

# SPAIN – The World's No.2 Market

Spain is now the second largest wind power market in the world. By the end of last year installed capacity was not far from 5,000 MW. The dynamism of the country's industry is further underlined by the fact that it accounts for 12% of worldwide turbine manufacture.

*Pepa Mosquera and Crispin Aubrey chart the progress of Europe's southern giant.*

Three European countries lead the world wind power industry: Germany, the market leader, Denmark, which dominates in turbine manufacture, and Spain. With 4,830 MW of capacity installed by the end of 2002, this is now the world's second largest market. More than 4% of Spanish electricity is currently supplied by the wind.

Last year a total of 1,493 MW of new plant came on line across eleven of Spain's autonomous regions and offshore islands. This was a 44% increase over 2001. "These figures illustrate that renewable energy is on the way to becoming a real alternative to conventional technologies," says Sergio de Otto from APPA, the national renewable energy association.

Although assessments by other organisations have produced higher figures than those from APPA, these are usually based on a more complex mixture of reports from turbine suppliers and confirmed projects in the ground. APPA also points out that an apparent slow-down in the market during the first half of 2002, when only 350 MW came on line, was radically reversed. In the second half of the year an impressive 1,100 MW kicked in.

## Increasing growth rate

The pace of growth in Spain has been increasing. During the 1990s the average rate was 24%. Currently it is well over 30%. Only Germany has shown a faster growth rate in the past two years.

Turbines installed in Spain are also increasing in capacity. The average rating for turbines erected during 2002 rose to 808 kW. This compared with 721 kW in 2001 and 648 kW in 2000.

Wind power in Spain owes much of its success to two factors: a simple and consistent national support mechanism together with a firm commitment from many regional governments (see panel). Given that each of Spain's seventeen autonomous regions is separately responsible for regulating wind power, such commitment is vital.

Top of the list is the north-western region of Galicia, which installed 341.5 MW last



year, bringing its cumulative total to 1,314.9 MW and confirming its position as Spain's key wind power player. The regional government aims to install 4,000 MW of wind power by 2010, which it estimates will supply around 50% of the region's total electricity demand.

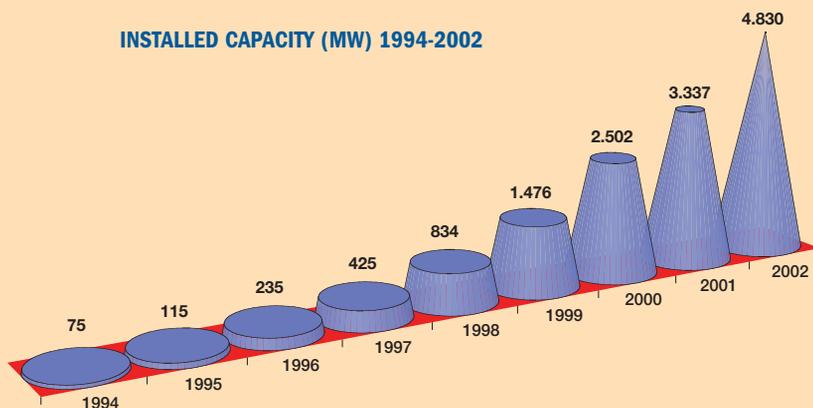
Second to Galicia is the region of Castilla-La Mancha - homeland of Don Quixote himself - with 741.2 MW on line, 48% up on the figure for the end of 2001. Current regulation allows for a further 4,000 MW to be installed across the five provinces that make up the region.

Aragón now stands third in terms of installed wind capacity, following a spectacular surge of growth throughout last year. A total of 269 MW came on line, 57% up on the previous year. Meanwhile, Navarra is the fourth busiest region, with 689.2 MW on line, 16% more than in 2001, followed by Castilla y León, which finished the year with 634.9 MW, doubling 2001's figure.

### Thriving manufacturing industry

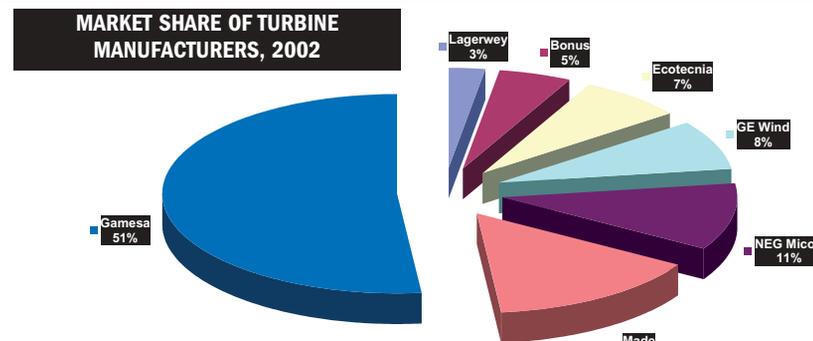
Spain's wind power boom has been spurred on by a thriving turbine manufacturing industry. Two of the country's main domestic manufacturers, Gamesa and Made, are among the world's top ten, with Gamesa achieving fourth position in the global league table, according to the latest report from Danish consultants BTM Consult. Ecotècnia, another company manufacturing and supplying entirely

INSTALLED CAPACITY (MW) 1994-2002



Source: APPA

MARKET SHARE OF TURBINE MANUFACTURERS, 2002



Source: BTM Consult

CAPACITY BY REGION (MW) AT END 2002

Installed end 2002	No. of wind parks	% of Spain total
1,314.98	61	27.2
741.17	22	15.3
733.92	36	15.2
692.51	25	14.2
634.93	41	13.7
203.52	5	4.2
163.63	13	3.4
126.92	44	2.6
86.36	6	1.8
73.72	2	1.5
26.97	1	0.5
20.49	2	0.4
11.22	2	0.2

Spanish technology, finished the year with the joint largest growth rate (together with Germany's REpower), according to the BTM Consult analysis.

