



Strategy, Organization and Management Systems

- Action Principles and Values
- Organization
- Management Systems
 - Commitment to Quality
 - Commitment to Environment
 - Continuous Improvement
 - Commitment to the Future, R&D&I

Action Principles and Values

Mission

Abengoa is a technological company that applies innovative solutions for sustainable development in the infrastructures, environment and energy sectors. It is present in over 70 countries where it operates through its five Business Units: Solar, Bioenergy, Environmental Services, Information Technology, and Industrial Engineering and Construction.

The focal points of Abengoa activity are its customers, the professional development and welfare of its employees, and the creation of value for its shareholders.

Approach

Abengoa believes that a mandate for innovation in a market economy context is an efficient and necessary instrument for becoming a sustainable development company.

Values

Throughout its history, Abengoa has continued to develop on the basis of a series of shared values. These principles constitute the structure of our ethical code. Through all of its channels, Abengoa promotes its awareness and applications, as well as providing control and revision mechanisms to ensure adherence and updating. The most important points underlying this set of values are summarized below.

- **Integrity.** Pride in professional performance forms part of the very identity of Abengoa and is evident in all undertakings of our staff, both on and off site. Uncompromising integrity is seen as credibility by our customers, suppliers, shareholders and other third parties with whom we have dealings. Integrity also generates value both at the individual and company level.
- **Law Abiding.** Law abidance is not just an external requirement, it is also a personal and company obligation. The law provides a secure framework for company undertakings and also serves to reduce risks in business dealings.

- **Professional Rigour.** The concept of professionalism in Abengoa is closely linked to our service culture in activity development, performance and business project involvement. All undertakings in the performance of allocated functions must be guided by professional responsibility and governed by the principles provided for by common management systems.
- **Confidentiality.** Abengoa expects discretion and caution from the people attached to its organisation when communicating and dealing with third parties. Adequate steps shall also be taken to safeguard information in the company's possession.
- **Quality.** Abengoa is committed to quality in all aspects of its performance - internal and external alike. This task is assigned neither to a specific group of people nor to senior management as it concerns all members of the organisation in a day-to-day capacity. Abengoa has specific quality standards in place, which have developed from awareness, common sense, rigour, order and responsibility.

Strategy

In Abengoa, corporate social responsibility is regarded as a strategic factor. It is one of the essential pillars which upholds our current and future strategy. We have generally incorporated this factor into our strategy through our environment, quality and human resources policies, and have also integrated it into all company management systems. In support of this strategic factor, Abengoa maintains a presence in those forums which are involved in sustainable development. In addition, in 2002, Abengoa signed with the United Nations World Business Leadership Pact. The purpose of this agreement is to contribute to the adoption of shared values and principles which give the world market a more human face.

The World Pact involves the institution of its principles in the strategy and operation of the signatory company, through a process of dialogue, transparency in information and training. These principles consist of the following:

- In the sphere of human rights, adherence means to support and uphold the protection of internationally proclaimed human rights and avoid circumstances involving infringement.
- In the area of labour rights, adherence means to uphold freedom of association and effective recognition of the right to collective negotiation, to eradicate all forms of forced and obligatory labour, and to eliminate discrimination in employment and occupation practices.
- With regard to the environment, adherence means to support a cautious approach to environmental issues, to adopt initiatives to promote greater environmental responsibility and to encourage the development and diffusion of environmentally-friendly technologies.

Abengoa, together with the other signatory companies, actively participates in action to promote the World Pact in Spain. Abengoa recently its World Compact Progress Report 2006, and it has been published in the spanish World Compact web. (www.pactomundial.org)

Human Resource Strategy

The Human Resource Strategy responds to Abengoa's mission, vision and values, and its operational strategy and, therefore, it has to be directed towards and aligned, at all times, with its strategic objectives and their attainment through the execution of the Strategic Plan.

In Abengoa, it is its human capital that makes the attainment of its objectives possible by providing the differential competitive values through talent, skill and work performance. Therefore, when speaking of the employee, the suitability concept becomes a key factor.

The pursuit of this suitability is, in effect, one of the fundamental objectives of the Human Resource Policy; suitability of the employee for the position, from a technical and generic point of view, and suitability of his/her working conditions, from a material and immaterial point of view.

Said pursuit of suitability inspires the policy as regards training and selection, and the work performance measurement policy inspires the segmentation by position and responsibilities, and the remuneration and conditions policy impregnates each of the sections as regards employee development.

In order to achieve this, Abengoa utilizes a human resource management model based on competencies that enable this sought-after alignment between strategic objective, position and person (suitability) and which allows it, at the same time, to identify and detect talent.

Abengoa is aware that in the current environment characterized by innovation and change, the performance of its professionals and its capacity for attracting, developing and retaining talent is the key to success for any company and, for this reason, it has firmly decided on a Human Resource Policy with a two-fold objective:

- To strengthen, exploit, transmit and manage the knowledge and experience of its highest level professionals and guide the development of competencies.

- To continuously provide the human resource organization with suitable means, in quantity and quality, for the development and implementation of Abengoa's strategy.

The need to create the required suitable conditions that enable the above must be integrated into the Human Resource Scheme and, to this end, the following is conducted:

- Career plan development
- Constant study of remuneration conditions and their adjustment to results and the market
- Periodic assessment of work performance
- Required constant training by profile and position
- And those related with Corporate Social Responsibility

to develop, strengthen and remunerate the human resources so that they may contribute their very best and so that this contribution may be in line with Abengoa's needs.

Abengoa considers employee commitment, initiative and proactivity to be fundamental. Therefore, Abengoa utilizes an Integral and Integrated Management System:

- Integral, as it covers the definition, description and classification of posts, recruitment and selection to attract the best professionals in the marketplace, training and development, with the consequent career plans, performance assessment and management and remuneration, as well as internal communication and social action.
- Integrated, as it contemplates interrelated processes. The synergies of the different processes must be exploited and continuity pursued, in spite of the autonomy of each one (Selection, Training, Assessment, etc.) They must all pursue a common goal which is none other than to enable Strategic Plan fulfillment.

This human resource management system is the means for Abengoa to overcome the challenges it has to face, through constant enhancement that enables it to maintain and develop a sustained competitive advantage, by aligning its human resources with its strategy and pursuing excellent work performance.

