

# Wind of change

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With strong incentives from individual governments and the European Community to reduce gas emissions and promote renewable energy, wind power is currently considered the most developed renewable technology in the world, second only to hydro. Combined with the evolution of technology towards reduced capital costs per kW installed and a general increase in the size of wind turbines, the favourable legal framework has resulted in the wind power market becoming a fast growing sector showing growth rates in excess of 25% per annum.

Today, over two-thirds of installed wind power capacity is located in Western Europe, Spain having the fastest growing rate before Denmark and Germany and representing c.14% of the World's installed wind power capacity at the beginning of 2001 (c.17,700 MW).

Table 1: Breakdown of Operating Wind

Capacity Worldwide, Start 2001

(Megawatts)

Europe 12,972 Asia 1,574

Germany 6,113 India 1,220

Spain 2,402 China 340

Denmark 2,297 Other 14

Netherlands 448

UK 409 Pacific Region 221

Italy 389 Japan 150

Sweden 231 Other 71

Greece 189

Ireland 118 M. East & Africa 141

Portugal 100 Egypt 63

France 79 Morocco 54

Austria 78 Other 24

Other 119

South & C. America 103

North America 2,695 Costa Rica 51

USA 2,555 Brazil 20

Canada 140 Other 32

The impressive evolution of the Spanish installed wind power capacity has allowed the rapid expansion of wind power related businesses such as wind turbines manufacturing. In Spain, three major local turbine suppliers (Made, Ecotecnia and Gamesa) coexist alongside three leading European players that hold technology/construction agreements with local manufacturers.

Table 2: Spanish Wind Capacity Evolution,

1990-2010e (Megawatts)

Year New MW Accum. Installed Capacity

1990 2.7 6.6

1991 0.7 7.3

1992 38.4 45.7

1993 6.0 51.7

1994 23.7 75.4

1995 39.9 115.3

1996 95.9 211.2

1997 243.9 455.1

1998 392.8 847.9

1999 660.7 1,508.6

2000 897.3 2,402.0

2010e 6.568.1 8,974.0

It is in this favourable context that Iberdrola Diversificacion, S.A. and Energia Hidroeléctrica de Navarra, S.A. (?EHN?)

joined efforts to develop, and finance on a limited recourse basis, Energias Eolicas Europeas, S.A. (E3E), the world largest wind farms' project. Prior to 2001 and excluding the 238 MW IVPC Italian transaction, wind farm projects financed through project finance techniques totalled around 50 MW per project while E3E encompasses 31 wind farms with a total installed capacity of 1,173 MW.

Crédit Agricole Indosuez, together with four other European banks, lead arranged the transaction which was successfully syndicated in the first half of 2001 amongst an international group of 54 banks.

#### European and domestic background

Our intent is not to provide a detailed analysis of all the decisions or programmes issued on an international or European level but simply to focus on the main programmes which underpin the development of renewable energy.

Among them is the Kyoto Protocol of November 1997 under which industrial countries have for the first time established a commitment to reduce their emissions of greenhouse effect gases by years 2008-2012. It was signed by the European Union as a whole in April 1998 and determines that the EU shall reduce its emissions of greenhouse effect gases by 8% as compared with 1990 levels. Following that date, the European Union distributed this global commitment in quantified objectives among the European countries. Spain was in this way allocated a reduction of 15% of the emissions.

Also worth mentioning is the Green Paper on renewable energies issued in 1996 by the European Commission which specifies inter alia the obligation for electricity production based on renewable energies to reach c.12% of the global energy consumption of the European Union by 2010. The Green Paper was then followed in 1997 by the White Paper on renewable energies which established a specific action plan to promote renewable energies and introduced the concept that measures shall be adopted to insure an economic equilibrium for renewable energies projects, including the principle of minimum prices for the energy produced that will cover the costs incurred.

