

Bioenergy

Abengoa Bioenergía is its holding company. The Business Unit is dedicated to the production and development of biofuels for transport, bioethanol and biodiesel, among others that utilize biomass (cereals, cellulosic biomass, and oleaginous seeds) as the raw material. The biofuels are utilized for ETBE production (gasoline additive), or for direct blending in gasoline or gas oil. Given that they are renewable energy sources, biofuels reduce CO₂ emissions and contribute to the security and diversification of the energy supply while reducing the dependency on fossil fuels utilized in the transport sector and helping towards compliance with the Kyoto Protocol.



With biomass... we produce ecologic fuels and animal feed

Europe's largest bioethanol producer (340 million liter production capacity) and fifth in the US (415 million liters)

www.abengoabioenergy.com



Organization

The Business Unit comprises the management of the following companies:

Ecocarburantes Españoles, S.A.
 Ecoagrícola, S.A.
 Bioetanol Galicia, S.A.
 Biocarburantes de Castilla y León, S.A.
 ETBE Huelva, S.A.
 Abengoa Bioenergía, S.A.
 Abengoa Bioenergy Corporation
 Abengoa Bioenergy France
 Abengoa Bioenergy of Hanover
 Abengoa Bioenergy R&D Incorporation
 Grencell, S.A.

United States

Abengoa Bioenergy Corporation has continued building the leadership infrastructure during 2005 that will provide the base for its growth during the coming years as the Bioethanol industry experiences rapid growth in the United States. The following during this period is the most noteworthy:

- Portales expansion activities continued with expected completion by year end.
- Completed financing of the Ravenna project and construction of the plant initiated.
- Management and direction teams completed at plant and corporate levels.

Europe

The most notable milestones reached during the year 2005 were the following:

- ETBE Huelva implementation
- 85 Ml signed in export markets.
- AB Bioenergy France Project obtains 40,000 tons of tax concession 2007-2012.

- Agreement with Cepsa for the construction of a biodiesel production plant in the grounds of the Refinery "Gibraltar" of Cepsa in San Roque (Cadiz). The investment anticipated for the plant is 42 million euro.
- Creation of the European Association of Bioethanol Producers (e-Bio)

Research and Development

Abengoa Bioenergy R&D, Inc. is a subsidiary of Abengoa Bioenergy Corp (ABC).

ABRD's efforts are focused on four high priority projects:

- Improve actual production process yields and co-product quality at existing dry-mills.
- Increase ethanol capacity and develop new feed co-products.
- Develop and demonstrate cost competitive technologies for new biomass facilities.
- Develop demonstration programs which permit an increase in the field of ethanol utilization (i.e., e-diesel and hydrogen fuel cells).

ABRD is leveraged by grants from the U.S. Department of Energy, the European Union and various ministries within the Spanish Government. Grencell, our affiliate in Spain, is responsible for the management of our European activities, reporting to ABRD.





Operations in Europe

Introduction

Abengoa Bioenergía is the European leader in the production of bioethanol for use as a biofuel and it presently operates with two plants in Spain, Ecocarburantes Españoles, in Cartagena (Murcia) and Bioetanol Galicia in Teixeiro (Coruña), which have a total installed capacity of 150 and 176 million liters annually, respectively.

It also operates with Ebro Puleva a third plant in Babilafuente (Salamanca), Biocarburantes de Castilla y León, with a production capacity of 200 million liters annually, of which 5 million litres will be obtained from the conversion of biomass from cereal by means of a new technology which is being developed by Abengoa Bioenergy R&D.

The construction works continue developing in its final part, in accordance with the revised program with the incorporation of the modification of the Alcohol Park, to adapt it to the logistical requirement for distribution of the final product.

It is therefore hoped to shortly start the tests of the different plant installations which will conclude with the implementation of the largest bioethanol production plant in Europe.

The Business Plan of Abengoa Bioenergía includes the promotion and construction of two new bioethanol from cereal plants in Europe. This year (2005), Abengoa Bioenergy France has submitted a proposal to the French Government for the construction of a plant which will produce 180,000 tons per annum of bioethanol, in the town of Lacq, in the southwest of France. The plant would commence operation in 2008, using more than 400,000 tons of corn per annum, which the local cooperatives of Aquitaine and Midi Pyrenees would supply.