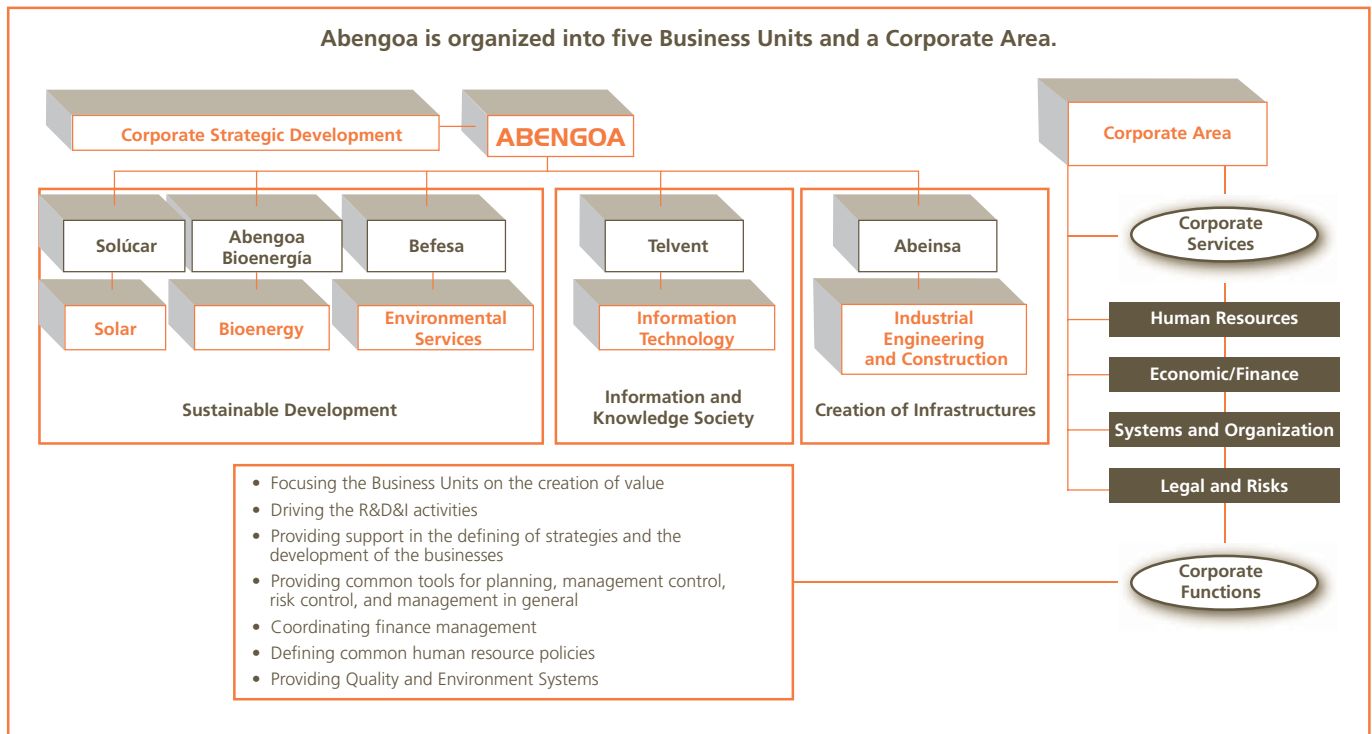
As regards the organization model, Abengoa opted to establish an in-house and specialized Services Company: Gestión Integral de Recursos Humanos (GIRH), with a much defined mission which is none other than to offer efficient and effective Human Resource management, utilizing quality and innovation processes to enable the enhancement of the operativity and competitiveness of the different Companies.

Organization

Abengoa is organized into five Business Units: Solar, Bioenergy, Environmental Services, Information Technology, and Industrial Engineering and Construction, and a corporate services area. All the company's social action is channeled through the Focus-Abengoa Foundation.

The corporate area provides Management Control, Financing, Risk Control, Strategy, Human Resource, Legal Counsel and Systems services with the aim of capturing management synergies and providing a common management philosophy by:

- Focusing the Business Units on the creation of value
- Providing back-up in the defining of strategies and business development
- Driving the R&D&I activities
- Providing common tools for planning, management control, risk control and management in general
- Coordinating finance management
- Defining common human resource policies
- Providing quality and environment systems



Management Systems

Commitment to Quality

Since its founding, Abengoa has been convinced of the need for its processes, products, services and systems to pursue full customer satisfaction.

The current common management system was introduced in 1997. It is structured around a set of compulsory internal rules designed to unify the managements of the companies making up Abengoa. Quality systems have also been put in place in all companies of the group as a strategic objective which goes beyond certification.

In accordance with standard ISO 9001:2000, there must be a mechanism in place that controls the mandatory design and implementation of quality management systems. Based on solid management leadership, these systems provide the training and resources necessary for employees to contribute to constant improvement in their day-to-day activities.

The principles that underpin this Quality policy are:

- Rational use of resources, error avoidance and minimization, through implementation of constant improvement programs and goal and objective setting.
- Promotion of active and responsible involvement of all members of the organization and provision of adequate ongoing training, allowing for participation in the constant improvement process of the system.
- Fostering of team work and sharing of necessary information, for raising the quality of our activities.
- Compliance with regulations currently in force and any other commitment subscribed to by the company.
- Reinforcement of innovation, new ideas, new methods and updating of resources, which are vital components of the constant improvement process, the results of which are threefold

- Customer satisfaction: identification of key attributes and minimization of failure rates; process control and improvement.
- Employee satisfaction: development and training programs; responsible participation; and achievement recognition.
- Improvement of economic results: increase in earnings via differentiation; reduction in the resulting cost of poor quality and an increase in competitiveness in the markets in which Abengoa operates.

Structure and Quality Organization

Each company under the Abengoa umbrella is capable of structuring and organizing itself according to its needs. The determination of resources necessary to implement the company's commitment to quality is the responsibility of the management teams.

As an instrument for developing this commitment, each company is specifically organized in view of its needs and dedicated to the development and maintenance of the Quality Management System. The reporting flow in each company is targeted directly at the applicable management team, on either a company or business group basis. In each case, the management team is comprised of fully qualified personnel with the appropriate academic and specific training in the relevant areas.

The companies devoted to engineering and industrial construction have a decentralized structure, with activities in specific works or projects, both on the permanent site (branch or regional management) and in the main office (which reports to general management).

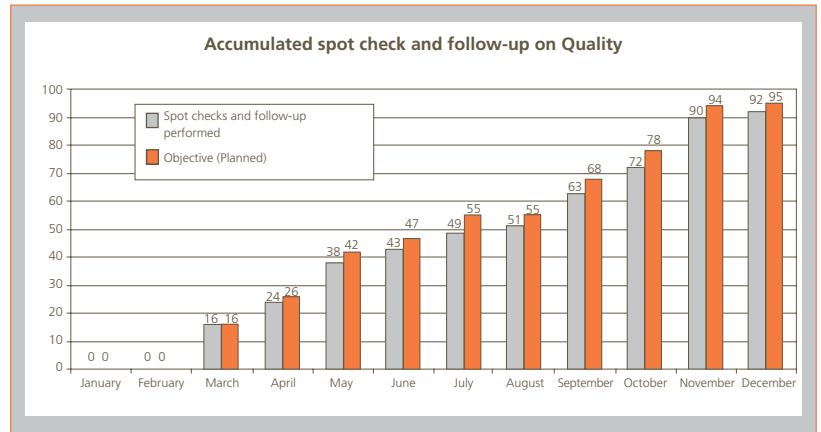
At the company level and reporting directly to the Abengoa Chair, there is a corporate management structure for organization, quality and environment, each with its own resources. In the sphere of quality, the purpose of this area of responsibility is to inform the Abengoa Chair as to the evolution and position

of the quality management systems in the different companies of the group. This supervision is led by the general coordinator for quality and environment and Occupational Risk Prevention, who verifies attainment of these objectives and capitalization on synergism through spot checks and follow-up.

