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Acquisition of Horizon Wind Energy by EdP

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Abstract

At the beginning of 2007, EdP, a Portuguese electricity utility was studying the potential acquisition of Horizon Wind Energy. Owned by Goldman Sachs, Horizon was a relevant player in the wind energy industry with capacity installed in USA. Requiring that EdP more than doubles its investments in renewables until 2010, this consolidation move would place the company as the 4th largest operator in the world.. Governmental support is just one of the factors that has to be analyzed in this deal, since the strategic implications and risks involved may determine the approval or refusal to go forward with the acquisition, and the price to be paid for the American company.

Keywords:

Horizon Wind Energy, EDP, Renewable Energies, Institutional Equity Partnerships.

The complete abstract as well as the objectives of the business case are explained in more detail on the synopsis of the Teaching Note

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Introduction

It is after lunch in Lisbon and chaos is instilled on the streets around Marquês de Pombal. From the window of his office, António Mexia, the former minister of Public Works, Transport and Communication of Portugal watches the traffic jam while he is waiting for the arrival of the remaining executive members. The recently appointed CEO of EdP has requested a meeting to discuss the acquisition of Horizon Wind Energy, an important opportunity that was presented some weeks earlier by Goldman Sachs and had made António Mexia very interested in the operation.

After a while the executive team is finally together and the conditions for the meeting to begin are set. António Mexia complains about the typical Portuguese lack of punctuality, informing the other executives that he has to leave before 6.30pm, to pick up his daughter from school. The first speaker is António Martins da Costa, a knowledgeable executive, who starts by presenting the history of EdP.

EdP – Energias de Portugal

EdP was created in 1976 as result of a wave of nationalizations that dominated Portugal in the period subsequent to the political revolution of 1974. The vertically-integrated electric utility resulted from the merger and nationalization of many smaller firms in the electricity sector, becoming instantly the dominant player in the Portuguese

electricity market, on the activities of generation, supply, distribution and commercialization.

After some decades of stable growth and diversification, political decisions were taken towards the reprivatisation of the company. The process started in 1997 (sale of a 29.6% stake), progressing through new privatization phases (in May 1998, June 1998, October 2000, November 2004 and December 2005) until the company reached the current profile in which roughly 75% of the company's capital is non-state owned. Nowadays the portfolio[1] of operating units include generation, supply and distribution of electricity in Portugal and Spain, making it the third biggest operator in the Iberia with 12,452 MW of installed electricity generation capacity. The operations in Spain are made through HC Energia a formerly Spanish-owned utility called Hidroeléctrica del Cantábrico, with core operations in Asturias and Basque regions. In Iberia, EdP also has a very relevant position in the gas market. Outside Iberia, the company is present in the Brazilian electricity market.

The anticipation of renewable energy sources' potential by the management had origin in 1993 – the year of Enernova's foundation. The purpose of Enernova was to explore energy projects from renewable sources - especially wind - in Portugal. After a period of reflection and preparation, Enernova started operating in 1996 with an installed capacity of 10 MW in what was considered a very innovative project for the time. In addition to wind projects, Enernova initiated a project in biomass power in 1999 with 9 MW of capacity. One year after the launch of Enernova, the Spanish predecessors of Genesa installed the first turbines with an aggregate capacity of 13 MW. In subsequent years, the installed capacity grew steadily but still represented only a tiny part of the total electricity production in the two countries of Iberia.

[1] Exhibit 12 and Exhibit 13

Eventually the renewable power turned out to be of greater significance to EdP, and the company started to look at it in a different light. The acquisition of 80% of Genesa in 2002 (Caja Madrid retained 20%) was the first sign that the future of wind power was much more evident on the Spanish side of the border than on the Portuguese one. Genesa was, in turn, the result of the merger of Hidrocantábrico subsidiaries for renewable: Genesa and Sinae. The installed capacity reached the dimension of 328 MW in 2003 and 530 MW in 2004, dominated by the generating facilities in Spain.

The confirmation of the importance of wind energy on the portfolio of EdP came with the acquisition of Desa (2005). Including the Spanish assets of Nuon, Desa had much of the implied capacity (1490 MW) still in the pipeline. However, the acquisition helped the portfolio dispersion across the Spanish country and the entry into France. In the same year, EdP creates the holding NEO Energia that became in charge for the management of all companies in the renewable energies business line.

The autonomous management brought a brand new vigour to the area and a series of acquisitions took place. Those operations expanded the leadership of Spain in terms of generating installed capacity on the company portfolio, relegating the share of Portugal to a subordinated position (~20% in 2007). The strategy of EdP for the renewable energies favoured growth through the development of early-stage/greenfield projects, rather than the acquisition of operating assets. This is justified by the superior capacity that EdP argues to have on the management of projects during the continuous phases of the pipeline.

In the presentation, António Martins da Costa deliberately emphasizes the investments in the renewable sector, as the purpose of the meeting concerns the potential acquisition of Horizon Wind Energy ("Horizon"), an American company

specialized in wind energy. He then proceeds by giving an overview of the energy industry.

Industry Overview

Renewable energies are seen as the rising stars of the new energetic paradigm that countries are projecting for the future, especially the countries of OECD (Exhibit 3). For them, issues related with energy prices climb, oil/gas external dependence and global warming became hot question marks, requiring action in the short-term.