More than 85% of Spain's installed capacity in recent years has been supplied by Spanish manufacturers using in house technology. All of these companies have also begun developing machines in the megawatt range. Gamesa, for example, now includes 2 MW turbines in its range, Made is developing its own 2 MW model and Ecotècnia offers turbines up to a rating of 1.67 MW. Furthermore, the Spanish turbine market is among the most dynamic, accounting for 12% of world turbine supplies, according to the national energy agency, Instituto para la Diversificación y Ahorro de la Energía (IDAE).

Gamesa's world market share grew by 11.8% last year, compared with 9.5% growth in 2001. The company is present in various European countries, as well as in Japan, and is making inroads in the USA, Brazil, Austria and China.

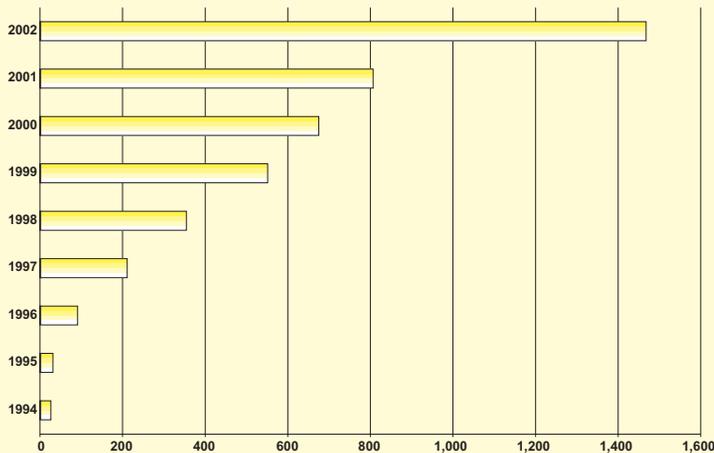
Ecotècnia, meanwhile, a member of the Basque Country's Mondragón cooperative business group, exports to Japan and is gaining a foothold in Portugal and Morocco, among other countries. Another company gaining ground is Izar Turbinas, which manufactures turbines through a technology transfer deal with established Danish turbine-maker Bonus.

### Utility investment

The position of utility Endesa's turbine manufacturing wing, Made, is more complex. Although it has expansion plans in China, Tunisia, Brazil and Mexico, the company has been up for sale since the end of last year. Gamesa has made an offer but, at the time of writing, the deal has not been completed.

Spain has also seen a number of major wind project development businesses created, mostly by existing power companies such as the Navarra region's EHN and national power company Iberdrola. At one time these two giants had plans to create what would have

ANNUAL INVESTMENT IN WIND ENERGY SECTOR (€1,000)