The functions of the environment and quality organizations mainly consist of managing and developing the documentation of the systems; keeping it updated as required under applicable national and international standards; proposing and developing the annual plan for internal audits; assuming the role of secretary to the quality and environment committee, where the objectives, indicators and goals are proposed for the company, areas and departments; responding to consultations and requests for advice from the areas and departments; collaborating on training programs; evaluating suppliers; acting as supervisor in the application of problem solving (PSR) and improvement action (IA) initiative; and collaborating with general management on the annual revision of the systems, in order to determine proposals for improvement.

Quality Management Systems

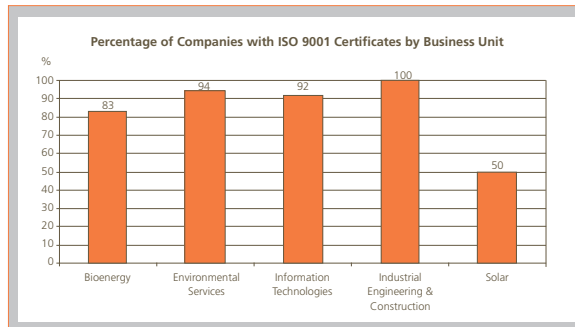
The progressive introduction of the quality management systems in the Abengoa group of companies is one of the strategic objectives of the group's commitment to quality. This objective revolves around the quality management model which conforms to ISO 9001 and ISO 9004 and the EFQM excellence model.



UNE-EN ISO 9001 and 9004

These international standards are used by Abengoa as a basic reference for the development and introduction of Quality Management Systems.

The percentage distribution of the companies bearing Quality certificates by Business Group is detailed in the attached graphics:



It is important to stress that the need to integrate the Quality, Environment and Occupational Risk Prevention Systems has been established as a medium term objective. Accordingly, seven companies have developed and implemented integrated Quality, Environment and Occupational Risk Prevention Systems to date, which have been certified by the international certifying entity and, a further three companies have integrated the Quality and Environment systems.

EFQM Model

The EFQM Excellence Model is a non-prescriptive work framework focused on achieving the sustained excellence of an organization, based on the following principles:

- Results orientation
- Customer focus
- Leadership and constancy of purpose
- Management by processes and facts
- People development and involvement
- Continuous learning, innovation and improvement
- Partnership development
- Corporate social responsibility

The EFQM Excellence Model includes a structure of criteria and sub-criteria that includes the best practices and the best organizations together with a powerful assessment, scoring, continuous improvement and recognition system.

In addition, the EFQM model is a complete model that considers all the management aspects of an organization and therefore allows the integration of other specific management systems focused on Quality, the Environment, Innovation, etc. This model has already been implemented in the Information Technologies Business Unit and its implementation in the other Business Units is nearing completion.

Throughout 2006, the Information Technologies Business Unit continued to conduct self-assessments, based on the EFQM model, in all its companies in Spain, Brazil, Mexico and North America, utilizing the simplified tool "Profile" under licenses from the Excellence in Management Club, and commenced

use of the advanced tool "REDER" in the Energy and Environment and the Traffic and Transport sectors.

As regards participation in competitions of renowned prestige, in 2006, Telvent presented candidatures for the "11th Prince Felipe Award for Industrial Quality", the "ALAS Award for International Implantation" (organized by the Regional Government of Andalusia), and the "First Edition of the Madrid Excellence for Customer Satisfaction Award" in the Energy and Environment sectors, the "7th Andalusia Excellence Award", the "2006 Prize for Encouraging Innovative Business Management, Quality management modality" (organized by the Institute for Economic Development of the Principality of Asturias), and the "2nd Castilla Leon Management Excellence Award" in the Traffic and Transport sector.

As a result of the introduction through the EFQM of the Excellence recognition levels associated with statutory external assessments, Telvent presented its candidature in the Energy and Environment sector and was awarded, in 2004, the European Excellence seal of recognition (Silver Seal), which was revalidated in 2006 with a notable increase in the ratings in almost all the sub-criteria.

Furthermore, the Industrial Engineering and Construction Business Unit, Instalaciones Inabensa, drew up an EFQM report that was presented for the "7th Edition of the Andalusia Business Excellence Awards" and received first finalist recognition in the Large Companies category.

Commitment to the Environment

Abengoa is fully conscious of the fact that its services, systems, processes and products must be environment-friendly in order to meet current-day needs, and that it must identify and control the associated activities and possible environmental impacts in order not to endanger the capacity for meeting future needs.

This commitment to the environment is reflected by the very structuring of the business. Two business groups, Environmental Services and Bioenergy actively work for the environment. Together with the environmental perspective of the remaining areas, the group has a clear environmental orientation

The Environmental Management Systems are supported by solid leadership from management, who provides training and necessary resources so that all Abengoa employees can help to improve the environment through their day-to-day activities.

The principles underpinning Abengoa environmental policy are:

- Compliance with legal standards in force from time to time, requirements occurring within the company, demands made by our customers or interested parties and goals and objectives set
- Prevention and/or minimization of harmful or negative repercussions on the environment
- Reduction in consumption of energy and natural resources by using, to the greatest extent possible, sources which can be renewed or regenerated
- And finally, constant improvement of environmental behavior

Structure and Environmental Organization

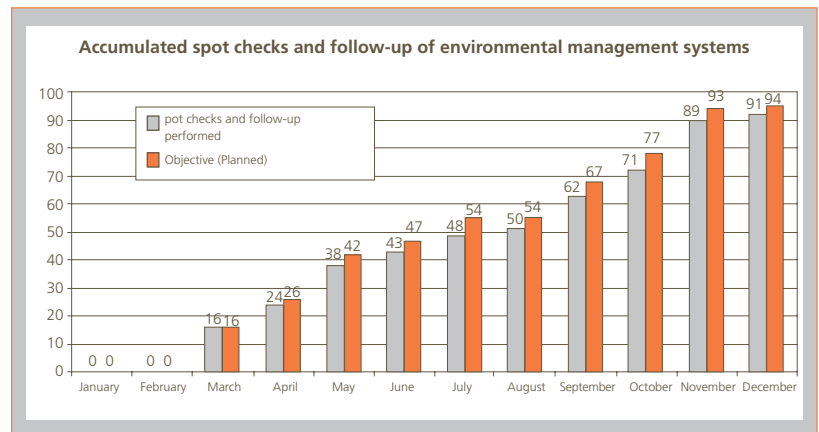
For the Abengoa group of companies the following obligations, pertinent to structure and environmental organization, flow from the development of internal management standards:

- Constitution of a quality and environment committee, representative of the whole organization and presided over by company management. Its function is to be the governing body of the environmental management system.
- Provision of structure and environmental organization necessary for fulfillment of the environmental commitment expressed in the standard. The application of this standard, which is the responsibility of management, must be in proportion to the needs of the company.