Abengoa Bioenergía, the leader in Europe for bioethanol production, has a share (51 per cent) in Abengoa Bioenergy France, created on the second of March 2005 and will manage and control it. The following also have shares: Dyneff, the leading independent distributor of oil products in France; Aquitaine Industrie Innovations, a capital risk



company specialising in renewable energies and innovation; Agpm, a French national association of corn producers; and Euralis, Etablissement Lacadee, Lur Berri, Maisadour and Vivadour, the main grain cooperatives in the region.

Main milestones (industry, legislative and internal)

Industry:

- Exports of bioethanol to Belgium (8 million liters), Germany (44 million liters) and France (33 million liters).
- Development and promotion of Flexible Fuel Vehicle FFV (E85) fleet in Spain.
- Commercial agreements with the main oil companies which operate in Europe.
- Agreement with Cepsa for the construction of a biodiesel production plant in the grounds of the Refinery "Gibraltar" of Cepsa in San Roque (Cadiz). The investment anticipated for the plant is of 42 million euro.

Legislation:

- EC Directive 2003/30 for the promotion and use of biofuels approved. This is the first time that a European Directive has governed the minimum consumption of renewable energies in each Member State.
- As a result of applying this Directive, each Member State will be obliged to comply with the objectives set out by the EU. This means that, as at 31st December 2005, 2% of fuels for transport must be through biofuels, increasing gradually to 5,75% in December 2010.
- New European Regulations concerning the PAC and energy crops.
- Legislation and implementation with regard to the issue of rights for CO₂ emissions.





- Development of specifications for bioethanol in the CEN of the EU.

Internal:

- Termination of the construction of the biofuels plant of Biocarburantes de Castilla y León in Salamanca. It will start operating in 2006.
- Awards through tenders for alcohol wine from the EU as a raw material for the plants of Ecocarburantes Españoles and Bioetanol Galicia.
- Implementation of the Integrated Management System implemented in each of the companies of the Business Group.
- Development of a Risk Management policy in the companies subject to commodities volatility.
- The World Biofuels conferences were held for the fourth consecutive year.

During 2005, Abengoa Bioenergía has achieved contracts for the supply of bioethanol in the EU for a total of 85 million liters. Exports of bioethanol in the next five years to cover demand in the European Union are a key factor in the Abengoa Bioenergía Business Plan.



Operational results of the plants (bioethanol, DDGS - refined corn grains dried with solubles and production of electricity)

Production	Ecocarburantes	Bioetanol Galicia	ETBE Huelva	Total
Bioethanol (m³)	131,904	171,588	0	303,492
DDGS (Tm)	120,186	110,965	0	231,151
Exported electricity (Mwh)	124,912	165,264	0	290,176
ETBE (Tm)	0	0	43,491	43,491

Ethanol Contract Highlights

The bioethanol plants of Abengoa Bioenergía in Spain, Ecocarburantes Españoles and Bioetanol Galicia, have a surplus production capacity that allows the exportation of this surplus production to countries of the European Union. A significant factor in the competitiveness of the supply based on these exports is the reliability and flexibility of this and also of the capacity to introduce into the market a large volume of bioethanol of a high quality, arising from the improvements made in the production process and from an efficient operation in Abengoa Bioenergías' plants.

New Projects

The Business Plan for Europe also includes the promotion and construction of two new bioethanol plants in Europe. The first of these projects is a plant which will produce 180,000 tons per annum situated in the south of France, which will be operational in 2007. The second project in Europe is in the promotion stage and will be operational at the beginning of 2009. These projects have been activated following the recent guidelines approved by the European Directives for the Promotion and Taxation of Biofuels and the implementation thereof in the Member States.



US Operations

Introduction

Abengoa Bioenergy Corporation presently is the 5th largest producer of Bioethanol in the United States. We presently have over 110 million gallons of installed capacity from three plants in operation and have a project underway to add another 88 million gallons in early 2007. During 2005 we have developed relationships and now have as customers many first class refiners offering ethanol blends primarily in E10 and soon E85 markets. Total sales of ethanol into these markets totalled over 98 million gallons in 2005.



2005 has been a year of transition for Abengoa Bioenergy Corporation. We have strengthened our management team with key additions while also building upon our competency program for all employees that was launched in 2004. The rapid growth of the industry will continue to provide challenges for us as we strive to be a market leader in the United States. Our competency models and training programs including partnering with local colleges are projected to attract top talent to support our growth.

Milestones Achieved

Industry

The U.S. ethanol industry continued its rapid expansion during 2005 with 11 new plants coming on line. Operating plants now total 92 in number with installed capacity in excess of 4.2 billion gallons. This represents an increase of approximately 600 million gallons since January 2005. An additional 23 plants with additional capacities of 1.4 billion gallons per year are currently under construction.