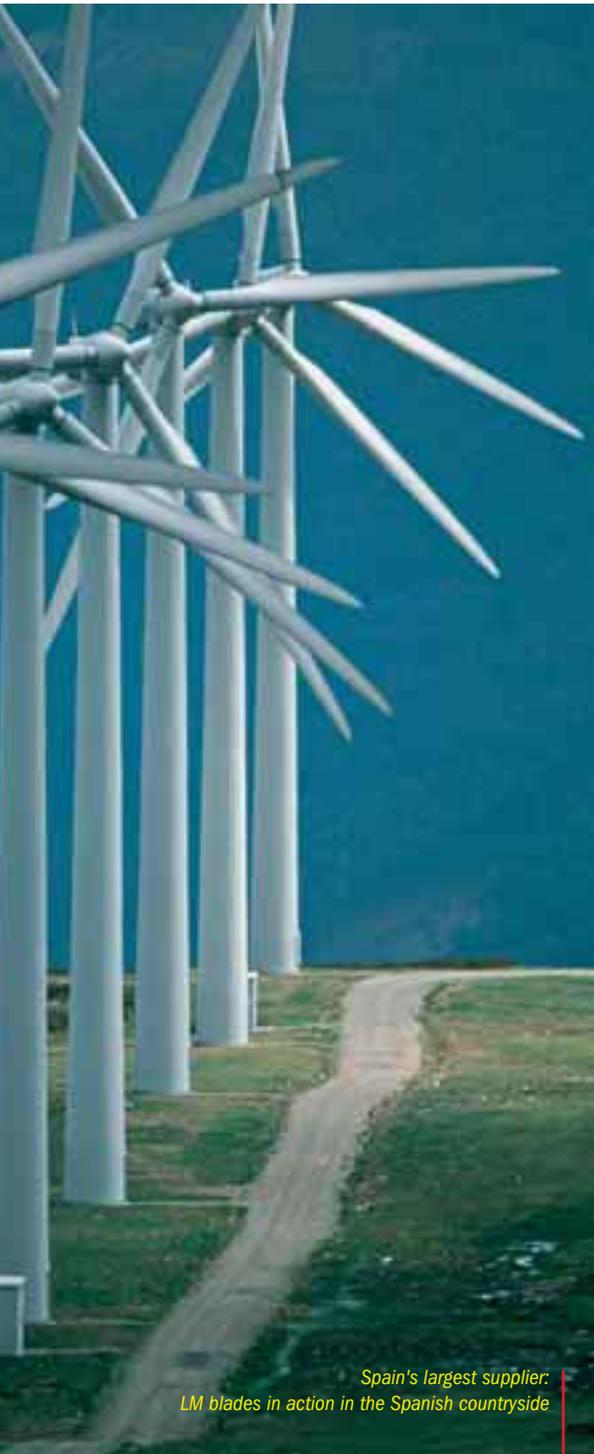


Source: IDAE, APPA



Photo: Gamesa

Industry leader:  
Tower manufacturing at  
a Gamesa factory



Spain's largest supplier:  
LM blades in action in the Spanish countryside

Photo: LM Glasfiber

been one of the largest renewables development joint ventures in the world, but have since decided to pursue their separate plans.

Following the separation, EHN has taken full control of all wind plant in Navarra and now owns 50% of Renomar, a development company in the Valencia region. In turn, Iberdrola has assumed complete control over Energías Eólicas Europeas, active in Castilla-La Mancha, 50% of Energías Renovables de la Región de Murcia and has taken over a majority share in three further development companies.

Iberdrola's impact on the Spanish wind scene also comes via its €1,000 million wind turbine purchase deal with Gamesa, signed towards the end of last year. The deal, which includes a commitment to buy 1,100 MW of Gamesa turbines, has so far seen Iberdrola acquire eight wind plants totalling 165 MW for €184 million. With the addition of this new capacity Iberdrola now estimates its renewables capacity will have reached 2,600 MW by the end of this year, 70% of the goal set down in the company's strategic plan for 2002-2006.

### New ventures

Spain's wind industry development has created a chain of associated companies supplying components, equipment and services, with over 350 businesses now involved. Gamesa, for example, recently launched an affiliate, Green Energy Transmission, specifically to ensure its component supplies. In Castilla y León, the manufacture of wind power components has become the main source of

new employment and new business over the space of just five years, according to the regional government.

Nonetheless, the project processing bottleneck presently being experienced in Castilla y León could slow this upward trend. Danish blade manufacturer LM, for example, which has three production facilities in Spain, had to close its Ponferrada facility in León province for three months earlier this year. LM is Spain's largest blade supplier and sold its 10,000th blade in the country last January. The closure resulted from proposed wind parks failing to gain grid connection, environmental approvals or financing in the expected time, the company said, although its other factories in Galicia and Castilla-La Mancha have been operating as normal.

There is also ample evidence of new industrial ventures in the Spanish wind industry. Turbine manufacturer Izar Turbinas, for instance, is preparing for the inauguration of a new nacelle assembly unit at A Coruña in Galicia. At the same time, Ecotècnia is about to open a tower manufacturing facility in Castilla y León's Zamora province. Last November, Navarra region saw a brand new Spanish blade manufacturer start up - Noi Navarra - which is mainly controlled by Germany's NOI (51%) and the public holding company Sodena (41.5%).

### Creating employment

In terms of employment in the industry, interesting evidence comes from a study carried out by EHN into the effects of wind development on Navarra's job market. Based on the installation of 265

MW, the study showed that the development and operation of this capacity created 2,043 jobs, including initial assessments and planning, manufacture of the turbines, plant construction and operation and maintenance. Work was also created for a further 1,315 people, if component and equipment suppliers are included.

In 2000, according to figures from leading trade union Comisiones Obreras, the industry already employed 5,000 people in Spain and indirectly provided work for another 8,000. Looking ahead, one estimate is that the 13,000 MW of wind power envisaged by 2011 within the Spanish government's energy infrastructure plan will create almost 20,000 full-time jobs in manufacturing, maintenance, operation and associated businesses.

### Growing income

During 2002, Spain's wind plants generated a total of 9,120 GWh of electricity, according to APPA calculations, representing an income of €695 million. This was a 57% increase over sales in 2001. Developers in turn invested a total of €1,466 million last year in 1,535 MW of wind farms. Bank credit financed 80% of this investment whilst developers accounted for the remainder out of their own funds. APPA estimates that overall investment in Spain's cumulative wind capacity total has now reached €4,612.6 million.

Despite these positive figures, APPA warns that increasing costs to developers are still making life difficult for the wind industry. One of the main threats comes from the fact that many of the sites with the best wind resources have already been taken up, even if not already developed. Another limit on profitability is the increasing demands on developers to finance interconnection power lines. At the same time, procedural bottlenecks and red tape are dragging out the timescale of developments. Furthermore, the absence of a stable tariff mechanism, illustrated by the cut in this year's national tariff for wind, has encouraged some credit risk agencies to be more cautious. Even so, says Sergio de Otto from APPA, "in spite of all the obstacles, the wind sector in Spain is showing considerable strength."

## Southern Europe's Powerhouse

**The Spanish wind energy industry has forged ahead in recent years more successfully than any other in southern Europe. A sparsely populated countryside combined with strong government policies have together made Spain a powerhouse for both manufacture and development.**

As importantly, this development is now taking place across many regions, from the jagged Atlantic coastline in the northwest to the mountains of Navarre to the sun-drenched plains of Castilla la Mancha.

