute three R&D projects:

- Development of more efficient parabolic trough collectors in continuation of the work we are doing with NREL.
- Development of advanced reflecting materials.
- Utilization of molten salts as the heat-bearing fluid in parabolic trough collectors in combination with thermal energy storage.