Legislation

After 3 years of attempts, the U.S. Congress finally passed a comprehensive Energy Bill in July of 2005. The bill includes a Renewable Fuels Standard which sets mandatory, increasing inclusion rates for renewable based fuels (principally bioethanol and biodiesel) beginning with a 4 billion gallon required usage in 2006 and culminating with 7.5 billion gallons in 2012. The bill does not include a ban of MTBE, but does eliminate the Oxygenate Requirement of the Reformulated Gasoline Program (RFG), effective 270 days after enactment (May 2006), but incorporating “anti-backsliding” provisions which will prevent increases in gasoline emissions and encourage continued use of ethanol in RFG.

Although the Energy Bill as passed does not include a nationwide phase out of MTBE, 25 states (5 more states than in 2004) have currently passed legislation banning the use of MTBE individually. With the passage of the energy bill, and the elimination of the oxygen requirement, there is much less reason for oil companies and refineries to use MTBE, and it is expected that MTBE use will be eliminated at an even faster rate than before. Other key provisions of the Energy Bill include the establishment of a 30% tax credit up to \$30,000 for the cost of installing clean fuel refueling equipment, such as an E85 fuel pump.



Internal

Key accomplishments for 2005 include;

- Successful financing of Ravenna project and construction of the plant initiated.
- We have continued with the Portales Plant Expansion tuning to 30MMGPY.
- Management and direction teams completed at plant and corporate levels.
- Our York plant achieved an all time monthly record production exceeding typical rates by more than 8%.
- We have developed an Employee Handbook which presents policies procedures and standard practices.
- We have established improvements in our risk management policies and have plans for continuous improvement of these programs.



Both of these circumstances drove all energy values to all time record highs with ethanol values topping \$2.20 per gallon. We predict that the ongoing substitution of MTBE coupled with continued interest in E85 will sustain demand and pricing for ethanol in 2006. Market reports indicate that about 4.2 million gallons of MTBE will be replaced progressively in the following years.

Plants Operations Results

Production	York, NE	Colwich, KS	Portales, NM	Total
Bioethanol (mm gals)	57.3	23.5	17.5	98.3
DDGS (Dry tons)	174,230	70,620	90,650	335,500

Ethanol and Co-Product Market Overview

The overall complexity of energy markets has provoked extreme volatility in 2005 with prices that have no connection with previous trends. Unrest in the Middle East resulted in the highest price increases in history and then further exacerbated by the devastating damage from hurricanes to both natural gas and refineries in the Gulf.

Abengoa has continued its strong presence in the marketplace by maintaining relationships to supply the top refineries and traders. We have ongoing discussions with the largest refineries in North America and, over 65% of our contracts have been signed with important clients in the complex energy sector.



We are extremely pleased with our 100% customer satisfaction rating in 2005 with no customer complaints and our consistent on time delivery of product.

Co-product marketing remains a key factor within the ethanol industry in the United States. With our commercial network located at each of our facilities our goal is to develop and sustain close and effective partnerships with our customers to provide both efficient and quality service. We continue to evaluate the quality of our feed products and by employing our state-of-the-art evaluations in R&D, where we are striving to provide further guidance to industry standards related to these products, and so provide added value. Our active participation in commercial groups, along with our relationship with university feed programs and studies demonstrates our commitment to our customers and the improvements they seek for their animal nutrition needs.

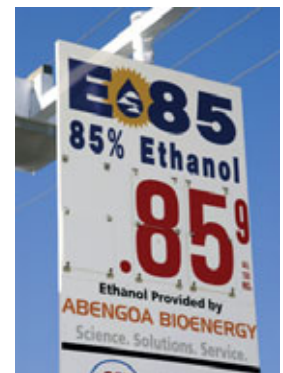


New Projects

The Ravenna project is well underway. The start-up of the 88 million gallon per year facility is foreseen for the first quarter of 2007.

We have two additional projects under consideration in 2006 that could further increase our presence and supply possibilities for the American Market. We are very enthusiastic about what these projects might offer and we have high expectations that they will enter the next stage of development in 2006.

We are presently providing E85 to a limited number of distributors. Our plan in 2006 is to leverage our capabilities and presence in the industry and utilize the supply of E85 as a growth engine for Abengoa. We are developing a series of market evaluations that we believe will provide insight and direction to the approaches we should pursue in this market.