On the supply side, the market is already changing mostly in response to benefits provided by governmental authorities. A solution for the aforementioned issues has not yet been found, since there are still several drawbacks preventing renewable and nuclear energies from assuming a more prominent position in the energy mix. For the former, the main concerns are high costs and intermittent production, whereas for the latter, the main problems are radioactive waste and bad memories of Chernobyl and Three Mile Island accidents.

By extrapolating the current trends, the power production in OECD is expected[2] to increase at 0.9% per annum, holding the current ranking of fuels in the energy mix. In particular, the production from nuclear sources, which is often presented as a solution for the current problems of CO_2 emissions, has no perspectives of increase (thus, its weight is expected to decrease). Even though the lead from coal is unarguable, the growth of Gas (due to cost and environmental advantages over other fossil fuels) and renewable energies constitute the highlights deriving from IEA[3] perspectives. Furthermore, renewable energies are expected to lead the investments in the industry.

[2] World Energy Outlook 2007
[3] IEA – International Energy Agency

Within the renewable energies industry, Wind is receiving the largest part of the investment. This can be partially explained by the higher development stage of Wind technology when compared with other renewables such as the Biomass and Solar, already being able to compete with Hydro. (Exhibit 4)

According to GWEC – the Global Wind Energy Council – the countries with largest wind power installed capacity in 2007 are Germany (22.3GW), USA (16.8GW), Spain (15.1GW), India (8GW) and China (6.1GW). By 2012, almost 95% of the new capacity is expected to be installed in Asia, North America and Europe. By the end of 2012, Europe is expected to hold the lead (with 102 GW, which represents 42.4% of the world capacity), followed by Asia with 66 GW and North America with 61.3 GW. According to information collected by EdP, it is forecasted about 16.5 GW of new capacity in United States for the period 2007-2010, the largest growth potential in the world.

The senior executive's speech comes to an end, and while he is thanked by António Mexia, Ana Maria Fernandes starts to prepare. Recently integrated in the managerial team of EdP, Ana Fernandes was chosen by the current CEO: the two had worked together some years earlier in Galp, and now she is in charge for renewable energies and gas operations of EdP. Even before presenting Horizon, and conscious of the current importance of governmental support to renewable energies, the executive launches her presentation by referring to the public initiatives that sustain much of the development of renewable energies.

Kyoto Protocol

The adoption of Kyoto's Protocol in 2007 symbolizes an important breaking point, when the world abandoned the fruitless rhetoric, and became committed to the

issues associated with global warming. Under the supervision of the United Nations, most industrialized countries agreed on binding goals for a reduction of greenhouse gas emissions, to the order of 5.2% (benchmark: year 1990) in 2012.

The Protocol is based on the principle of '*common but differentiated responsibilities'*, meaning that only the industrialized countries are attached to the reduction efforts. This is actually the reason why the USA refused to ratify the agreement. Kyoto also includes the so-called *flexible mechanisms*, being the most important the Emissions Trading (a.k.a. carbon market).

European initiatives

The subject of renewable energy sources is of particular interest to Europeans, so it is no wonder that the European Union and its institutions are leading the movement in favour of a *greener world*. Although the idea could appear too naive, renewable sources are emerging as solid alternatives for a region that is becoming increasingly concerned with their energetic dependency.

The European Commission's White Paper on renewable energy in 1997 represented the launch, by encouraging the countries of EU to increase their share of renewable energies in the overall mix from 6% to 12% in 2010. However, as time went by, some signs gradually appeared that those targets were not in line to be achieved. This was particularly evident on the sectors of biofuels and heating/cooling.

Following some preparatory work, the Commission finally presented the Renewable Energy Road Map in 2007, where it proposes ambitious targets[4] for energy, known as 20/20/20 goals to be accomplished by 2020. These mandatory goals[5] include

[4] These proposals were included on the Climate and Energy Package, voted and approved on the European Parliament at 17 December 2008.
[5] The targets were set for the EU as a whole, being each country attached to specific targets.

reducing greenhouse gases by 20%, as well as achieving a 20% share of renewable energies in the energy consumption. In addition, and only indicatively, the energy efficiency should also be improved by 20%.

The fact that 20% of the energy consumed in the EU must come from renewable sources together with the reduction targets for greenhouse gas emissions, have promoted a great dynamism among the European companies, which therefore became the outstanding worldwide leaders on the renewables industry.

Even though the EU shares a common target, the way each country is supporting the renewable energy program is not exactly the same. The most used mechanism is Feed-in Tariffs, yet different schemes are also used. Under Feed-in tariffs, electric utilities are obliged to purchase all electricity produced by renewable sources at a fixed minimum price, above the regular market price for a given period, as an incentive to invest in the sector. Besides this, other mechanisms are being used (in some cases in addition to Feed-in tariffs) such as tax incentives, quota schemes or green certificate system (regular producers are obliged to buy green certificates from renewable energy producers, on a fixed percentage of their production).

American initiatives

Despite the fact that the renewables subject is not as mature in the USA as it is in Europe, there is actually quite a developed industry exploring this market, mainly in Texas and California. Alternatively to the Kyoto Protocol that USA never ratified, the country has set other goals and found other ways to support *green technologies*, a topic that has been gaining momentum in the last years. The most important mechanisms regarding the support of renewable energies are PTC, MACRS and RPS.

