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# Industrial Engineering and Construction

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**Engineering, construction and maintenance of electrical, mechanical and instrumentation infrastructures for the energy, industrial, transport and service sectors. Development, construction and operation of industrial plants, conventional power plants (cogeneration and combined cycle) and renewable energy facilities (bioethanol, biomass, wind, solar and geothermal). Turnkey telecommunications networks and projects.**



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## Energy

- In 2001 work continued on the construction of the bioethanol production plant in Teixeira Curtis (La Coruña) for Bioetanol Galicia, which will have a production capacity of 126 million litres of alcohol a year. Engineering work also began on another plant in Salamanca for Biocarburantes de Castilla y León, which will produce 200 million litres of alcohol a year.
- In the biomass sector, work continued on the construction of a 25 MW biomass plant fired by straw and forestry waste for Energía Hidroeléctrica de Navarra in Sangüesa (Navarre).
- In the area of cogeneration and energy efficiency the following projects were carried out.
  - In March the combined-cycle cogeneration plant was put into operation for Sniace at its factory in Torrelavega (Cantabria). The plant is equipped with two 41.5 MW gas turbines.
  - Final testing was completed successfully at the pig slurry treatment and disinfection plant in Vilches (Jaén), equipped with three 15 MW gas engines, for Procesos Ecológicos Vilches, S.A.
  - Work continued on the construction of a 25 MW simple-cycle natural gas-fuelled cogeneration plant for Bioetanol Galicia in Teixeira Curtis (La Coruña).
  - A 48.4 MW combined-cycle cogeneration plant, equipped with one gas turbine and one steam turbine, was put into operation for Torraspapel at its factory in Motril (Granada). Construction work on a 30 MW simple-cycle power plant with a gas turbine for GDP Energía (Portuguese gas company) and EDP Cogeração (Portuguese electricity company) in Carriço (Portugal) is now nearing completion and the testing period is in progress.



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The construction of an 8 MW power generation plant for Nuegas supplied by the El Romeral gas fields in Carmona (Seville) is now nearing completion.

The 42.1 MW San Carlos II heavy fuel oil diesel power station in Baja California (Mexico) constructed for the Mexican Federal Electricity Commission was put into operation.

Work began on the repowering of the El Sauz thermal power station in Mexico, which will be upgraded from a simple-cycle power station to a 413.6 MW combined-cycle power station for the Federal Electricity Commission.

In 2001 Abener continued to operate the following cogeneration plants:

15 MW combined-cycle cogeneration plant fuelled by liquefied natural gas for Precosa (Delphi España-General Motors) at its factory in Puerto Real (Cadiz).

19.7 MW combined-cycle cogeneration plant fuelled by liquefied natural gas for Enernova Ayamonte (Acuinova-Pescanova) at its fish farm in Ayamonte (Huelva).

21.5 MW simple-cycle cogeneration plant with fuel engines for Covisa (DSM Deretil) at its facility in Villaricos (Almería).

12.7 MW simple-cycle cogeneration plant with fuel engines for Aprofursa (Furfural Español) in Alcantarilla (Murcia).

Power generation plants supplied by the gas deposits at Las Balbuernas, Écija (3 MW), Las Viñeulas, Écija (3MW), and Las Barreras, Camas, Seville (5.8 MW).



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- Nuegas is a company in which Abengoa has a majority interest and which operates in the hydrocarbon exploration and exploitation sector.

Nuegas currently has three electricity-generating plants in operation with a total power output of 12 MWe. Two of the plants, Las Balbuenas and La Viñuela, which have a power output of 3 MWe each, are at the concessions El Ruedo-1, El Ruedo-2 and El Ruedo-3. Las Balbuenas is located in Écija (province of Seville) and La Viñuela in Fuentes de Andalucía (province of Seville) and they are supplied by production from the Córdoba C-1A and Córdoba B-2 wells. The third plant, located at the Las Barreras concession, has a power output of 6 MWe and is supplied by the San Juan V-1 (Seville) and San Juan V-6 (Camas) wells.

As at December 2001, the three plants had produced approximately 59.2 million Nm<sup>3</sup> of gas (around 206,300 MWh).