Research and Development

Main Strategic Milestones Achieved

Residual Starch

Process improvements helped to achieve yields of more than 2.9 gal/bu. from the more than 100 pilot plant corn data trials. Implementation of these improvements at one of Abengoa's pilot plants show that these expected benefits can be achieved on a larger scale. An ASPEN process simulation model has been developed and is being used to assess the impact of the improvements.

Pilot plant samples of new co-products were analyzed and found to have improved nutritional and physical properties.

Trials were completed moreover with barley and rye. Testing of wheat is underway and the nutritional properties derived from these raw materials are under investigation.

Co-Products

The initial construction phase of the starch pilot plant included equipment to process and ferment residual starch contained in the cereal. Subsequent to this phase, an expansion plan was implemented and completed giving the starch pilot plant the additional capacity to extract ethanol from fermentation (distillation columns), to separate liquids from solids, post distillation (centrifuge) and drying of the solid material (dryer). This expansion allows the starch pilot plant the capacity to carry out tests and evaluations in each phase of the starch to ethanol process.



With the completion of the expansion of the starch pilot plant, testing was carried out on multiple process parameters. In conjunction with Novus International, the resulting co-product from these tests was characterized and evaluated via detailed and multiple chemical analysis. Based on the results of these trials, the value of the resulting co-product was determined.

Biomass Enzymatic Hydrolysis

- Bench Scale Investigation

Bench scale investigation and evaluation of key technologies: biomass fractionation, enzymatic cellulose hydrolysis, ethanol fermentation were completed by ABRD partners (SunOpta, NREL, Auburn University, and Novozymes). ABRD formed partnership with NatureWorks to develop yeast strains for improved fermentation efficiency of biomass hydrolysates. ABRD also developed Aspen simulation models to evaluate various process options.

- Pilot Plant Development

SunOpta complete vendor equipment testing of feedstock milling, pumping, mixing and filtering pretreated biomass slurries.





Based on bench scale research and pilot plant equipment test results, ABRD is developing a basic engineering design package for the York Biomass Pilot Plant. The package includes: PID, PFD, process descriptions, equipment specifications, and general equipment layout. Several engineering companies and system integrators are being evaluated for providing detailed engineering design, procurement, and construction management services.

Fabrication of long lead equipment and construction of biomass pilot plant building has commenced. Installation of pilot plant equipment will be carried out in two phases: Phase one is scheduled to be completed by May 2006, and Phase 2 by September of the same year.

Biocarburantes de Castilla y León

ABRD and Harris Group completed the basic engineering design of a 5 million L/year straw-to-ethanol commercial demonstration plant using Abengoa Bioenergy R&D proprietary process technologies. This plant is integrated with a 195-million L /yr cereal ethanol plant in Babilafuente (Salamanca), Spain. The objective is to develop and demonstrate economically viable biomass ethanol technologies.

Abener Energia S.A. has been selected as the Engineering Procurement and Construction Company responsible for managing the detailed design, equipment procurement and installation. ABRD oversees the process technical lead during the detailed design and construction, and commissioning phases.

Abener has subcontracted Idom (Spain) to provide the detailed engineering design and evaluation of equipment bids. An agreement was signed with SunOpta to supply feedstock preparation and pretreatment equipment. Long-lead equipment has been ordered. Bids for other equipment are being obtained from various vendors.

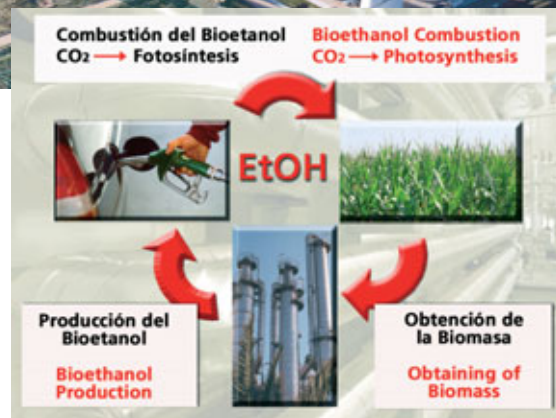


Site preparation and civil work started in September 2005. The plant is scheduled to begin operation in early 2007. It would be the first large-scale biomass ethanol demonstration plant in the world.

Gasification and Catalysis

ACES is a research project that is being carried out with the CSIC, in the ICP (Institute of Catalysis and Petrochemistry) facilities in Madrid, where other ABRD projects are being developed as well. The main objective of the ACES project is the development of a catalyst for ethanol production from syngas, which consists mainly in a mixture of carbon monoxide and hydrogen. This is the critical step in the thermochemical pathway for ethanol synthesis from biomass.