Each company is specifically organized to suit its needs and is dedicated to developing and upholding the environmental management system. As a general rule, these organizations report directly to the Managements of the companies, or in some areas to a specific management of the business group

for this area. In every case, fully qualified personnel with the necessary academic and environmental training make up the teams that are responsible for the environmental management system. Likewise, these teams are responsible for specific environmental management activities such as: identification of legal requirements; proposal and development of annual plans of internal auditing; assumption of the role of secretary to the quality and environment committee, where objectives, indicators and goals are proposed for the company, areas and departments; response to consultations and requests for advice from the areas and departments; collaboration on training programs; evaluation of suppliers; assumption of a supervisory role in the application of problem solving (PSR) and improvement actions (IA); and collaboration with general management on the annual revision of the systems in order to determine proposals for improvement.

The organization of the environmental management systems is basically the same as the quality management systems.



Environmental Management Systems

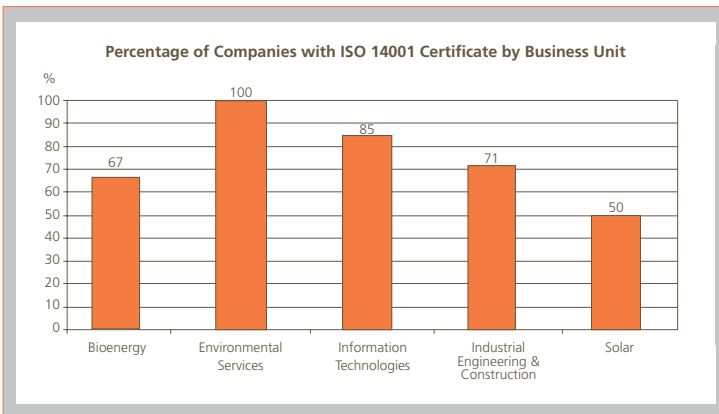
The progressive introduction of the Environmental Management Systems in the Abengoa group of companies is one of the strategic objectives included in the commitment to the environment of the group. The objective revolves around two environmental management models: the international standard ISO 14001 and the Eco-Management and Audit Scheme (EMAS).

The former is the international standard that Abengoa has set as a reference for the development and introduction of environmental management systems. Below is a representation of the evolution of these systems, certified by certification bodies:

European Eco-Management and Audit Scheme (EMAS) Regulation

At present, three Environmental Services Business Unit companies, three Industrial Waste Management centers, and one Information Technologies Business Unit company have obtained the Verification Certificate for Environmental Management System conformity to the requirements of the European Eco-Management and Audit Scheme Regulation (EMAS).

Over forthcoming years, the objective of several of the companies from the abovementioned Business Units and from other Business Units will be to achieve listing in said register.



Continuous Improvement

Abengoa bases its evolution on continuous improvement in the development of its management systems and the following instruments, which it considers to be strategic: Six Sigma, Trouble-Shooting Reports (TSRs) and Improvement Actions.

Six Sigma

In 2003, Abengoa opted for Six Sigma as a tool for constant improvement in the important processes of the business with an irregular or unsatisfactory track performance. Six sigma is a methodology that applies statistical techniques from Project management to control and reduce variables affecting global performance; the results of which are threefold:

- Customer satisfaction: the identification of the key attributes of their demands, minimization of failure rates and better control of processes
- Employee satisfaction: through participation in development and training programs which allow individuals to participate responsibly and gain recognition for achievements
- Improvement of economic results: increase in earnings by differentiation and reduction of the costs associated with of poor quality output.

Since 2004, as a consequence of the above, each Business Unit has commenced the preparation of human teams of "Black Belts" and "Green Belts", managers that act as Champions, and different projects that have now been completed were undertaken. During this trade year, work continued on the application of this improvement tool for and different projects including the following were undertaken:

- Optimization and reduction of traveling costs.
- Software Maintenance Optimization.
- Reduction in number of provider complaints.
- Reduction in fuel consumption.
- Reduction in telephone costs.
- Documental management improvement.
- Reduction of points pending in construction.
- Reduction of approval time for providers' invoices.

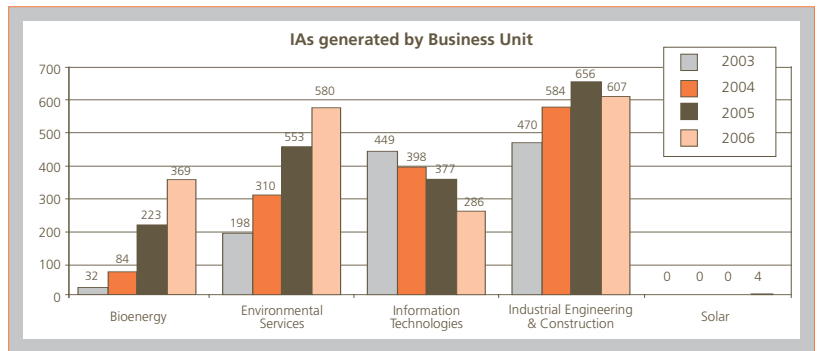
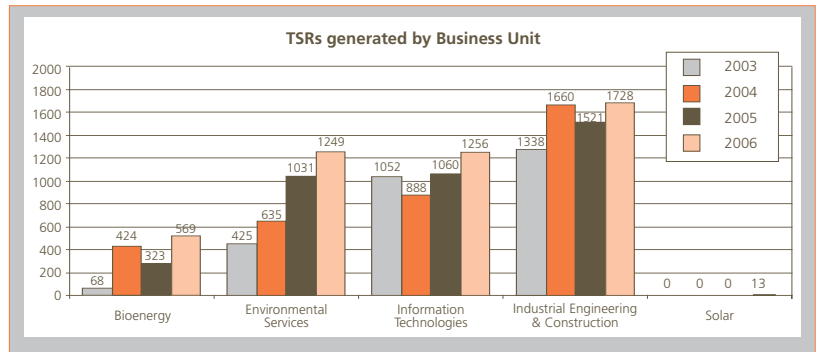
- Reduction in manufacturing time for motor control center containers for combined cycle power plants.
- Elimination of internal suck-ins in aluminum alloys.

Trouble-Shooting Reports and Improvement Actions

As strategic tools for improving Management of Quality and Environmental Management Systems, new versions of two computer applications have been installed in all Abengoa companies, one for management and Trouble-Shooting (TSR) and the other for processing Improvement Actions (IA).

The essential aspect of these applications is that problem management and solution and improvement actions alike can be proposed at the most relevant level to the problem, in such a way that problem detection (TSR) and solutions or improvement proposals (IA) go from "low to high". Full utilization of these tools can be enormously advantageous in the day-to-day handling of problems. This type of constant improvement is designed to be redundant in view of the efficiency of the system.

Below is the comparison, broken down by business group, of the results obtained in 2003, 2004, 2005 and 2006 relative to problem detection and proposals for improvement actions, as well as the distribution of the problems detected and proposed improvement actions.