In 2001 work was carried out on the reinterpretation of seismic data from previous campaigns and the one conducted in 2000. Work has also begun on reinterpreting data for the wells already drilled, including both productive and unproductive wells.

Nuegas wholly owns the operating concessions for El Ruedo-1, El Ruedo-2, El Ruedo-3 and Las Barreras and therefore acts as operator for them.

An 8 MWe electricity generation project is expected to start production in the first quarter of 2002. Located in Carmona (Seville), the plant will be supplied by production from four wells known as El Ciervo-1, Sevilla-1, Sevilla-3 and Santa Clara. This work is being carried out at the El Romeral-1, El Romeral-2 and El Romeral-3 concessions, in which Nuegas has a 25% interest.

Nuegas has a 15.22% interest in the prospecting licences for Bricia and Arcera under which it drilled the El Coto-1 well to a depth of 4670 metres in the municipality of Polientes (Cantabria) on



a budget of approximately 12 million US dollars. The well has now been abandoned and sealed owing to the difficulties encountered in conducting production testing.

Following the analysis of the data from prospecting and exploration activities undertaken in 2000 and the drilling campaign carried out in 2001 at the Marismas B-1, Marismas C-1, Marismas C-2 and Rebujena operating concessions, production was started at the Z-3ST deviated well located in Hinojos (Huelva). The other well that showed positive results during the campaign was the La Cerca well located in the municipality of Aznalcázar, where production is expected to commence in the first quarter of 2002.



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## Installations

Inabensa achieved optimum results in 2001 in terms of sales (205.3 M€), contracts won (218 M€) and net profit. 2001 was therefore a year in which our position as an industrial engineering and construction company was considerably strengthened.

The outlook for 2002 is also good, in spite of the fact that the performance of the Spanish economy and the world economy in general, if as predicted, will not be conducive to the growth of our business. The expansion of activities on foreign markets has been and will continue to be a key factor in coming years, as the forward order book includes contracts for projects abroad worth over 140 M€ as at 31 December 2001, in addition to sales by the concessions in Brazil, which will add up to more than 500 M€.

On foreign markets, Inabensa continued to pursue its objective of further internationalising activities, mainly in Europe, Africa, Central America y Asia, aiming to be involved in major infrastructure, industrial and energy projects.

The development of new products, activities and services based on advanced management systems and new technologies is aimed at diversifying our traditional business activity and improving competitiveness. An example of this is the work carried out by Inabensa in the area of solar energy and fuel cells, which has led to the setting up of two specialised companies.

The strength of Inabensa lies in its firm commitment to quality and customer service, which it maintains by making optimum use of technical and financial resources and its highly qualified, specialised human resources.

Significant projects carried out in Spain include the following:

Construction of Pazos-Atios/Mos 220 kV lines for Unión Fenosa, Benejama 132 kV double circuit Alcudia-Alcoy link for Iberdrola and Trillo-Calatayud and Soto-Penagos 400 kV lines for REE.

Commissioning of the 132 kV substations at the Torraspapel cogeneration plant in Motril, the 220 kV substation at the Repsol Petróleo cogeneration plant in La Coruña and work at the 220 kV substation in Ormaiztegui (Guipúzcoa) for Iberdrola.

Among other projects for the Madrid Metro, the project to interconnect the Estrella-Conde de Casal-López de Hoyos-Gregorio Marañón substations, the renovation project on line 10 and the new 1500 V DC electrical substation at the Cuatro Vientos coach yard.

Extension of air traffic control centre at Palma de Mallorca Airport and the construction of a new electrical substation at Alicante Airport. In temporary partnership with other companies, works to upgrade Santiago de Compostela Airport to category II/III and a new air traffic control centre at Gavá (Barcelona) for AENA.

Electromechanical installations at the new Isla de la Cartuja clinic (Seville) for Asepeyo. In temporary partnership with other companies, the construction of the new Local Police building in Huelva and the complete remodelling of the Chapín stadium (Jerez de la Frontera) to be used in the coming World Equestrian Games in 2002.