The Aces project is progressing with testing of various catalyst compositions. The project has led to finding a class of catalysts with promising results and potential for further improvement.





The catalyst will be tested in different conditions by Asociación de Investigación Industrial de Andalucía (AICIA) within Biocomb project, funded by the Spanish government.

In order to assure a detailed study of the catalytic synthesis of ethanol from syngas and the improvement of the catalysts at the necessary level for economical application, a project with a few research partners was organized in the US and was selected for a financial award by Department of Energy.

Gasification of biomass produces syngas, which can be used either for the catalytic synthesis of ethanol or for heat and power production. Gasification is studied under the European Renew program in the Sixth Framework program. We are investigating at the same time different gasification technologies to determine their suitability for the gasification of agricultural residues.

Fleet Demonstration (E-diesel, FFV, E95)

E-diesel is a blend of ethanol with diesel that could be used in diesel engines without modifications, improve the environmental performance of the engines and could increase the ethanol market.

As a previous step to fleet demonstrations, lab and motor tests have been developed both at Cidaut and Universidad de Castilla La Mancha. The results show that the emissions are reduced greatly, mainly particulate, HC, CO and Nox emissions.

A part of the development will benefit from a grant from Spanish Profit program.

Fuel Cell

Ethanol reforming is a promising way to get hydrogen from a renewable source, and a patented catalyst, owned by Abengoa bioenergy, has been successfully tested at pilot and lab scale. Abengoa



Bioenergy initiated this project four years ago to demonstrate the viability of bioethanol as hydrogen source.

Abengoa Bioenergy is going to construct and test a demonstration plant for ethanol reforming and has finished the design and initiated the construction that will be finished at the beginning of 2006, with an ambitious test program.

The project is developed in collaboration with the catalyst and Petrochemical Institute (ICP) of CSIC, which has developed the catalyst and has tested the lab and pilot plant with Abengoa Bioenergy...

Energy Crops (Profit)

Jerusalem Artichoke and sweet sorghum are two sugar content crops promising to produce bioethanol. To implement them as raw material it's necessary to determine how cultivate, when collect and which is the yield. This works needs field demonstration developments that are being accomplished within the project.





The project is funded under the Profit program and is being developed in collaboration with UPM (Universidad Politécnica de Madrid) and Instituto Tecnológico Agrario de Castilla y León (ITACyL).

New Projects

I+DEA project presented to Cenit call for proposals

Abengoa Bioenergy is leading a project in looking for three main objectives:

- Develop lignocellulosic energy crops
- Develop gasification and catalytic ethanol synthesis
- Develop ethanol market through ediesel

The project has been launched to Cenit call from proposals, funded by CDTI, and the partners in the project are: for energy crops are Asaja, Agencia andaluza de la Energía, Syngenta and Oryzon. For Gasification and catalysis Agencia Andaluza de la Energía and Solutex. And for ediesel Cepsa, Tussam, Auvasa, and Ciudad Real Council.

The project indeed introduces different Public Researching Centers like AICIA, CSIC, ITACyL, CENER, ITAP, Ciemat, UCLM, Cidaut and Universidad de Comillas.

Singular Strategic Project (PSE) on energy crops

Abengoa Bioenergy and some of its subsidiaries take part in this project that has been funded by the Spanish Government to develop energy crops for different applications. Abengoa Bioenergy leads the development of starch crops for ethanol production.

In the project there are several partners, but in the starch energy crops evaluation the main are ITACyL and Asaja.

Alliances and Partnerships

Alliances

ABRD has entered into a strategic alliance this year with O2Diesel to provide funding and commercial support to develop the European market. ABRD continues its alliance with Novus (product characterization, proof-of-concept, field evaluation and commercialization of new feed products).

Partnerships

ABRD continues its partnership with Novozymes (enzyme application), Genencor (enzyme supplier), Auburn University (analytical support), NREL (pretreatment, AspenPlus Model, NIR Rapid Analysis), and NatureWorks (fermentation).

Workforce in Spain	
Spain	
Ecocarburantes Españoles	75
Bioetanol Galicia	77
Biocarburantes de Castilla y León	103
Corporate Abengoa Bioenergía y Ecoagrícola	30
Total workforce in Spain	285

Workforce in USA	
USA	
Colwich	46
Portales	56
York	60
Corporate USA	40
Ravenna	5
Total workforce in USA	207