The origins of Spain's success can be found in a mixture of factors: a good wind regime liberally spread across a land mass over ten times as large as Denmark, a focused regional development policy and a national support scheme which is strong and straightforward.

### National legislation

The first piece of government legislation to provide substantial backing for renewable energy was introduced in 1994. This obliged all electricity companies to pay a guaranteed premium price for green power over a five year period, operating in a similar way to the Electricity Feed Law in Germany. At the end of 1998 the government reaffirmed its commitment to renewables with a new law designed to bring this system into harmony with the steady opening up of European power markets to full competition.

The 1998 law confirmed an objective for at least 12% of the country's energy to come from renewable sources by 2010, in line with the European Union's target, and introduced new regulations for how each type of green electricity would be priced. For wind energy producers, this means that for every unit of electricity they produce they are paid a price equivalent to 80-90% of the retail sale price to consumers. During 2003, the government agreed price is 6.2 €cents/kWh, making wind a relatively attractive investment.

### Regional plans

Whilst national laws are important, a crucial impetus for wind development in Spain has come from the bottom up, from regional governments keen to see factories built and local jobs created. The incentive is simple: companies which want to develop the region's wind resource must ensure that their investment puts money into the local economy and that they source as much of the hardware as possible from local manufacturers.

In Galicia, for example, a shortlist of promoting companies, including both power utilities and turbine manufacturers, have been granted concessions to develop set quotas of capacity within 140 specified "areas of investigation". Galicia's aim is that at least 70% of this investment should be made within its borders, creating thousands of jobs. As a result, factories making blades, components and complete turbines have sprouted up around the province.

An indication of the regions' ambitious plans is that the total amount of wind capacity envisaged by 14 regional governments has now reached over 30,000 MW. This is considerably more than the 13,000 MW contained in the central governments' latest projection for what the grid network can accept over a similar time period.

## Spain: Core Facts

- In 1994 just 75 MW of wind capacity was operating in Spain. Last year the total reached almost 5,000 MW.
- Spain's autonomous regions have combined targets for a total of more than 30,000 MW by 2011.
- Investment in Spain's cumulative installed capacity has now reached over €4.6 billion.
- 350 companies have been created by the Spanish wind industry.
- More than 85% of wind parks built recently have been supplied with Spanish made turbines.
- Over 4% of Spanish electricity demand is currently covered by wind energy.
- With effective take-off in 1994, Spain took just five years to reach 2,000 MW, even faster than Germany.



## INTERVIEW

# José Folgado, Spanish Secretary of State for Energy

**Wind Directions:** Spain has adopted the European Union Directive target for a 29.4% contribution from renewable energy to national gross electricity consumption by 2011. Can this target be met?

**José Folgado:** This is undoubtedly an ambitious objective which the government still believes can be achieved. So it is simultaneously working on two fronts. On the one hand, the Spanish Strategic Energy Efficiency Plan 2003-2012, which will promote improvements in the efficiency of all energy consuming sectors, is already in an advanced state of preparation.

On the other hand, the annual follow-up which monitors the Renewable Energy Promotion

Plan 2000-2010 allows for adaptive measures to be taken to ensure the adequate development of the different aspects involved in reaching the Plan's electricity generation objectives. Similarly, the government is working on improving the regulatory framework in order to foster the increasing growth in electricity generated from renewable sources.

To this effect, the new method for reviewing the production premiums for renewable energy sources – in order to give this support instrument a more predictable nature in the medium and long-term – is close to being finalised.

Finally, I would like to mention the tax incentives that have recently been enacted, with rebates of 10% on corporate income tax for investments in renewable energy sources. I believe that this initiative is very important and situates us in a leading position in Europe.

**Wind Directions:** Wind energy is so far the only renewable technology in Spain that is growing according to the Renewable Energy Plan, which has a goal for 13,000 MW of capacity by 2011. Why has the government then reduced the wind energy premium payment by 8% this year?

**José Folgado:** The government has not reduced or increased any of the premiums encompassed in the Special Regime. What the government has done is to apply a mechanism for adjusting the premiums in accordance with the Royal Decree 2818/1998. In this legislation two alternatives are established for calculating the remuneration to be paid for energy generated by a wind farm: a premium plus the general "pool" price, or a fixed remuneration. Any operator can choose which option they consider most favourable.

Every four years, the methodology for calculating such tariffs is reviewed. This will take place this year. At the same time, the amounts relating to the premium and the fixed price are updated on an annual basis, taking into account the average



*EHN wind turbine against the background of the Navarre mountains*

Photo: EHN

*“This review has not significantly changed the profitability of wind farms, which is shown by the dynamism that the wind business continues to display”*

retail price of electricity. For the current year (2003), the Royal Decree 1436/2002 has established a reduction in the wind premium of 8%, which represents an overall decrease of approximately 3% on the end price, and the fixed remuneration has been reviewed downwards by 1%, being set at 6.2145 €cents/kWh. This review has not significantly changed the profitability of wind farms, which is shown by the dynamism that the wind business continues to display.

**Wind Directions:** Can you explain more about the new methodology for revising the premiums for renewable energy, and when it will be introduced? What will it mean for wind energy developers?