The PTC – Production Tax Credits – is a federal incentive in which a fixed premium is paid to the producers of renewable energy by each megawatt of energy produced, for a 10-year period subsequent to the capacity instalment. In 2007 the premium is of $19/MW, and according to the law it should increase in line with inflation. The PTC were established in 1992, yet they needed to be consequently renewed, since its lifetime is normally of three years. This is a serious issue for renewable producers, because the current PTC expires in 2008, without any guarantee that it will be extended, even if that is the common expectation. Without distressing the current capacity, the non-renewal of PTC would probably freeze much of the future capacity.

Another important incentive is MACRS, which stands for Modified Accelerated Cost Recovery System. Through this special accounting device, the renewable producers are able to depreciate much of their equipment over 5 years (instead of the regular 20 years). This system has been present in the American accounting standards since 1987, without expectations of ending.

Finally, the third factor that is boosting the industry is RPS – Renewable Portfolio Standards. These are held not at Federal but State level, imposing that a fixed share (normally 10-20% in 2015) of the energy produced by an electric utility, comes from renewable sources. These target shares vary across the states (Exhibit 5), in a system that is very similar to the one adopted by European Union. In practise, the way the electric utilities achieve those targets is through the negotiation of REC – Renewable Energy Certificates. These certificates assure that the energy produced came from renewable source, and are normally bought together with energy from renewable producers, although they can also be sold separately from producers that have them in

excess. Currently, Wind is the most competitive resource of RECs as Hydro projects are excluded by most states to fulfil RPS.

Having the governmental part completed, Ana Fernandes finally directs the attention of the audience to the 'hot' topic of the afternoon: Horizon Wind Energy. The company was Goldman Sachs property, and the investment bank was very active in the market searching for a buyer. At the same time, the commitment to renewable energies expressed in the recently approved strategic plan, was a strong sign that EdP could represent what Goldman was searching for.

The executive responsible for renewable and gas operations, begins by introducing Horizon, explaining EdP's motives for the acquisition of the American company.

History: Horizon Wind Energy LLC

The deep roots of Horizon come from a small company called International Wind, based in Dallas, Texas, which started to develop wind farms in the early 1990s. At that time, wind power was not yet in fashion, but the concerns related with the shortages of energy in 1970s and the incentives introduced for the renewable energies (PTC in 1992) were creating space for the commercial use of the wind energy.

The calendar was showing the year 1998 when the former owners of a very innovative gas and oil company, Selim and Michael Zilkha jumped in, with fresh money from the recent sale of Zilkha Energy Company and acquired International Wind. Father and son had achieved a high reputation by introducing sophisticated techniques that allowed the drilling of oil fields in the Gulf of Mexico that had already been closed due to their lack of competitiveness. The duo took overall control of the company in 2000

for about $6 million, renamed it Zilkha Renewable Energy and opened a new chapter for the company.

The management brought new and diversified blood to the company, including wind power specialists, traditional power plant developers, Peace Corps participants and other activists. The new owners also had a familiar way of running the company which particularly helped in the development stage of the company. By the words of Michael Zilkha: “Making a profit is essential for a business to remain vital and exciting, but it is also wonderful when a business has a purpose beyond simple economic motive… (like) avoid an ecological disaster”.

The company’s nature remained from the International Wind times, so the business was still “build-transfer”, which consists of the construction of wind-farms for further sale.

Under Zilkha’s ownership, the company “took-off” from a small office in Dallas to reach a prominent position within the biggest national wind-farms developers, with projects ranging from California in the west coast to New York on the opposite coast. As the business was growing, financial constraints, along with a family approach started to stifle further growth of the clean-tech company. According to company’s sources: “wind projects are getting bigger and bigger, and it is becoming a business whose capital requirements are significant even for very wealthy individuals” and continued “the projects and companies involved are becoming more attractive to players who can mobilize a lot of capital.” So it was about time to move forward, and the next character was Goldman Sachs.

Being one of the largest investment banks in the world, Goldman Sachs was aggressively investing in the renewable sector on technologies such as cellulosic ethanol, photovoltaic solar modules and wind turbines when Zilkha’s enterprise crossed

its path. In 2005, the year of Goldman's acquisition of Zilkha, the company had interests in about 4,000 MW at different stages of development. The terms of the deal were never disclosed but the size of the deal was said to be far greater (around $1 billion)[6] than the figures involved in the acquisition of International Wind five years before.

Along with new-owner's money came an evolution in the company's nature. Beyond the developer function, the enterprise became a "developer-owner-operator" of wind-farms, which comprise holding and managing the energy complex rather than just constructing it for further sale. The company was also renamed Horizon Wind Energy LLC. In the following years with the financial support of Goldman, Horizon started an impressive expansion across the country, claiming a presence in 15 States and a pipeline of more than 9,000 MW (just 2 years after the acquisition).

Strategic rationale of the concentration move:

The motivations behind the deal are centred on the following general ideas: (i) projection of EdP as a global leader in renewable energies; (ii) operation fully consistent with the Strategic Plan 2007-2010[7]; (iii) entry into a market with high growth potential and finally, (iv) reduction of portfolio and regulatory risk through diversification.

If the operation is successful, EdP climbs directly to the 4th position in terms of global wind installed capacity (Exhibit 6). Such a significant operation in the renewable market still requires the approval of American authorities, but the procedure was not seen as a problem by the Portuguese utility.