Installation of two 40 MW gas turbines at the cogeneration plant being built by Energy Works at Gepesa's facility in Cartagena for General Electric International Inc.



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Installation of equipment, prefabrication and installation of piping for the Teixeira bioethanol plant (La Coruña), installation of a 28 MW turbine and associated systems and a biomass-fired fluidised bed boiler at the EHN cogeneration plant in Sangüesa (Navarre) for Abener Energía.

Electrical and instrument maintenance at the Compounding and Lexan I plants in Cartagena, for General Electric Plastics España, at the La Rábida refinery in the province of Huelva, for Cepsa, and at the Palos de la Frontera plant also in the province of Huelva, for Enagás.

Supply and electrical and instrument installations for the extension of the PVC section at the Vilaseca facility (Tarragona) for Aiscondel.

Electrical and instrument installations at the Lexan I and II plants in Cartagena for General Electric Plastics España.

Remodelling of Cadiz station, underground lines and electrification for the Ministry of Development.

Also for RENFE, the modernisation and improvement of the overhead contact line on the following sections: Valchillón-La Roda, San Cristóbal-Aranjuez, La Negrilla, Málaga-Fuengirola, Cerdilla-Cotos and at Ponferrada station and Tardienta station.

Other significant projects include the work to change the voltage from 3 kV DC to 25 kV AC on the Madrid-Seville AVE (high-speed train) line at Santa Justa station and Atocha station.

LV switchboards and motor control centres, protection boards and 6.3 kV cubicles for the two generating units of the Iberdrola combined-cycle power stations in Castellón, LV switchboards and motor control centres for the two generating units of the combined-cycle power stations in San Adrián de Besós and San Roque for Endesa and Gas Natural, the same equipment for the diesel power stations in Ibiza, Ceuta and Punta Grande and for Endesa's Son Reus and Iberdrola's Pasajes thermal power stations.



Inabensa carried out a significant number of projects abroad, including:

Engineering, supply, installation support and commissioning of the Peñas Blancas 230 kV substation for Instituto Costarricense de Electricidad.

Engineering, supply and installation of rural electrification equipment, phase II, for the Kenya Power & Lighting Co. Ltd. (Kenya).

Work to reinforce substations and HV, MV and LV networks and to extend the Tinteniac 90/20 kV substation for Electricité de France (EDF).



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Engineering, supply, installation and commissioning of the Nouakchot and Rosso 230 kV substations and the 90 kV line between Matam and Kaedi. Extension of the Kaedi-Boghué section of the Mauritania-Senegal interconnection for Sogem/OMVS.

Electrical installations at the new Ford Trim plant in Salvador de Bahía (Brazil). Amazon project.

Engineering, supply, installation, commissioning, maintenance and operation of the extension of the 525 kV North-South interconnection I for Aneel (Brazil). Samambaia-Itumbiara and Samambaia-Emborcação transmission lines and associated substations.

Design, engineering, supply, installation and commissioning of the Izmir 25 kV AC railway line between Basmane-Menemen-Aliaga and Alsancak-Cumaovasi for Turkish State Railways (TCDD).



## Protisa

Protisa continued to expand its traditional activities including the supply and installation of thermal and acoustic insulation, refractories, passive fire protection and industrial doors, also seeking to incorporate associated activities and products, such as the removal of asbestos from facilities and photoluminescent signage.

The most significant projects included:

Supply of more than 500 sound-proof and fire doors for the Carlos III National Cancer Research Centre in Madrid.

Removal of asbestos thermal insulation from two boilers and piping at the Solvay Química plant in Torrelavega (Cantabria), confining the works to a 6000 m<sup>2</sup> polyethylene film bubble with all openings hermetically sealed.

Installation of the refractory for three furnaces and the ducting system of the hydrocracking facility at the Repsol IPF refinery in Tarragona for Foster Wheeler.



## Morocco

Two contracts for the Office National d'Electricité (ONE) involving the electrification of 74 villages were completed as part of the PERG rural electrification programme.

In the area of mobile telephone network deployment, phases 3 and 4 of the construction of rural and urban GSM mobile telephone sites were carried out for Mediatecom through Siemens AG.