**José Folgado:** This new methodology has a twofold goal: to ensure that the level of income is more predictable and the evolution of premiums more stable. We have just received a most interesting proposal from the National Energy Commission, the implications of which are being studied. Its contents will shortly be made public, and we expect it to come into force before the beginning of 2004. It is important to highlight that this initiative is part of a new Spanish energy model, together with the tariffs methodology already mentioned, the Electric Grid Plan (to improve access to the grid), the Renewable Energy Plan, the Energy Efficiency Strategy and the complete liberalisation of the gas and electricity markets.

**Wind Directions:** Spain's greenhouse gas emissions have already gone beyond the 15% increase cap agreed under Kyoto. What role will renewable energy play in the Spanish government's plans for cutting emissions?

**José Folgado:** The Renewable Energy Promotion Plan plays a very significant role in reducing greenhouse gas emissions. It should not be forgotten that CO2 from energy generation makes up two thirds of the total emissions covered by the Kyoto Protocol. According to our forecasts, the development of renewable energy sources can avoid the emission of more than 50 million tons of CO2 per annum by the end of this decade.

**Wind Directions:** With this year's European Wind Energy Conference being held in Madrid, what will this mean for the Spanish wind industry?

**José Folgado:** This will be the largest international event on wind energy held to date, and especially addressed at the business and research sectors. For the Spanish industry it offers a unique opportunity for making known the latest products and services it has to offer, as well as to prepare business strategies that will offer it the greatest degree of competitiveness. The fact that it is being held in our country this year endorses the outstanding position that the Spanish wind energy business has in the market and its technological development at an international level.

*“The fact that (2003 EWEA) is being held in our country this year endorses the outstanding position that the Spanish wind energy business has in the market and its technological development at an international level”*

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Delivering insurance solutions for the wind industry

# Gamesa: Aiming For The Top

Gamesa is Spain's leading wind turbine manufacturer and wind farm developer. Luisa Colasimone talked to Chief Executive Iñaki Lopez Gandasegui about the company's future plans and his vision for the European industry.

**Wind Directions:** What do you believe are the critical European and international markets in the short to medium term?

**Iñaki Lopez Gandasegui:** The two leading markets at present are Germany and Spain. Some other countries, such as Italy, UK, France, Portugal and Greece, are also emerging in the international market, proving that the role of the European Union in the development of the wind industry sector will be critical in the near future. EU countries will have a key role in the growth of the wind industry, as the US market is still very dependent on tax regulations.

**WD:** How do you think these markets can be opened and moved towards the size of Spain over the coming five years?

**ILG:** It will be a progressive process to start with, very dependent on how aids to renewable energy will be funded in the individual countries. France for example could face some difficulties given its dependence on nuclear energy, while Italy has got some strong potential. Of course the growth of each national industry will depend on the size of the country and on the implementation of national policies on renewables.

**WD:** What do you think are the important political and policy questions facing the wind power industry in Europe?

**ILG:** The wind industry benefits from a relatively fortunate situation in the European Union. The goals set for 2010

are significant and the basis of the Kyoto Protocol is very strong. However, the lack of a homogenous development scheme for wind energy presents a problem. This has created a situation in which each country presents a different level of development and applies different methods of encouragement. There are currently several proposals to reach a more homogenous political scheme at an EU level by 2005, but such a step will also have to take into account the incorporation of Eastern European countries.

I personally look at the enlargement very positively in terms of its impact on the wind energy market. The new members will have to conform with and adopt the common European policy in terms of energy and environment, and given the importance that renewable energy has in the EU policy scheme, this means that the newcomers will have to work towards development of renewables, contributing to the enlargement of the wind energy market. It will be a very positive step to amplify the market over the next 10 to 15 years.

**WD:** What is your view of the role of European utilities like Iberdrola in wind power development?

**ILG:** Until a few years ago wind energy was in the hands of mainly small producers, but the number of megawatts installed annually has been growing steadily, transforming the business into something more appealing to electricity



Gamesa Chief Executive Inaki Lopez Gandasegui

companies. This explains the stronger role played by companies such as Iberdrola. I believe that more and more electricity companies will join the wind energy market in the coming years.

**WD:** What size do you think the market could be by the year 2010 in Europe?

**ILG:** In Europe we have a very strong market, around 6-8,000 MW per year, and I expect it to grow even further, to 10-12,000 MW per year. Other countries will take up the relay baton from Germany, Spain and Denmark in the development of renewables, ensuring a stable market in the long term. I am very optimistic about the situation of the market in Europe, and I can see it growing. However the most important issue is to keep such a market stable, as we are already at a very high level.

**WD:** How important is wind energy to the Gamesa group compared with its other business activities?

**ILG:** For Gamesa wind energy is its core business. We have invested a lot in the development of this renewable energy source, both in the construction of turbines and in the installation of wind farms, and all the related activities. Gamesa has also got a strong aeronautical division, but our strategy for the next 2-3 years is to segregate the aeronautical activities in order to concentrate exclusively on the renewable energy sector.

Gamesa has a vocation to be one of the leaders in the wind industry sector, both in terms of manufacturing components and as developers of wind farms, not only in Spain but also at a European and global level. Gamesa is probably the world leader in the promotion of wind farms and we expect to strengthen our role, both as manufacturer and producer, even further in the coming years.

**WD:** Overall, what are your expectations for the wind energy side of the Gamesa company's business over the next five years?