As a global leader in wind energy the bargaining power is enhanced, with understandable reflections on the relationships with turbine suppliers. Moreover,

[6] In The Sunday Times:http://business.timesonline.co.uk/tol/business/specials/rich_list/article5817180.ece
[7] Exhibit 8

Horizon has more than 9,000 MW at different stages of pipeline, which enables the company to carry on organic growth, profiting from being an early mover in the American market.

The company believes that many advantages could arise from the early mover position, essentially the privileged access to existing electricity grid and most favourable locations (in terms of wind quantity and consistency). The larger set of historic (wind) records constitutes an important competitive advantage when developing the greenfield of the company, and afterwards on selecting the best projects from the pipeline. The company expects that after the acquisition is completed, additional projects will enter in prospective phase (and afterwards in pipeline), delivering about 800 MW to installed production per year beyond 2010. Besides the importance of the American market as one of the fastest growing markets in the world, EdP anticipates that Horizon can serve as a platform to enter in other North American markets.

The diversification of the portfolio is also seen as an important gain from the transaction. The maturity signs on the markets where EdP operates - namely Spain and Portugal on a smaller scale - were emerging, with companies installing new wind-farms with lower load factors. (Exhibit 1). Thus, in order to maintain the competitiveness of wind energy, new favourable locations were needed. Furthermore, by diversifying the production into the USA, the Portuguese utility would also reduce its regulatory risk.

Worried about the dimension of Horizon and the impact that it would have on the financials of EdP, the CFO Nuno Alves raises the important matter about valuation of the American company. The company has already had significant experience in the sector, but both the size of the operation and the lack of expertise in USA create new challenges for the management. The opinion of the CFO is that two additional factors

should be analyzed in the deal: the sustainability of the strong appreciation of the EURO against the US Dollar, and the impact that the operation could have on the credit rating of EdP.

It was about time to go deeper into the operation details, and Ana Fernandes restarts her exposition referring to the critical elements to be considered in the valuation.

Investment Plan:

1 - Capacity

Even though Horizon had a vast experience in developing wind-farms, the first results from its day-to-day management had only recently started to appear. The mainstream of projects to be owned were expected to leave the pipeline during 2007[8], being the intention of EdP to negotiate Institutional Equity Partnerships to compromise the capacity to be installed in 2007.

More than the installed capacity, the crucial element in this deal for EdP was the existing pipeline. The purchase of the existing pipeline allows important savings in prospective costs (already incurred by Horizon), as well as benefiting from premium spots to place wind-parks. According to EdP's estimates, the superior class of Horizon's assets could achieve a long-term expected load factor of 36%, an impressive figure when compared with EdP's load factor in Portugal & Spain (28%), and France (25%).

According to the financial model used by EdP, the useful lifetime of a turbine is 20 years, a belief that is shared by turbine suppliers. The model also assumes that there is still significant value after the 20 year useful life, to the order of 20% of the CAPEX. This value can come from repowering (replacement of old turbines) or salvage. By

[8] Exhibits 10, 11 and 11a

repowering, the company saves in civil works, network connections and can even receive incentives (namely in Spain). In the case of salvage, production licenses, land leases, network connections or simple scrap still have some value in the market after the 20 year lifetime.

1 - Sales

The sales of Horizon comprise not only the energy, but also the Renewable Energy Certificates (REC) that are used to fulfil RPS requirements. Because those requirements vary across states, added to the fact that different states have different potentialities for renewable energy production, the prices of REC can differ quite a lot from state to state.

The forecasts made for the United States incentive the investment on the country, namely supported by the expected rise of energy prices in the long-run. (Exhibit 9). These forecasts assume that after 2008, energy prices may decline for a while, but fundamental drivers will later push energy prices up. As fundamental drivers for rising prices the company identifies the decline in reserve margins caused by increase in demand, the increasing capital costs of conventional generation technologies and the carbon trading poised to start in the country.

Horizon operates three different sales channels, being PPA (Power Purchase Agreement) the most important for the company. Under PPAs, Horizon and electricity utilities establish deals by which energy and REC are sold together at spot price (normally escalating with inflation). Moreover, these PPAs are set for periods of 10-20 years. The remaining sales are done directly through the market, either hedged or at pool price, being the REC sold separately from the energy.

2 - Costs

Regarding expenditures, a practical approach is often done through the distinction between capital expenses (CAPEX) and operational expenses (OPEX).

The CAPEX is dominated by turbine costs[9], which lately have been increasing due to rising pressure on steel prices. Even though this is not a problem for 2007 since all the contracts with suppliers are already closed, it represents a risk factor for the subsequent years. Nonetheless, according to EdP forecasts, CAPEX on current pipeline is expected to reach an average $1.8 MM per MW to be installed.

Concerning the operational side, the discrepancy in the performance of both companies is notorious. By comparing the efficiency ratios of Horizon and EdP, it is possible to verify that the Portuguese company expects to spend $48.000/MW in OPEX against $65.000/MW by Horizon in 2007. (Exhibit 16). The performance of EdP comes from the superior management of O&M[10] and real-time centralized control of widespread wind-farms. The management of EdP considers that is able to transfer know-how and apply its reputable model to operations that it may acquired in USA, fulfilling the massive space that exists to improve Horizon's performance.