In addition to the rural electrification projects, the ONE has also issued various invitations to bid for work to strengthen its 400 and 225 kV transmission network (interconnected with Spain) and its 60 kV distribution network.

The tenders submitted by Inabensa in consortium with Inabensa Maroc are worth over 300 M€.

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Supply and installation of the smoke evacuation and sectoring system for the Bonaire shopping and leisure centre in Valencia, using ventilators and automatic smoke barriers for fire protection, for Sulzer.

Installation of thermal insulation for the piping and equipment of two 48,800 kW twin cogeneration plants located at the Michelin tyre factories in Valladolid and Vitoria.



## Telecommunications

### **Abentel**

Abentel's activity was affected by the slump in the telecommunications sector, which was at its worst so far in 2001, as it struggled to rally, with businesses up for sale, layoffs, restructuring and suspended payments. Investment in telecommunications was therefore at an all-time low.

In spite of this, we met overall targets for the year thanks to a solid contract portfolio, mainly with its customers Telefónica and Jazztel.

Work continued on the contracts involving the installation and maintenance of external plant in ten Spanish provinces for Telefónica. In all these provinces and in two others, we also carried out work to install and maintain customer equipment for private households and businesses, with a large number of ISDN and ADSL installations in businesses.

In 2001 we implemented what we call the Integra Project for a part of the activity carried out with Telefónica, which is the result of a competitiveness and quality plan, which was set in motion in 2000. One of the most important innovations is that service orders are dispatched and performed using mobile telephones with GPRS technology, which is a completely new development in Spain.

We continued work on an integral operation for Jazztel involving the engineering, planning, construction and laying of a fibre optic network, including subscriber access facilities, together with improvements in its network deployment management information systems

For other fixed and cable operators, such as BT, Metrored, Supercable, Madritel, etc. we continued to carry out work of various kinds to provide integral services connected with the construction of their respective networks. An important contract with a fixed operator was the one signed with TyCom to condition the switching nodes of its fibre optic trunk network deployed in the Iberian Peninsula. This was probably the most significant contract secured in 2001 in that it contributes to achieving our aim of broadening our customer base, it was won in the face of fierce competition on the strength of Abentel's extensive experience and proven track record, which played a key role in differentiating its tender from others, and it involves a new activity that will afford new business opportunities.



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Activity in the mobile telephony sector in 2001 did not entirely live up to expectations. The current state of UMTS technology meant that these new networks were not deployed as planned and work in this area was confined to completing the deployment of the GSM networks of existing operators at a slower pace. Abentel's work in this sector included two main projects: engineering and construction of mobile telephony base stations for Amena and the supply and installation of radio link equipment for Vodafone.

Another important activity in 2000 was the provision of outsourcing services for the sector's manufacturers and technology providers, an area of business we embarked on in 2000 when we won a multi-year contract with Ericsson España for internal plant engineering for its switching centres and associated facilities. In 2001 we extended outsourcing services to include the installation of radio links.

Abentel completed a large part of the work to condition the buildings where Carrierhouse undertakes its housing operations. Abentel's activity as a constructor for Carrierhouse is a good example of the synergy existing between companies belonging to the group.

Another landmark development in 2001 was the start of R&D&I work at Abentel through two projects: the Integra Project mentioned above and the Siloc Project, involving the implementation of a vehicle tracking system using GSM mobile telephone networks. Our Information Systems Department played a key role in each of these projects, using the experience and expertise gained through its work with geographic information systems (GIS) and information systems for network deployment management to develop new products like these and others aimed at operation support systems (OSS).

Finally, Abentel continued its operations abroad, with good results for the year in Portugal and the discovery of interesting business opportunities in other countries, such as Mexico and Costa Rica.

## Marketing and Manufacturing

### Nicsa

Nicsa was successful in meeting the targets set for 2001. It increased its market presence substantially, building up its leadership position in the supply of electrical, instrumentation and communications materials to the chemical and petrochemical industries, refineries, combined-cycle power stations, nuclear power stations, thermal power stations and heavy industry in general.