**ILG:** As Gamesa is listed on the stock market, we cannot release specific information. However, after a growth of over 100% in 2002 we can foresee an average 30% growth for 2003, and with a specific focus on wind farm development. We are aiming at an increase of 400 MW per year.

**WD:** Gamesa Eolica is the leading turbine manufacturer in Spain with roughly 50% of the market. How are you planning to maintain that position against increasing competition within Spain?

**ILG:** Gamesa has achieved its status through its proven competitiveness. Nobody has made us presents, and we have closed important deals with key clients in Spain. The fundamental reason behind Gamesa's success is the competitive quality of our turbines, the level of the service that we manage to provide through our national infrastructure, which is the best in Spain, and our prices, which are extremely competitive. Therefore we believe that we will also be able to maintain our position in the Spanish market in the future.

**WD:** Can you define the business structure division between Gamesa Energía and Gamesa Eolica?

**ILG:** The two divisions represent two independent businesses. They are complementary, however, and we therefore use turbines from Gamesa Eolica to install Gamesa wind farms, but the closeness ends there. Gamesa Eolica has its own separate management and objectives. Having the two components gives us the chance to have a good insight into wind energy technology when it comes to the establishment of new wind farms.

**WD:** What do you think are the main pressures facing the leading manufacturers and developers in the next few years?

**ILG:** In Spain, the key manufacturers and developers are also those present on the international market, such as NEG Micon and GE, and the main issue is a common one. We will be facing the issue of consolidation and I believe that within the next 3 to 4 years we will witness the establishment of three or four key producers at a global level. Gamesa aims to be one of those leading presences in the wind industry. Because of the growing demands, this industry will become more and more international, making it a necessity to be present at a global level.

**WD:** Your turbine range is now concentrated on the 660 kW, 850 kW and 2 MW models, I understand. Where do you see the major growth within that range?



Photos: Gamesa

Blade manufacture in a Gamesa factory, and (overleaf) erecting turbines in Spain

**ILG:** We will concentrate mainly on the more powerful turbines, offering big and medium sizes of 2 MW and 850 kW. The tendency for wind farms is clearly to install larger turbines in the future.

**WD:** You produce all of your main components in-house at present at factories in Spain. Do you intend to develop factories in other countries?

**ILG:** Within our industrial strategy we believe that it is important to be present in the key market areas, as closeness to the market is important to maintain costs at competitive levels. For us Europe is a key market area, therefore manufacturing in Spain, Portugal, France, Germany or Italy means that we are present in the same market. From Spain we export to Portugal, France, Italy and Germany. Reaching northern Europe could present a cost issue, but our presence in

Spain means that we can take advantage of competitive production costs and high-level technical skills.

Considering other markets, such as North America, once we reach a significant market share in the US, it will make sense to set up manufacturing there. Latin America on the other hand has seen a very low level of wind energy installation up to now, less than 50 MW per year. Therefore there is no reason at present to set up an industrial presence there. In the future, should the market develop, we would definitely consider it.

**WD:** To what extent is Gamesa focusing its efforts on offshore wind power?

**ILG:** We don't have a particular interest in offshore wind power. We believe it will be a key renewable application for the countries in northern Europe. Offshore wind farm installations are expensive and also present higher maintenance costs, demanding specific adaptations of the technology. Gamesa will continue to focus on on-shore wind farms in the future.

**WD:** What are the main barriers to continued expansion of wind power in Spain?

**ILG:** In Spain we have reached a pretty high level of wind energy development, reaching some 1,500 MW per year, and I believe that if we manage to maintain such a level in the coming years we will have achieved a very important objective. This should be the main focus of the Spanish wind industry in the coming years.

The main barriers for wind power in Spain are common to other countries: access to electricity grids and the long process to obtain permits, which makes the establishment of wind farms a lengthy process. However, I don't see any specific obstacle to further future expansion.

## Gamesa KEY FIGURES

Gamesa expects to manufacture 1,200 MW of wind turbines during 2003, an almost 30% increase over 2002.

The company is aiming to increase its complement of wind farms by 400 MW each year.

Turnover for the Gamesa group is expected to reach €1.53 billion in 2003.

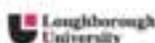


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# Regional Success Story: Navarre's Sustainable Vision

EHN is the largest independent developer of renewable energy in Europe and the largest constructor and operator of wind farms in Spain. *Luisa Colasimone* explains how the company's fortunes have been closely linked to those of the Navarre region.

Created in 1989, Energía Hidroeléctrica de Navarra, with a mixture of public (48%) and private (52%) ownership, quickly consolidated its position as a benchmark company in the promotion of renewable energy sources in the region. It began its operations with mini hydroelectric power stations, purchasing them from companies ready to sell, modernising them and installing remote control systems. In 1990, however, EHN turned its attention to the wind power potential of Navarre.

A traditionally agricultural region, Navarre underwent a process of industrialisation in the 1960s and now appears at the top of the Spanish regional league table in terms of prosperity and welfare. Investments by the EHN group have led to the creation of 7,000 direct and indirect wind energy-related jobs.

## AMONG RENEWABLES, WIND HAS DEMONSTRATED ITSELF TO BE A WINNER

The main goal for EHN has been to lead the transformation from polluting energy sources with a finite limit to a sustainable, clean and economically beneficial industry. It has never been an ambition simply to create a successful company: EHN wanted to make a difference in the energy sector, and therefore focused its strategy only on the development of renewables.