The negotiations with Goldman Sachs also included two additional points. EdP redeems the debt of Horizon (assumed to be $0.18 billion) and reimburses the investment bank for the capital expenditures already incurred in 2007. Moreover, the company anticipates that the acquisition of Horizon would increase net debt in more than $4 billion US dollars by 2010. The impact of the acquisition is expected to gradually being reduced, driving financial ratios back to levels consistent with the low risk profile that characterizes EdP. Much of this debt comes from Institutional Equity

[9] Exhibit 14

[10] O&M stands for 'Operations and Maintenance'. The key advantage of EdP is its ability to **internalize** functions (such as inspections/revisions or stock management of spare parts) that peers normally outsource to turbine suppliers at higher costs.

Partnerships (which in accounting terms is registered as Other Liabilities), since the remaining funds from this project will be provided though shareholders' loans (intra-group loans).

3 - Institutional Equity Partnership Structures

In order to gather the tax credits granted by the American authorities, Horizon had to find a clever system, since the current small turnover hinders that possibility for the company. The solution adopted was to set up agreements with institutional partners – normally global investment banks – that, in contrast with Horizon, have enough taxable income to take full advantage of the tax credits. (Exhibits 17 and 18)

To finance new capacity Horizon establishes partnerships, where institutional partners enter with a significant part of the investment, and are designed in such a way, that they receive an agreed IRR. The *Flip Date* is the time when agreed IRR is achieved, and after the *Flip Date*, institutional partners either keep a residual share of the wind-farms, or sell it to Horizon.

Until the *Flip Date* the income related with taxation - namely PTC, tax reduction due to MACRS and payable taxes – is allocated to institutional partners as it is generated. To reach the agreed IRR, the operational income is also assigned to the partners, but only after *Cash Flip Date* (and until the *Flip Date*). The *Cash Flip Date* is reached when Horizon finishes the recovery (through the operational results) of capital that was used to fund the construction of the wind-farm.

Currently institutional partners are requesting an IRR of around 6% to enter in these partnerships, where they generally finance 50% of new wind-farms. Under these partnerships Horizon claims day-to-day control, even though some critical decisions (such as sale of major assets) require the partners' approval.

Exhibit 1 – **Wind Power**

Wind Energy Technology Presentation

Wind power is a form of energy conversion in which turbines convert the kinetic energy of wind into mechanical or electrical energy that can be used for power[11]. Being a renewable source, wind comes from the irregular way of the solar impact on the Earth's surface. In areas of greater solar impact, air heats up and rises (creating low pressures) and it is this shift of air masses that forms the wind.

The device that converts wind's kinetic energy in useful electricity is called wind turbine, which is mainly composed of a tower and a gondola comprising a rotor. The rotor combines blades (normally 3) and an axle, linked to each other by a gear box. Wind makes the blades spin, transmitting this energy to the gear box which is connected to a multiplier that increases the axle speed. Moreover, the multiplier is connected to a generator which is able to convert the mechanical energy into electricity.

The state-of-the-art turbines have blade diameter and tower height greater than 100 metres, achieving 5MW of capacity. The wind turbines are grouped together (creating wind farms) in order to take maximum advantage of a windy spot, and reduce connection costs with the electric grid. Hilltops are normally the favourite places to raise wind farms due to favourable conditions of high altitudes.

Because wind does not blow equally everywhere, the location of wind-farms is a critical element in this industry. In technical terms, specialists use load factors to forecast energy output produced by a given technology. Load factor is a measure of the net energy output from a wind-farm as percentage of its total output capacity. Normally the computations are done for annual periods providing excellent forecasts for the output, since wind force does not vary much from one year to another. For example a 5MW turbine with load factor of 30%, would produce approximately 13,140 MW*hours*[12] a year.

For wind energy, the standard load factors range from 25% to 40% which is a low figure when compared with other sources of energy[13]. Periods of weaker wind force or production stops (due to routine maintenance or unexpected reasons) push load factors down.

[11] Encyclopedia Brittanica
[12] 13,140 MW*hours* = 5 MW * 24 *hours* * 365 *days* * 0,3
[13] http://www.bwea.com/energy/rely.html

Exhibit 2 – **Peers**

- **FPL Energy (Gross Inst. Cap. 5,000 MW)** – is a subsidiary of the American FPL Group Inc, one of the nation's largest players on the electricity sector, present in 27 States and Canada. Wind represents about 33% of FPL Energy portfolio, whereas 42% is Natural Gas, 16% is Nuclear and the remaining part is hydro, solar and oil sources. It is the largest owner and operator of wind generating facilities in the world, present in 15 States of USA, with most of the capacity concentrated in California and Texas. In addition, FPL is also the biggest generator of solar thermal power worldwide, with 310 MW of installed capacity.

- **IBERDROLA (Gross Inst. Cap. 4,800 MW)** – is a world leading electric utility, with headquarters in Bilbao – Spain, operating in about 40 countries but predominantly in Spain. The renewable portfolio is composed primarily by Wind (~ 95%). Renewables have been increasing during the last years achieving 14% of the company earnings in 2006.

  IBERDROLA has plans for a major expansion, especially in the USA (which is expected to become its largest market) and in UK (in a smaller scale) through acquisitions of local firms, with the clear objective of becoming the world leader in wind. To help on the expansion plan, IBERDROLA is planning an IPO of 20% of the capital of the subsidiary in charge for the renewable segment.