Commitment to the future. R+D+I

In Abengoa, we believe that the innovative company within a context of global change and competitiveness is an efficient and necessary tool to enable advancement towards a sustainable development society. Innovation is not an end in itself, as Research can be in many cases. Innovation has an essential role to play and that is to lead society towards a better world. The objective is to make our socioeconomic system, which is not sustainable or for everyone, evolve into one that is sustainable and also for everyone. This is our commitment to the future.

2006 was a year of special importance for the push given to R&D&I at all levels.

Of note in the EU was the intention of doubling the R&D budget for the period 2007 to 2013. In particular, Spain has been allotted a 2,000 M€ Technological Fund for business R&D to be invested over this period.

In Spain, investment in R&D reached 1.13% of the GNP, a figure that, although still far off those of our European and American reference countries, represents an accumulative annual growth of more than 10% over the past ten years.

In September, the EU published the Scoreboard with a Ranking of the European companies that invested most in R&D&I in 2005. Abengoa is listed as fifth among the Spanish companies.

Innovation Strategy

Abengoa's policy focuses on the creation of value and its sustainment. Innovation is focused on results, in pursuit of three groups of tangible objectives: diversification, through the development of new products and services, differentiation, through improvement and adaptation of existing products, and services for the improvement of processes.

In addition, the intangible objective pursued in Abengoa is the acquisition of essential skills, and above all, the generation of future options. This last point is especially related to value through prospects of growth and development of new businesses.

Innovation is carried out in Abengoa in several forms. It is put into practise internally, and designed to provide specific customers with solutions or integrated into their own development efforts. It is also put into practise externally based on collaboration agreements with universities, research centres, and third parties, with the execution typically shared between the participants. On other occasions, technology is acquired, and additionally, as has taken place in the past strategic shareholdings have been acquired in technology firms.

With regard to financing, Abengoa also has external resources (taxation, grants, universities –research centres, shared or customer R&D) and well as its own internal resources.

During its innovative history, Abengoa has received recognition in multiple business and academic forums on account of its R&D&I activities. Some of the prizes it has received over the last ten years are listed below:

- Alas 2005 (5th edition) for International Implantation. **Abeinsa**. Regional Government of Andalusia. 2006.
- 11th Andalusia Environment Prize. Environmental Management Modality. **Befesa**. Regional Government of Andalusia. 2006.
- EOI. Business School and Public Foundation of the Ministry of Industry and other companies. **Abengoa**, for its efforts in the field of sustainable development. 2006.
- 4th City of Seville Awards. Energy Agency of Seville. Prize for the Best Business Initiative, to **Solucar**, for the Sanlucar la Mayor Solar Platform. 2006.
- 3rd Ricardo Carmona Awards. Chamber of Commerce and Industry of Almeria. To **Solucar** R&D, Prize for Technological Innovation for its works towards the development of solar thermal energy. 2006.
- 7th Andalusia Business Excellence Award. **Inabensa**. Regional Government of Andalusia. 2006.
- Best of European Business for Innovation. **Abengoa Bioenergy**. Roland Berger and the Financial Times. 2005.
- "City of Seville" Prize. Mention of Honor for Hynergreen. Seville City Council. 2005.
- National "Mare Nostrum" Computer Science Prize. Telvent. Ministry of Education and Science. 2005.
- Abengoa Bioenergy awarded the "Best Energy Website" Prize. The Web Marketing Association, USA. 2004.
- Andalusia Prize for Excellence 2004 awarded to Telvent. Regional Government of Andalusia.
- The State of Rio de Janeiro Best Company Award in the electric and electronic sector, to Barga. The Miguel Calmon Institute. 2003.

- Excellence and Best Practices Award for Technological Innovation, to Sainco **Telvent**. AENA. 2003.
- ComputerWorld Prize for Technological Innovation in Andalusia, to **Telvent** Outsourcing. 2003.
- Nebraska Business Innovation Award (USA), to **Abengoa Bioenergy** Corporation. 2003.
- Technological Innovation Prize in the Recovery Sector, to Deydesa 2000. Spanish Recovery Association. 2003.
- Best Project Prize for the year, to Hynergreen. Eighth Grove Fuel Cell Symposium. 2003.
- Dilectae Academy Prize (First Edition), in recognition of its innovative trajectory: **Abengoa**. Engineering Academy, December 2002.
- AEC Prize, for its work in R&D&I related to Environmental Protection: **Abengoa**. Asociación Española de Científicos AEC, Madrid, November 2001.
- Greatest Value Innovation Prize: Sainco's Velflex Product. European Wind Energy Conference, Copenhagen, June 2001.
- European Union Prize for the Best Industrial Initiative in the Use of Renewable Energies, for the use of bioethanol in the "Renewable Energy for Europe. Camping for Take-Off" project: **Abengoa**, Repsol-YPF and Cepsa. European Union, Toulouse, October 2000.

Innovative Tractor Projects

The Demonstration Project

Abengoa believes that the Demonstration Project is the key instrument that enables the execution of an innovation policy focused on developing new products for the market. The Demonstration Project achieves the operational validation of an innovative product, system or process and its market proving. It also facilitates knowledge of its cost in order to set a first true price which could be subsequently reduced by means of the experience curve. On the other hand, demonstration projects produce a real demand of the Public R&D Systems that enables Science to continue to serve the needs of society.

Therefore, Abengoa's companies always have multiple demonstration projects under way, which are market oriented and focused on the creation of value. These

are usually carried out in collaboration with multiple scientific institutions and different technological agents. Many of these projects incorporate public support.

We would especially mention, in the Bioenergy sector, the research being done on the production of bioethanol from lignocellulosic biomass (this is currently achieved from cereals). The objective of this project is to convert corn stover and the straw from other cereals (as well as other agricultural wastes) into bioethanol. This will result in new benefits for farmers, will lower the cost of production bringing it closer to that of petrol and reduce the greenhouse effect through the absorption of CO₂ by plants – raw material for bioethanol production – through the chlorophyll function. The project, with a foreseen investment of 35,478,775 US\$ over five years, has received significant financial backing from the Department of Energy of the Federal Government of the United States, the DOE, amounting to 17,739,380 US\$, 50% of the total investment.

We here-below offer a selection of other innovation projects our companies have been carrying out throughout 2006.