Subsequent to these publications, the European institutions – the Parliament, the Commission and the Council – have worked to establish a legal framework to sustain the goal of increasing the portion of renewable energy to 12% of the total gross consumption and to 22.1% of the electricity produced. Several draft Directives and working papers have been prepared, the process being lengthy because of the various positions expressed about whether the level targeted for renewable energy in each country should be mandatory. Since then, the Parliament very recently passed a resolution on the Council's third draft Directive stating, inter alia, the possibility for the European Commission to make the renewable energy targets mandatory if needed. It also makes provisions for a set of favourable measures including a guarantee that national special regimes supporting these energies continue during a temporary period of at least 7 years so as to maintain investors' confidence, priority access to the grid for renewable energies and that transportation and associated costs do not induce discriminatory conditions for electricity produced from renewable energy.

In parallel with this international framework, Spain established specific legislation for renewable energies as early as 1994, supplemented by Law 54/1997 on the Electric Sector and the Royal Decree 2818/1998. These two regulatory documents provide the domestic legal guarantee mechanisms for compliance with the international goals committed to in supranational initiatives. Law 54/1997 sets the overall objective that by year 2010 at least 12% of Spanish global demand for power must be sourced from renewable energy but more importantly, these documents provide for:

- The right of power generators to incorporate into the system all the electricity produced by installations using certain renewable energies without being subject to usual procurement rules and the reciprocal obligation of the nearest electricity distributor to purchase such electricity at a price set by law. This right also applies to electricity produced from wind sources.

- The definition of the price formulae applicable to electricity generated by the installations benefiting from special regimes. In turn, these documents establish government-regulated electricity tariffs which incorporate premiums to

sustain the overall objective that electricity produced from renewable energies covers 12% of Spain's total energy demand by year 2010.

#### The tariff applicable

The Royal Decree 2818/1998 defines the applicable tariff as the sum of (i) the average hourly final price and (ii) a premium, where the hourly final price is itself the sum of the hourly market price resulting from the bidding process (the pool price) and the remuneration of auxiliary services and power capacity guarantee.

The premium is fixed annually by the Government according to the general provision of the Law on the Electricity Sector which states that the premium included in the tariff shall ensure that the price of electricity sold by special regime producers range between 80% and 90% of the annual average price of electricity. Such annual average price of electricity is defined within the Law on the Electricity Sector as the annual average electricity selling price charged to the final consumer (all types of consumers included). Given that this average price is well above the market pool price (on a monthly basis average, 165% higher since the enforcement of RD 2818/1998 in January 1999), the implementation of such a high minimum remuneration for the electricity generated from renewable energies such as wind, provides producers and investors with significant incentives as well as the stability required for the limited-recourse financing structures.

In addition, the Royal Decree offers renewable energy producers the ability to receive either the variable tariff resulting from the above formulae or a fixed tariff. Usually, a fixed tariff is slightly lower than the variable tariff (on a monthly basis average, c.1% lower since the enforcement of RD 2818/1998) but it hedges the generator against fluctuations in market prices.

The Government carries out annual updates of both the premium to be included in the variable tariff and the fixed tariff itself so as to take into account the variation of the average selling price of electricity and ensure that special regime installations continue to sell their electricity at a price ranging between 80% and 90% of the average price of electricity.

The Royal Decree 2818/1998, also provides for a review of the premium every 4 years to take into account the evolution of the energy market situation. In addition to the evolution of electricity prices, the contribution of special regime installations towards meeting national demand and their impact on the technical management of the system will be assessed. This process will enable the Government to decide whether incentives granted to such renewable energies are adequate in view of the overall objective of reaching a coverage of 12% of the country's electricity consumption. This allowance for revisions does not however affect the protection granted by the Law on the Electricity Sector in relation to the minimum price level for renewable power.

In 2000, the premium included in the variable tariff was Ptas 4.79/kWh (or Euro 2.88 c/kWh) and remained unchanged in 2001. With this premium, the variable tariff itself reached an average of Ptas 11.08/kWh in 2000 (Euro 6.66 c/kWh) while the fixed subsidised price set by the Government was Ptas 10.42/kWh (Euro 6.26 c/kWh) for both years.