- **ACCIONA (Gross Inst. Cap. 4,200 MW)** – is a Spanish conglomerate group with operations in Infrastructures, Real Estate, Energy, Water, Urban and Environmental Services, Logistic and Transport Services. It is the world largest developer and constructor of wind farms, but only the third in term of installed capacity. With many small owned-farms spread over the world, the core of wind power capacity is based in Spain (~ 70%)

- **ScottishPower/PPM (Gross Inst. Cap 2,300 MW)** – as part of the M&A deal between Iberdrola and Scottish Power, the portfolio of PPM Energy (Scottish Power subsidiary) is expected to be integrated on Iberdrola portfolio during the year of 2007. PPM Energy is a significant player on the American market, with a vast portfolio of wind farms and being the third largest independent gas storage provider. The integration on Iberdrola will create the world number one in Wind generating installed capacity.

- **ENDESA (Gross Inst. Cap. 1,900 MW)** – is a Spanish leading electric utility. It is living turbulent times with takeover bids and political intervention over those bids. Has significant presence in Spain, Italy, Portugal and France. The portfolio size of Wind generating facilities was about the same as the one of EDP at the end of 2006.

- **BABCOCK & BROWN (Gross Inst. Cap. 1,500 MW)** – proclaimed as an international investment and specialised fund and asset management group, it has interests in North America, Australia, Europe and Asia. The company has been focused on four different industries – the real estate, infrastructure, operating leasing, corporate and structures finance – creating and managing investment vehicles specialised on those industries. The weight of Wind on the portfolio is very small (~ 3%), with particular focus in European countries and USA.

- **INVENERGY (Gross Inst. Cap. 1,200 MW)** – is an American company specialised on the development and management of large-scale clean electricity generating facilities, predominantly from Wind and clean natural gas. The focus up until now has been in North America and Europe (UK and Poland).

Exhibit 3 – **Total Electricity Generation** (in the reference scenario)

	Energy demand (Mtoe)		Share (%)		
	2005	2030	2005	2030	Growth (% p.a.)
Power generation	**2 231**	**2 814**	**100**	**100**	**0.9**
Coal	917	1 097	41	39	0.7
Oil	118	64	5	2	-2.4
Gas	382	599	17	21	1.8
Nuclear	611	616	27	22	0
Hydro	109	130	5	5	0.7
Biomass and waste	60	154	3	5	3.8
Other Renewables	33	154	1	5	6.4

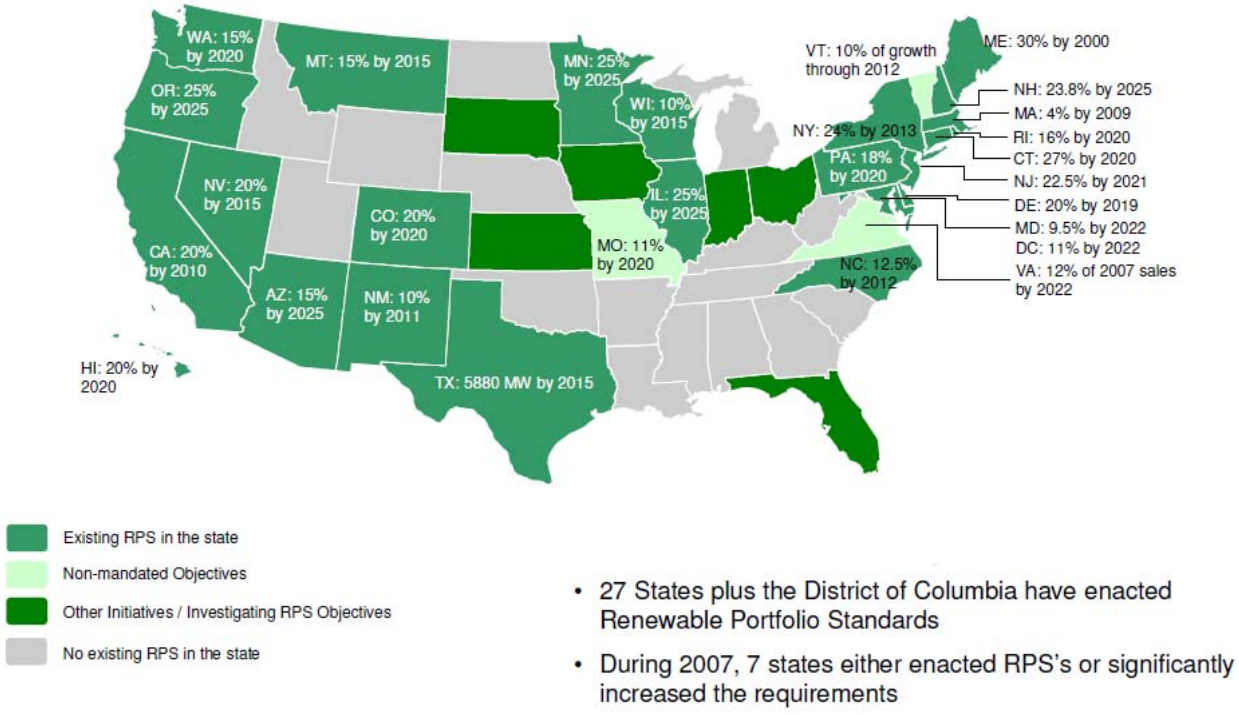
From: World Energy Outlook 2007, by International Energy Agency