Among renewables, wind has demonstrated itself to be a winner, and it is also the field in which EHN has shown its strongest savoir-faire. "Renewable energy sources have to be the energy of the future," says Pablo Eugui of EHN. "We don't think that renewables are going to be just complementary; in 25-30 years they should be the main source of energy. "We concentrate on a sustainable economic system, valid both now and in the future. We don't see any other possibility than renewables since other energy

sources – petrol, gas and coal – are exhaustible. And they are highly polluting." EHN philosophy focuses on the fact that renewable energy is not a mere alternative, but a competitive presence in the energy market.

## Spectacular development

Nine years ago (1994-5), EHN opened its first wind farm, El Perdon. Located seven miles from the city of Pamplona in the Spanish region of Navarre, this was the start of a spectacular wind power development that placed Spain, together with Germany and Denmark, among the three world wind industry leaders.

The environmental impact of the El Perdon wind farm is slight. Vegetation is scarce compared to other regions of Navarre and it is not considered by people to be an area of particular environmental interest. Nevertheless, an environmental impact study aimed at minimising the effect of the facility on the landscape was carried out.

Of the corrective measures to be adopted, one would prove itself to be very effective as time went by. The El Perdon range is crossed by migrating birds, and griffon vultures can often be seen in the area. It was decided to leave an 800 metre wide passage in the centre of the rows of towers to let the birds fly through. Later monitoring studies by biol-



Photos: EHN

# “Renewable energy sources have to be the energy of the future”

ogists have confirmed that a large proportion of the bird life crossing the El Perdon range actually uses this passage.

The steps taken prior to the construction and entry into service of the wind farm also took into account the need to convince affected local authorities of the positive factors involved. All the local councils considered the project in a favourable light and they are paid on a yearly basis per turbine, plus other local taxes.

## Positive response

The installation of this (and subsequent) wind farms proved to be a total success, confirmed by three opinion surveys commissioned by EHN to find out what local people thought of the initiative. In the last survey, conducted in 2001, by which time 700 turbines had been installed in Navarre, over 1,400 people participated. The results speak for themselves. 85% of the respondents considered the installation of wind farms to be positive or very positive, with only 1% against.

Although people responding to the survey said that the landscape was perhaps less pretty, they still accepted that wind turbines were a necessity and must be installed in order to produce clean ener-

gy. This is a small price to pay, especially when compared to the environmental impact on Spain's natural resources of accidents such as the Prestige tanker oil spill.

In recognition of its exceptional landscape value, the north of the Navarre region – apart from the district of Leitza – will in fact have no turbines installed as it is the most beautiful part of the region. This decision has been taken by EHN in order to avoid all visual effects on the landscape, despite the fact that wind resources are possibly most abundant there.

An example of EHN's concern for the landscape was a meeting held six years ago with the Navarra Federation of the People of the Mountain in order to present the plan for some 72 future wind farm installations and to discuss those locations which should not be pursued because of the potential effects on the environment. Thanks to this consultation process, the members of the Federation have always been fully behind wind power. Support comes also from environmental groups such as Greenpeace and Ecologistas en Accion (Environmentalists in Action).



## Biggest financing

Following the implementation of El Perdon - a milestone in the development both of EHN and wind power in Navarre - the company has continued to expand. EHN was a key player in the joint venture between Gamesa and Vestas to start turbine production in the region. The agreement for EHN to buy 1,800 turbines made by Gamesa was also the biggest contract ever agreed in the wind industry.

In the Castilla La Mancha region, 1,173 MW of wind power has been developed by Energias Eolicas Europeas, in which EHN had a 50% stake. This €850 million project, now managed by utility Iberdrola, involved a deal in which more than 30 national and international banks were involved, and was the biggest financing ever concluded in the renewable energy sector.

The company has also begun to develop its own turbine range, focused on the 1.5 MW model. At the beginning of May it opened a new €8 million manufacturing plant at Barasoain, Navarre with the aim of producing up to 250 turbines a year.

At an international level, EHN owns the Compagnie du Vent in France, with 33 MW already installed and many more plans in the pipeline. The lack of a clear political commitment in France, however, makes growth slow and tentative. Other key markets for EHN are currently the USA and Canada, but the company is keen to develop further contacts in other regions of the world.

By the end of 2002 EHN had accumulated 2% of the worldwide total of 31,000 MW. In the same year Spain reached a level of 4,837

MW, of which 581 MW were owned by EHN, representing 12% of the national total. By 2006, EHN expects to have developed 5% of world capacity and 18% (1,800 MW) of the overall Spanish capacity of 10,000 MW. If the present European commitment continues, including ratification of the Kyodo Protocol, EHN will have over 3,000 MW in wind energy assets by 2006.

## Political support

The success of Navarre, meanwhile, has been in large part due to the high level of political support for investment in renewable energy. EHN was given the opportunity to develop renewables thanks to the full backing of the regional authorities. In recognition of the region's great achievements in the sector, a Centre for the Implementation and Development of Renewable Energies (CENER) was opened this year, supported by both regional and central government (through the CIEMAT organisation).