Solar Energy

- **Fresnel PV-5x**. Development of the Medium Photovoltaic Concentration Concept at Values between 5x and 10x. This project, developed by Solúcar, Gamesa Solar and the University of Lerida, has received funding from the Ministry of Industry, Tourism and Trade, the Andalusia Development Institute (now the IDEA Agency) and the R&D Programs of the Regional Government of Andalusia.
- **CAC-30x**. Development of a Controlled Atmosphere Photovoltaic Concentrator of around 30x. As part of the project, in which the Ciemat, Fachhochschule Gelsenkirchen and Solartec are participating, two prototypes have been manufactured; one is being tested in Gelsenkirchen (Germany) and the other in Seville. Funding is under the 5th Framework Program.
- **Hicon PV**. Development of a High Concentration Photovoltaic Concentrator (1,000x). A prestigious group of European companies and institutions are participating. They are coordinated and led by Solúcar. They include RWE Solar Space Power, EdF Electricité de France, the German aerospace institute DLR, the Fraunhofer Institute for Solar Energy Systems (ISE), the German center PSE GmbH-Forschung Entwicklung, the Spanish energy research center Ciemat, and the Universities of Ben-Gurion (Israel) and Malta. 5th Framework Program Funding.
- **Medcal**. Systems to Improve the Precision Sun Targeting and Increase Solar Power Plant Efficiency. Profit Program Funding.
- **Aznalcóllar TH**. 80 kW Solar Thermoelectric Plant with Parabolic Dish Reflectors and Stirling Motors. The Project is being supported by the Regional Government of Andalusia through its Renewable Energies Incentives Order.
- **Almería Solar GDV**. 5 MW Plant comprising Parabolic Cylinder Collectors and Direct Steam Generation, in Almería, with the collaboration of the Ciemat, Iberdrola, Sener, IDEA and the University of Almería.
- **CCP Loops**. Repower CCP loops for Solar Tower Power Plant with steam store

Bioenergía

- **Advanced** Biorefining of Distillers Grain and Corn Stover Blends. In 2003, the United States Department of Energy (DOE) and Abengoa Bioenergy R&D signed a 4-year contract to develop the biorefining technology for the project. Abengoa Bioenergy R&D heads the work group for the development of the novel biomass derivatives process technology, which utilizes the advanced biorefining of distillers' grain and corn stover blends to obtain a greater production of bioethanol while, at the same time, maintaining the protein nutritional value. This technology is going to enable a more sustainable and economic industry, will reduce the petrol consumed per liter of produced bioethanol, and augment the availability of bioethanol. DOE Financed.

- **BCyL demonstration plant.** The world's first commercial-scale biomass plant built by Abengoa Bioenergy to demonstrate the biomass to ethanol conversion technology. It will process 70 tons per day of agricultural waste, such as wheat straw, to produce more than 5 million liters of fuel ethanol per year. The end objective is the development of production technologies that are gasoline competitive. Subsidy under the EU's 5th Framework Program.

- **E-diesel.** Abengoa Bioenergy is researching the utilization of e-diesel. E-diesel is a carburant that is obtained by adding ethanol to conventional gas oil at a percentage that can vary between 5 and 15%, plus an additive that ensures the stability of the blend. It can be used in any diesel engine. Collaboration with the Cidaut and the United States e-diesel Consortium. Funding from the Ministry of Education and Science.

Agrobihol. Energy crops are fast growth crops that are utilized specifically to produce energy (electricity or liquid fuels) from all, or part, of the plant. The objective of Abengoa Bioenergy is to produce fuel ethanol from crops grown in Spain, be it from cereals with a high starch content, lignocellulosic matter such as cereal straw, or from other herbal or lignose crops. Under the Agrobihol project, Abengoa Bioenergy is researching the feasibility of producing bioethanol from sweet sorghum and Jerusalem artichoke. In addition, this project proves

the use of bioethanol as an alternative fuel, in ethanol-gasoline and ethanol-gas oil blends, in conventional vehicles, and also the production of hydrogen for fuel cells. Funding from the Ministry of Education and Science.

Ethanol reforming. Abengoa Bioenergy is making an important effort in development to bring hydrogen generating from bioethanol systems to perfection. For this purpose, it is working on ethanol reforming, a chemical process in which hydrogen is generated through a reaction with steam and in the presence of a catalyst. To this end, it is participating in research projects that have led to the obtaining of an ethanol reforming catalyst and the construction of two pilot plants that have already been in operation for thousands of hours. A demonstration facility has been completed for this technology. It has facilitated the gaining of in depth knowledge on the design, operation and costs associated with this technology and will determine the aspects that have to be dealt with for optimization purposes. The project has received funding through the Spanish Navy.

ACES. A research project that is being carried out in collaboration with the CSIC in the ICP's (Catalysis and Petrochemical Institute) facilities, in Madrid, where other ABRD projects are also being carried out. The main objective of the ACES project is to develop a catalyst capable of producing ethanol from syngas, consisting basically of hydrogen and carbon monoxide. This step is the key to the thermochemical conversion of biomass to ethanol. Fully financed by Abengoa Bioenergy.

DoE project to develop an ethanol catalyst. This year DoE/NETL chose the group integrated by ABRD for the development of an ethanol catalyst. This program consists of a joint effort by a group of participants: two participants from the industrial sector with ethanol production, catalyst development and ethanol reforming activities (Abengoa Bioenergy R&D leads the project), and the catalyst and engineering processes developer (UOP), two National Laboratories (Argonne National Laboratory and Pacific Northwest National Laboratory), two universities (Washington University and Lehigh University), as well as two research organizations (GTI and Avantium). The total budget will be \$ 3,570,000, with a 20% contribution from the partners (mainly Abengoa Bioenergy Research and Development) and the remaining 80% funded by the DoE. The program comprises laboratory research focused on an ethanol synthesis and characterization catalyst, rapid screenings and tests in the reaction systems, elucidation of reaction mechanisms and kinetics, durability tests, and simulation and development processes. The main objective is to develop a catalyst that can execute ethanol synthesis of singas in an economic manner. An addition objective is to demonstrate, to GTI in Chicago, ethanol reforming utilizing the catalyst developed beforehand by Abengoa.

RENEW. The objective of the RENEW project is to develop, compare, demonstrate (partially) and prove a range of automotive fuel production chains. This project is coordinated by Volkswagen AG (Germany), and Abengoa Bioenergy is one of the key partners. Its contribution is to optimize the production of bioethanol from biomass via two processes: 1) enzymatic

hydrolysis, and 2) gasification and thermochemical catalysis, and the production of coproducts. The Chemical Engineering Department of Aicia, University of Seville, is collaborating with Abengoa Bioenergy on these tasks. The project is financed by the European Commission's 6th Framework Program.