Energías Eólicas Europeas, S.A: the financing of a portfolio of wind farms

#### Background

On 19th May 1999 the regional Government of Castilla-La Mancha entered into an agreement with Energías Eólicas Europeas, S.A (?EEE?) authorising EEE to carry out the construction of 11 Wind Farms for a total of 405 MW of installed power (the ?Agreement?). The aim of this Agreement was the introduction of renewable energy in the region and the initiation of a reasonably long lasting business project. Subsequently EEE sought approval of the Strategic Wind Plan which embraces 81 sites in the provinces of Albacete, Cuenca, Ciudad Real, Guadalajara and Toledo. EEE' Strategic Wind Plan was approved by the regional Government in April 2000. This approval covers an estimated total investment value

of Euro 3,250 million (ESP 540.733 billion), allows for the research of wind resources in approved sites and provides a priority system for obtaining administrative authorisations for wind farms resulting from such research, without precluding EEE from following the relevant administrative procedure.

## The Project

According to the Strategic Wind Plan and the Agreement, the Project consists of the construction of 31 wind farms, as well as transmission lines and substations facilitating connection to the grid. The Project will have a total installed capacity of 1,173 MW. The expected annual energy production for the Project is 2,711 GWh, which implies 2,311 annual equivalent hours.

## Location

The Wind Farms are located in the provinces of Albacete and Cuenca. These geographical areas, located between the Iberian and Betic Mountain Ranges, form natural orographical corridors for winds flowing between the central Spanish plateau and the Mediterranean Sea.

The central and deepest zone of this 'entrance' includes a strip of land formed between the plateau in Albacete and the villages of Almansa and Hellín. It reaches altitudes of between 900 and 1,000 meters and presents moderate terrain, well oriented towards the dominant winds, therefore suitable for the construction of wind farms.

In the northern and southern flanks of this 'entrance', higher altitudes ranging between 1,000 and 1,300 meters can be found. The landscape, although a little rugged, remains very favourable for wind farming, so its wind potential is optimal.

In the south-east of the province of Cuenca, south of the range, the corridor is not that visible but being at moderate altitudes, between 1,300 and 1,500 meters, wind circulation from the centre of the Peninsula towards the Mediterranean Sea comes against no major obstacle.

The strong climatic contrast between the continental plateau and the Mediterranean coast improves the pressure and temperature differences which favour wind acceleration in the border areas, where most of the wind farms are located.

## Wind Resource

The wind resource for each wind farm has been rigorously assessed by EHN over 2.5 years of accurate wind measurements, using more than 150 anemometer towers of 45/55 meters in height covering the whole region of Castilla-La Mancha, with a particular focus on the wind farms which are part of the Project. This allows for a detailed description of the long-term wind patterns at each site.

These measurements were compared and completed through the establishment of a correlation with long-term historical data from the Albacete-Los Llanos airport (monitoring data since 1991) and from La Solana station (monitoring data since 1996). The annual equivalent operating hours calculated by Garrad Hassan & Partners range between 1,810 and 2,888 hours. The measurement of the wind resource itself has been ratified by Garrad Hassan as wind auditor.

## Wind Turbines

The project consists of 1,418 wind turbines of the following four types: (i) Gamesa G47-660 with a nominal rated power of 660 kW. The height of the mast is between 45-55 meters and the diameter of the blades is 47 meters; (ii) Gamesa G52-850 with a nominal rated power of 850 kW. The height of the mast is 46.3-66.3 meters and the diameter of the blades is 52 meters; (iii) Enron TZ-750i with a nominal rated power of 750 kW. The height of the mast is 50 meters and the diameter of the blades is 50 meters; and (iv) Enron TW-1.5sl with a nominal rated power of 1,500 kW. The height of

the mast is 61.4-100 meters and the diameter of the blades is 77 meters.

#### Scheme of the Wind Farms

Each wind farm consists of a number of wind turbines which are interconnected in series to a substation of 20/132 kV and share one single access and control structure. Each wind farm has its own meter for the energy it generates.