Wind farms built by EHN in Navarre have also benefited from the national Spanish regulations covering "non-conventional" generating sources. According to these rules, any renewable energy source has priority access to the grid above thermal power stations. Purchase of its output is guaranteed by the electricity supply company at a higher price than conventionally generated electricity, thus acknowledging the beneficial effects on the environment. The spirit of this regulation has been embodied in the Spanish Electricity Sector Law approved in November 1997, and this framework has underpinned the spectacular promotion of wind power in Spain.

## Prominent position

Without this political framework it would have been impossible for the Spanish wind industry to reach such a prominent position among the wind energy world leaders. "Our company's achievements show how big the wind industry can become if there is the appropriate framework and support from the political parties," says EHN's Pablo Eugui, "as well as a very committed team convinced that it can be done at all levels: environmental, technological and economic." What is necessary now is to ensure that such

a political commitment exists at a European level, enabling the implementation of national legislation in other countries.

Thanks to the power installed by the end of last year, 50% of the energy needs of the Navarre region are now covered by wind energy. This compares with the most wind-powered regions of Germany, where the average is around 22%. In two years' time EHN expects the wind proportion to have reached more than 60%.

The Navarre example shows how it is possible to fundamentally change energy supply systems around the world. "Sun, wind, biomass and water are available globally," says EHN's Pablo Eugui. "What is needed is that countries accept these as the energy sources of the future, and that governments create appropriate frameworks to develop the use of these autonomous and unlimited resources."

However, one important problem remains, according to EHN: the existing infrastructure makes it difficult to connect and distribute electricity produced from wind power through the grids. At a European level, these difficulties reflect the lack of a proper interconnection system, a basic technical requirement for implementing the political willingness to produce more electricity from renewable energy sources and to create an effective common renewables market.



## EHN KEY FIGURES

**EHN directly owns over 600 MW of wind energy capacity and has developed and implemented more than 1,400 MW.**

**EHN has 43 wind farms in operation in Spain with more than 1,800 turbines.**

**By 2006, the company expects to have developed 5% of the world's wind capacity and 18% of the total in Spain.**



## INTERVIEW

# Enrique Albiol, President Wind Section, APPA

**“We have good relations with everybody in the wind industry,” says Enrique Albiol, “but we think that the main defenders of the industry’s interests are the promoters of wind schemes, those directly involved.”**

Albiol has been President of the wind section of APPA, whose membership covers about 40 wind power development companies, since last September. He is also chief executive of CEASA (Compañía Eólica Aragonesa), which built the first wind farm in Aragon in 1996, and has since developed 125 MW in the region.

Three main areas of activity will be central during his term of office, says Albiol. One is to keep open a direct line of contact with the government in order to maintain both a good relationship and the existing system of support for wind ener-

gy. This has been working well up to now, he believes.

### Social acceptance

The second is to help solve some of the technical problems which have followed on from the industry’s success, especially about future grid connection.

“REE, the company which runs the main transportation grid, is worried that it won’t be able to cope with the amount of capacity expected,” he explains. “In fact, some technical problems are relatively easy to solve, whilst others, such as predictability, are more difficult, especially in Spain with its more complex terrain. But we have time to solve these problems, because wind energy is still a rela-

tively small proportion.”

The third issue, says Albiol, is that of social acceptance. “Up to now acceptance of wind energy in Spain has been very high, people are generally in favour, but when new wind farms are installed there are often discussions about the impact. We think it’s very important that people understand the invisible benefits – the tonnes of carbon dioxide saved by every wind farm that goes up - as well as the fact, for instance, that they’re not noisy.”

APPA’s ongoing activities on this front include both a steady information flow to the media and arranging visits to wind farms so that more people can experience the reality first hand. says Albiol. “Knowledge is always good.”

### Government lobbying

Much of APPA’s recent energy has gone into lobbying the government over the nationally agreed price paid for wind production. Has it been successful, despite this year’s 8% fall in the premium price? “Even with the 8% fall, wind producers are still receiving close to 90% of the average consumer price,” Albiol points out, “which is the upper limit under the law. We would now like to see that percentage level maintained on a continuing basis for eight or even ten years. That would give some stability to the system.”



El Perdón wind farm in Navarre

Photo: EHN

**“I WOULD BE HAPPY  
IF WE ACHIEVED  
THE 13,000 MW  
LAID DOWN BY THE  
GOVERNMENT  
FOR 2011”**

What about the interest shown by the new industry body Plataforma Eolica Empresarial in the idea of green certificates? “When PEE was created we thought that it was unnecessary to have another organisation,” he says, “although obviously it is different from APPA because it is mainly supported by utilities, who have other interests than just renewables, but we would still like to work together.”

“As far as green certificates are concerned, this may be something for the future, but up to now there is very little experience of how they can work. The only system that has shown that it can work well for renewable energy is the one used in Germany and Spain and a number of other countries.”

### **Ambitious targets**

Albiol is cautious about setting the sights for wind energy in Spain too high. “I would be happy if we achieved the 13,000 MW laid down by the government (for 2011),” he says, let alone the more ambitious targets set by individual regions. “It’s true that we are increasing quickly, but it’s also true that we have used many of the best sites, and that those that are left are often more complex than the predictable terrain in Germany and Denmark. So it will be more difficult to maintain the rhythm of growth.”

And what about Spain eventually becoming No.1 in the wind world? “This is not like a soccer game with Real Madrid against Manchester United,” he says half jokingly. “What is really important is that every country in the world, including Spain, is able to develop as much wind energy as it possibly can.”

**Crispin Aubrey**

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