Environmental Services Befesa

- **Change of raw material treatment process.** Befesa Aluminio. Objective: To remove organics from profiles, trimmings, turnings and other complex raw materials that are difficult to recycle. In-house financing.
- **Enhancement of Paval by studying the reactivity of the slags.** The aim is the computerized prediction of the advance of the reaction of the salt slags. The theory phase was completed in March. This year, the previous works have been successfully confirmed upon the model having been applied to the reactors in Valladolid and Wales, for aluminum. Next year, the idea is to consider the composition of the gases, and their treatment in each case.
- **Treatment of SPL in collaboration with Alcoa.** Objective: The aim of the project is to find an application for the carbonous part of the spent electrolysis cells (SPL) in primary aluminum production. It is an environmental service for the facilities that require the recycling of this material.
- **Production of new materials and alternative fuels.** The project is aimed at validating valorization methods for inorganic industrial wastes as replacement materials for raw materials in industrial processes such as the manufacturing of cement and other construction materials. It also pursues the valorization of organic wastes as an alternative fuel to fossil fuels for industry.
- **Pretreatment of fuel for vitrification.** The project consists of the design of the waste pretreatment process at entry to the vitrification process to achieve a fuel to feed the process that ensures good functioning of the process and allows valorization of the synthesis gas obtained in the process.
- **Production of alternative fuels utilizing surplus energies from Sewage Treatment Work (STW) sludge.** The project consists of the valorization of STW sludge as alternative fuel by means of thermal drying thereof with the surplus energy from a cogeneration plant.
- **Pilot Plant for High Desalination Efficiency:** Objective: To reduce energy consumption in reverse osmosis desalination processes to less than 2.5 kwh/m³. In short, to obtain drinking water from seawater at reasonable cost, a fundamental factor for sustainable development. To this end, the high pressure pumping systems, reverse osmosis membranes and energy recovery systems are being analyzed. The project is subsidized by the Department of Innovation, Science and Enterprise of the Regional Government of Andalusia.
- **Development of advanced pretreatment systems for desalination.** Design of an optimal pretreatment system for desalination plants that enables minimization of the investment and operating costs while guaranteeing the quality of the product water as well as the dependability and availability of the facility. For this purpose, technologies for physical and chemical processes will be developed, as will the combination thereof for application to desalination. In short. The aim is to contribute to the reduction of the end cost of a cubic meter of desalinated water, thereby favoring access to this resource while also contributing to sustainable development. The project is subsidized by the Department of Innovation, Science and Enterprise of the Regional Government of Andalusia.
- **Study of the brine dilution phenomenon.** The aim of this project is to gain an in-depth understanding of the physics of the brine dilution phenomenon on a sea bed by developing simulation tools for said phenomenon validated with real results, to develop optimal diffusion systems and to develop an uninterrupted measurement system that enables monitoring of the dilution or rejection of brine in desalination plants.
- **DeReDes:** Development of Desalination with Renewable Energies. The general aim of the project is to encourage enterprise activity in the field of desalination by means of renewable energies at design, installation and systems maintenance level. To achieve this objective, a comparative technical-economic assessment of the different technologies is being conducted and three pre-commercial plants established as the most suitable for three scenarios with different characteristics will be designed. Both seawater and brine desalination are being considered, in both industrialized areas and areas that are isolated from the conventional electricity grid. The project is subsidized by the Ministry of Industry, Commerce and Tourism under the Technical Research Development Program (Profit).

Information Technologies. Telvent

- **ArcFM Solution.** ArcFM is a collection of GIS applications for utilities. In 2006, TM&M liberated versions 9.1.2 and 9.1.2 SP1. Among other improvements, these versions have developed the possibility of synchronizing a personal/local database with a centralized database, thereby enhancing solution mobility. The possibility also exists now of establishing routes to a destination or note-taking as you go utilizing a digital pencil.

- **Designer.** The Designer Workflow Manager is now capable of receiving and processing external CIM "Common Information Model" type messages.
- **Responder.** The "Archive Explorer" was introduced in 2006. It is an application for reports and historic treatment of incidents. It allows the user to create an archive of incidents, calls from customers, tags, work team activity and incident resolving.
- **Icaro.** Centralized urban traffic control system that combines artificial vision with calculation-specific algorithms, an expert system for traffic optimization and the implementation of a communications process between modules. Funding from the Ministry of Industry of the Regional Government of Catalonia.
- **SatTOLL.** Design and development of a new toll system based on positioning via satellite (GNSS) and cellular telephony (CN). Intek, Basque Government and Profit Program funding.
- **InTrasy.** Advanced modular structure urban traffic control and management system, capable of adapting to very different operational specifications. In-house and Regional Government of Catalonia Financing.
- **VisiTraf.** Image viewing and treatment system for traffic systems with the reading of license plates being the fundamental technology. Funding from the Madrid Regional Government.
- **SaReF.** Design and development of an integrated on-line railway traffic regulating system, employing in-house technology, for joint use with CTC systems that enable optimal global operation of the lines under criteria. Madrid Regional Government Funding.
- **Genio.** Development to provide transport ticket vending machines with an oral interface that enables the requesting of any product or service by means of a natural language dialogue. Financing from Fagor and Intek and the Basque Government.
- **WebPark.** Internet-based advanced parking lot management system.
- **SmartTouch.** Public transport access and payment system by mobile phone with NFC technology. European collaboration project within the framework of the Eureka-ITEA program, subsidized by the MIT&C and the Basque Government.
- **Avandis.** Project to develop Advanced DA/DSM Infrastructures for Efficient Electricity Distribution Network Management. It is a project aimed at exploring and demonstrating the benefits from using advanced DA/DSM (Distribution Automation/Demand Side Management) functions. Profit Program Funding.
- **Comed.** Modeling of control and metering devices for substation automation systems 61850). Project subsidized by the Dept. of Innovation, Science and Education of the Regional Government of Andalusia.
- **GasCAT.** Remote telecontrol station adapted to the needs of the Oil and Gas sector, including flow computer (with certified calculations for custody transference) and valve control functions.
- **Revolver.** Development of a Telvent brand transmissometer. This optical instrument that measure the transmissivity from which runway visibility is deduced is an essential element for measuring visibility conditions on airport runways. The developed transmissometer has already been installed at some airports.
- **Ceilometro.** Development of a Telvent brand cloud ceiling level sensor (or ceilometer). The ceilometer, also used for aeronautical purposes at airports, is an optical instrument that measures the height at which the lowest layers of clouds are by means of the reflection of an incident ray.
- **BefTel** (Optimized control system for desalination plants). Development of an advanced control system that enables optimization of the functioning of a desalination plant, from the point of view of energy efficiency and quality of the product water, by integrating for this purpose the latest control and simulation technologies into the most advanced desalination systems, new pretreatments and new energy recovery systems. It is being jointly developed with Befesa CTA with the support of the College of Engineers of Seville for the simulation tool. It is receiving public funding from the MIT&C, the Technological Corporation of Andalusia, and the Department of Innovation of the Regional Government of Andalusia.
- **Terwis.** Project to develop a global real-time information system that will predict the influence the weather will have on road transport. Profit Program Funded.
- **Health-Intercom.** The aim is to define, develop and implement a system for transferring a patient's relevant clinical information between the different health service providers, in an inter-autonomous region environment, the objective being to enhance the support for clinical decision taking, improve the quality of services provided and guarantee privacy and security of patient related sensitive health information. Subsidized by the MIT&C.
- **PMIA** (Image Assisted Medical Processes). This project is being jointly developed with Telefónica R&D and the research teams from Juan Ramon Jimenez Hospital in Huelva and University Hospital San Cecilio in Granada. Its objectives focus on 3D medical image modeling and the provision of tools for manipulating the models, which are a valuable source of information that is utilized by medical personnel to back medical diagnosis decisions. The project is grant-aided by the Technological Corporation of Andalusia.
- **eQECM** (eQuirófano: Multimedia Collaboration Environment). The aim of the project is the development of a multimedia integrated virtual classroom for surgery and hospital practice services. Telvent is participating in this Telefónica

R&D led project together with the company ICR and the research teams from University Hospital Virgen de las Nieves of Granada, the IVANTE Foundation, and the University of Granada. Subsidized by the Technological Corporation of Andalusia.