Nicsa is a company oriented toward engineering projects and is capable of covering entire projects or providing a certain range of materials. Our experience in this area enables us to act as a system integrator and to design, select, supply and test complete systems in compliance with specific technical requirements and the individual needs of each project.





The most significant projects carried out in 2001 included:

- Projects in Spain:
  - Repsol YPF, Hydrocracker, Tarragona. Integral supply contract for electrical material and instrumentation.
  - General Electric Plastics. Lexán II Plant. Supply of cables, grounding systems, lighting, cable trays, conduits, junction boxes, power points, engine-control, push button stations, cable glands, electrical tracing, pressure gauges and thermometers.
  - Itasca, Interquisa. Plant TA3/PTA4/S.S.A.A. San Roque, Cadiz. Supply of resistances, cables, cable trays, lighting, push-button stations, power points, lighting towers, junction boxes, feedthroughs and isolators.
- Projects abroad:
  - Initec-DSD. Repsol YPF, La Pampilla refinery, Peru. Substation, cogeneration, amines, storage

park and fluid catalytic cracking. Supply of cables, lighting, trays, conduits, grounding systems, junction boxes, cable glands, power points, push-button stations, beacons and markers.

- Initec-JGC, Ourhound Project, Algeria, oil field. Supply of installation material, control stations, power points, junction boxes, cable glands, panels, transformers, lighting, cable trays, conduits, cables and accessories.
- Chagalesh-Ecolaire. Butadiene extraction plants in Tabriz and Bandar Iman, Iran. Supply of cables, lighting, push-button stations, power points, beacons, markers, instrumentation panels, bus ducting, batteries and chargers, transformers.

We continued our operations in Latin American markets through our subsidiary Nicsa Trading Corporation.

## **Abencor**

In 2001 Abencor strengthened its market strategy based on serving major customers in the electricity, industrial and communications sectors, establishing itself as the commercial network of those suppliers that have entrusted the distribution of their products to us. The renewal of the Quality Assurance Certificate that we have held since 1995 and the granting of the Environmental Management Certificate in April of last year is evidence of our strong commitment to quality and the environment.

The electricity sector was the driving force behind our business in 2001, achieving record results and offsetting the falloff in communications contracts. The most significant contracts included the start-up of warehouse outsourcing for Endesa in the area of Compañía Sevillana de Electricidad and the supply of materials for the installation and construction of power lines in Spain and abroad (particularly in Mexico).

Lastly, we carried out a communications project called TIRO over the Internet, providing greater fluidity in the exchange of information with customers and suppliers.

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These contracts contributed to offsetting the slump in the mobile telephony market, where UMTS technology has come to a standstill, putting a stop on supply prospects for the year.

REE was our most important customer in Spain both in the power line sector and in the substation sector, with Eucomsa becoming its main supplier for these structures.

The Steel Sheet Division maintained its level of activity in significant products including the fibre distribution frame cabinets that we supply to Telefónica and other Spanish operators, automatic teller machines for Fujitsu and the habitual supplies for the traffic and road sign market.



Other important developments in 2001 included Eucomsa's efforts to support and launch the activity of Comemsa, its subsidiary in Mexico. It began operations in 2000 and was able to take on the manufacture of the bulk of the contract for Tuxpan (transmission line 406), among other supplies, achieving a dominant position in this market.

## **Eucomsa**

Eucomsa's activities in 2001 focussed on the exportation of transmission line towers to various countries, particularly Mexico, for a number of customers. The biggest supplies made in the Mexican market were for the Tuxpan Consortium (Abemex, Elecnor and Alstom) for the transmission line 506 project and for the Federal Electricity Commission and Abemex.

An important supply contract was also secured in Mexico at the end of the year for the transmission line 411 project, in which our customers were Abemex and Elecnor. We also have a contract for the supply of towers to Abengoa Chile for the Ralco Project, which will be manufactured in collaboration with Comemsa, our subsidiary in Mexico.

Other significant export contracts were with Balfour Beatty for Nigeria, with ESB for Ireland, with the Cobra/Elecnor/Inabensa/Isolux Consortium for Mauritania and with CME for Portugal.