In turn, the Wind Farms are connected to each other in parallel through transmission lines of 132 kV. These lines are connected to the grid of Iberdrola Distribución Eléctrica, S.A. and/or to the high-tension grid of Red Eléctrica Española by means of 3 substations of 132/400kV.

#### Current Project Situation

The construction works commenced at the beginning of 1999. During that year, 4 wind farms with a total installed capacity of 111.5 MW were completed.

This investment was financed through shareholder funds and a syndicated loan facility signed on 5th July 1999 by EEE and a group of banks amounting to Euro 110 million (ESP 18.26 billion).

During 2000, the company continued to develop its investment plan and built an additional 251.4 MW of capacity, which was financed primarily through shareholder funds, cash flow generated by the existing wind farms, further draw-downs on the 1999 debt package and a bridge facility granted in July 2000, amounting to Eu240 million (ESP 40 billion).

Therefore, as at end-December 2000, construction of a total 363 MW capacity had already been completed, of which 292.3 MW were in operation. The construction of the remaining wind farms that are part of the Project will take place in 2001 and 2002 .

The construction of transmission lines and substations has been scheduled in accordance with the planned timetable to Commercial Operations for the project as a whole.

The investment made between 1st January and 30th June 2001 was financed by subordinated debt granted by the sponsors, generated cash flow and the available balance of the bridge facility. From June, the remainder of the investment will be financed by equity contributed by the sponsors, generated cash flow and the senior facility signed in June 2001.

#### The Project Structure

The project's structure includes all the usual features of project finance:

- ? the construction is dealt with by Energias Hidroeléctrica de Navarra, S.A. through a fixed-price lump-sum, date-certain EPC (Engineering Procurement Construction) contract, which provides for delay and performance liquidated damages from the contractor,

- ? the construction and permitting risks are further mitigated by a completion guarantee issued by the sponsors covering those wind farms not yet completed at the time of closing,

- ? the operation of the wind farm is undertaken by Energias Hidroeléctrica de Navarra, S.A. under a 17-year Operation and Maintenance Contract which provides for inter alia a guarantee on the plant's availability,

- ? according to the Royal Decree, the power generated by each wind farm will be sold to the nearest electricity

distribution company (i.e.: Iberdrola) under a standard energy sale contract,

? the maximum leverage is set at 75% with the equity portion met through a combination of share capital or subordinated debt and cash flow generated by those wind farms already in operation,

? usual conditions precedent, covenants, events of default,

? a security package including a pledge over Energias Eolicas Europeas, S.A. shares, the assignment of the rights derived from the project contracts and of insurance indemnities, project's accounts,

? a distribution covenant and a cash sweep mechanism in the event certain distribution tests are not met in two consecutive years,

? an ownership clause ensuring that Energias Hidroelectrica de Navarra, S.A. and Iberdrola Diversificacion hold at all times a combined 90% interest in the project company until completion of a wind testing period and 51% thereafter.

With 31 wind farms totalling a rated capacity of 1,173 MW, Energias Eolicas Europeas, S.A. is the first project financing of a portfolio of wind farms in Spain. As a portfolio of projects, it offers an interesting risk diversification method.

For the sponsors, this portfolio approach provides many benefits compared to the usual single wind farm project financing: it secures the financing of a global investment of Euro 1.1 billion spread over a construction period of 3 and a half years, it reduces structuring costs and the time to perform the necessary due diligence and financially close the transaction.

In addition, it creates a critical mass and positions the project company as a key player in the development of the region as evidenced by the agreement entered into in 1999 with the Board of Communities of Castilla-La Mancha authorising the construction of the first batch of wind farms and followed by the approval in 2000 of the Strategic Wind Plan submitted by the company. With this project, the region will gather the bulk of wind power installed capacity in Spain before Galicia and Navarra (each with approximately 400 MW as of February 2000). Finally, it paves the way for the development and project financing of large wind farms projects.

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