- **EmCompAs.** Multiannual program in which fifteen companies and five countries are collaborating. It is an open initiative aimed at accelerating the deployment of broadband networks through the development of advanced products and applications for the residential environment, creating new multimedia services, home automation and remote control, security and monitoring, developing international standards and processes. Profit Funding. Eureka Program.
- **Families.** Consolidation of the CMMI (Capability Maturity Model Integration) standards, security in dynamically deployable distributed systems, quality variability techniques in the dynamic derivation of applications, case studies on the development of suites based on Model Driven Architecture (MDA), suite integration processes, recovery of third party assets based on open source. Profit Funding/Eureka Program.
- **Cosi.** Project aimed at specific architecture and software modules different to the commodity-type software based on open sources, and applying them to enhance organization and business processes. Eureka/Profit Program Funding.
- **Osiris.** Project executed in collaboration with European partners within the framework of the Eureka-ITEA program, led by Telvent, and focused on the development of free code service platforms for distributed environments. Osiris is being subsidized by the MIT&C.
- **Nuadu.** It is a European collaboration project within the framework of the Eureka-ITEA program. It deals with the technical risks of providing a residential environment intelligence system and in mobility for services in the health and welfare sector to improve the quality of life of the users with effective and efficient solutions from the service providers. Subsidized by the MIT&C.
- **Passepartout.** Project aimed at the convergence of systems and digital applications in the domestic environment. Eureka/Profit Program Funding.
- **Prometeo.** Telvent, together with the ESI (European Software Institute), is leading the embedded

systems technological platform, Prometeo (National Technological Platform for Embedded and Distributed Intelligence). This national initiative, subsidized by the Ministry of Industry, Tourism and Commerce, has a provisional 10-year horizon and includes all the important role-players in the sector.

- **Atenea.** The aim of the project, which is being developed along with 17 partners, is to develop a common vision of future challenges and base technologies by covering the three transversal domains identified in the Strategic Research Agenda of the Prometeo Platform; Architecture, Middleware and Methods/design tools. The project has received subsidized backing from the Ministry of Industry, Tourism and Commerce.

Abeinsa (Industrial Engineering and Construction)

- **Project Wi-Pac.** Developed in collaboration with APIF Moviquity, S.A., the University of Castilla-La Mancha, and Intercentros Ballezol, S.A. This innovative project will improve the quality of life for those suffering from Alzheimer's in hospitals, geriatric or similar centers, through the development of a wireless location and control management system. The project is being financed by the Ministry of Industry, Tourism and Trade.
- **Project EPiCo.** Development, in Spain, of PEM type Fuel Cells. Financed as a Singular Project of a Strategic Nature by the Ministry of Education and Science's Profit Program. Other participants in this project are Cegasa, Ajusa, David Fuel Cell Components, the Cidetec Foundation, and the INTA.
- **Project PlasmaGen.** Development of a Clean Hydrogen Production Process with plasma reactors. The ICMSE-CSIC is participating and funding is by the Regional Government of Andalusia.
- **Project Aquila.** Development of Fuel Cell based Electric Energy Generators for the Aeronautical Sector. With a 1.4 million euro budget, and supported by the Technological Corporation of Andalusia, the CSIC and College of Engineers of the University of Seville are collaborating on the project.
- **Project PlasmaGen.** Development of a Clean Hydrogen Production Process by means of Plasma Reactors. The duration of the Project is 24 months, from February 2005 to January 2007. The overall budget is more than 300,000 euro, with financing from the Innovation and Development Agency of Andalusia (IDEA), within the framework of the Incentives Order dated May 24, 2005, for R&D projects, issued by the Department of Innovation, Science and Enterprise of the Regional Government of Andalusia. The ICMSE-CSIC is collaborating on the development of the Project.
- **Project Hercules.** The objective is to demonstrate the production of renewable hydrogen utilizing solar energy. On the one hand, the aim is to establish a prototype production plant in Sanlúcar la Mayor and a renewable hydrogen service station capable of supplying the gas to vehicles that use it as fuel; on the other, the design and construction of an electric vehicle that utilizes hydrogen as fuel, employing fuel cell technology for this purpose. Project Hercules is an Andalusia initiative globally coordinated by Hynergreen and promoted by a total of 8 partners. These collaborators are five companies, a public agency and two research centers: Solúcar R&D, Santana Motor,

Carburros Metálicos, GreenPower, Andalusia Energy Agency, INTA and AICIA. The duration of the project is 42 months, from January 2006 to June 2009 and the worksite is the Sanlucar la Mayor Solar Platform. The overall budget is more than 9 million euro, with financing from the Innovation and Development Agency of Andalusia (IDEA), within the framework of the Incentives Order for R&D projects, issued by the Department of Innovation, Science and Enterprise of the Regional Government of Andalusia, and also from the Ministry of Education and Science, which has catalogued it as a Singular Project of a Strategic Nature.

- **Project Multionda PV:** design of a high performance 30 kVA rated photovoltaic inverter. Solúcar Energía, S.A. and Green Power Technologies, S.L. are collaborating on this project

which has received financing through the Profit Program (Technical Development Research Program) of the Ministry of Education and Science's National Scientific Research, Development and Innovation Plan, under file number FIT-120000-2005-80.

- **Project RES2H2:** The Cluster Pilot Project for the integration of Renewable Energy Sources into European Energy Sectors using Hydrogen aims at the integration of wind power with hydrogen storage, fuel cell and reverse osmosis technologies, within the European Union's 5th Framework Research Program. The budget for the RES2H2 project is 536,914.64 euro, with a subsidy of 268,458.32 euro (50%) under the European Union's 5th Framework Research Program, under file ENK5-CT-2001-00536.
- **Project Motronic:** new technology in Motor Control Centers. Project Motronic focuses on the "Development of software and the implementation of a remote microelectronic system for governing motor control centers (MCCs), under the Profit Program, with Inabensa as the leading company, and in collaboration with the Superior College of Engineers of Seville, through its Electronic Technology Work Group.

Abengoa's Investment in R&D&I

Main Projects	2005		2006		2007 (Est.)	
	M€	% / Sales	M€	% / Sales	M€	% / Sales
Solar Energy	31.7		17.4		15.7	
Biomass conversion to bioethanol	13.5		26.2		18.0	
Enhancement bioethanol efficiency (residual starch)	1.1		1.6		1.1	
Hydrogen Technology. Fuel Cells	2.7		2.1		6.6	
Electricity, environmental, oil and gas control centers	6.8		7.6		8.8	
Road and rail traffic, and ticketing systems	3.6		5.6		4.5	
Public Administration support systems	2.1		2.2		2.4	
Geographic Information Systems (GIS)	2.2		2.3		2.9	
Vitrification	0.0		0.4		0.1	
Environmental Technology Center	0.0		0.0		0.8	
Desalination	0.0		1.0		1.6	
Enhancement aluminum efficiency	0.2		0.1		0.1	
Other Projects	2.0		2.0		6.9	
Total Investment R&D&I	65.9	3.3%	68.5	2.6%	69.5	2.4%