Exhibit 4 – **Total energy demand** (in the reference scenario)

	Electricity (TWh)		Share (%)		
	2005	2030	2005	2030	Growth (% p.a.)
Total Generation	**10 391**	**14 597**	**100**	**100**	**1.4**
Coal	3 947	5 398	38	37	1.3
Oil	538	295	5	2	-2.4
Gas	1958	3 363	19	23	2.2
Nuclear	2 348	2 364	23	16	0
Hydro	1 270	1 510	12	10	0.7
Biomass and waste	192	492	2	3	3.8
Wind	102	959	1	7	9.4
Geothermal	33	93	0	1	4.2
Solar	3	112	0	1	16.3
Tide and wave	1	11	0	0	12.9

From: World Energy Outlook 2007, by International Energy Agency

Exhibit 5 – **Renewable Portfolio Standards**



- 27 States plus the District of Columbia have enacted Renewable Portfolio Standards
- During 2007, 7 states either enacted RPS's or significantly increased the requirements

Exhibit 6 - **Global wind ranking (installed capacity in Gross MW) by 2007:**

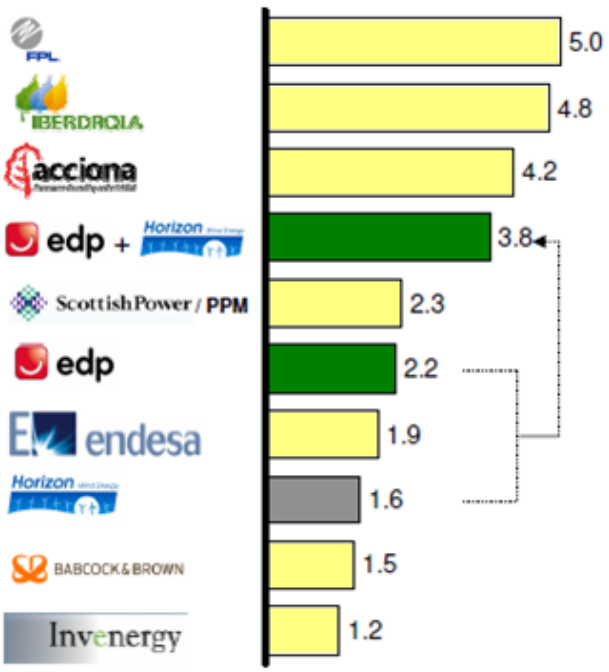


Exhibit 7 - **Wind generation capacity (expected) by 2010 in percentage (%):**

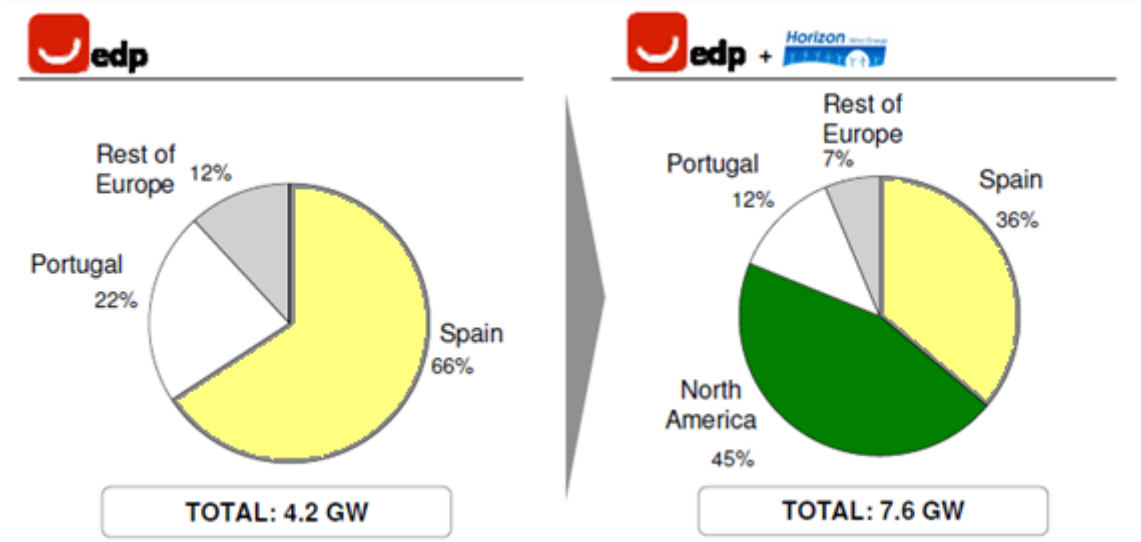


Exhibit 8 - **Main goals of EdP's strategic plan 2007-2010:**

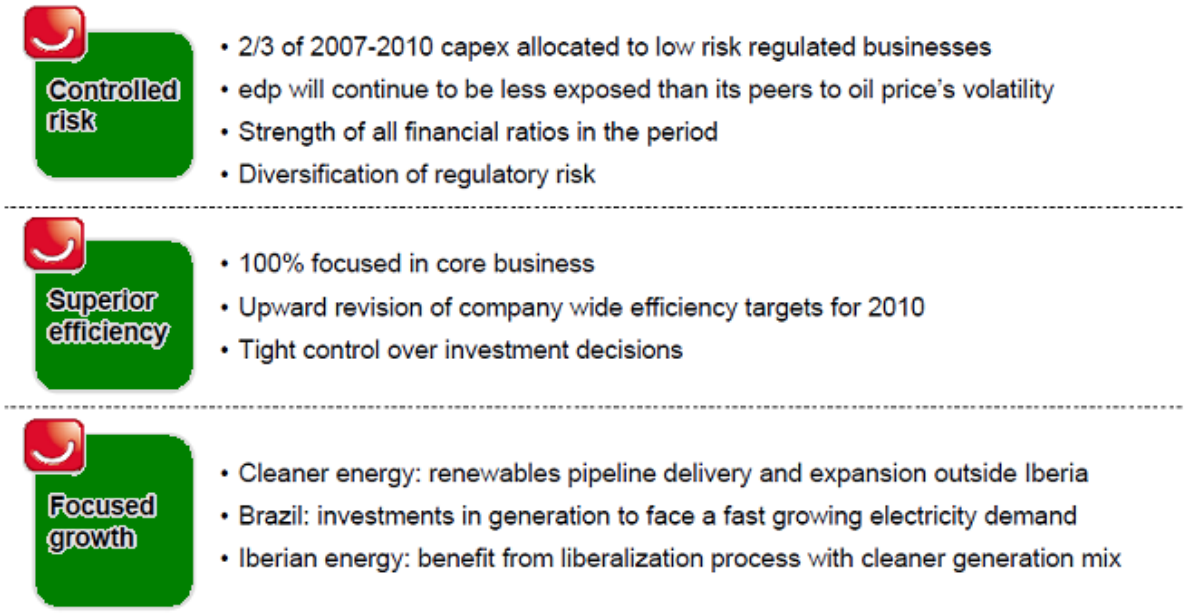


Exhibit 9 – **Recent and projected evolution of power prices in the US** (USD/MWh)

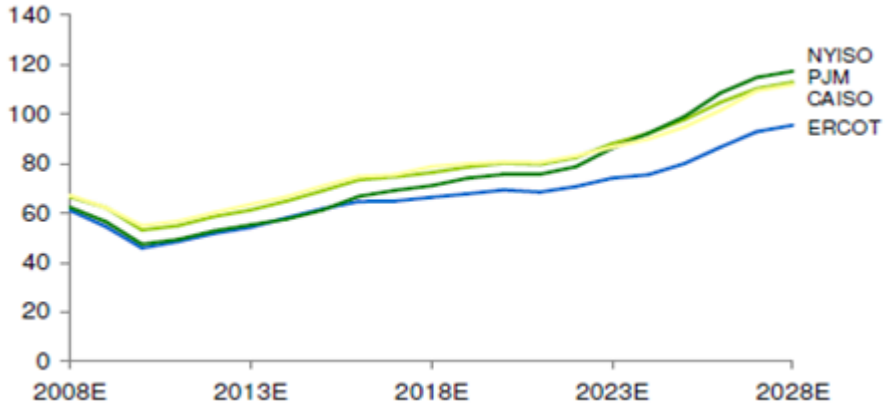


Exhibit 10 – **Pre-production phases**

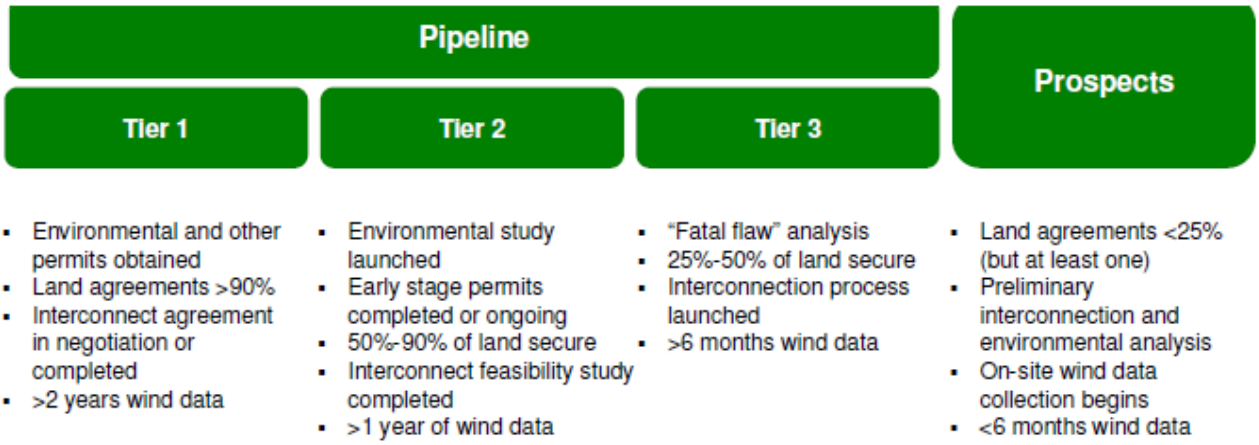


Exhibit 11 – **Wind generation capacity w/ current pipeline (Gross GW)**

Exhibit 11a – **Current Pipeline (Net GW)**

Net Installed Capacity at year end

	GW	Growth (GW)
2007	1.3	1
2008	1.9	0.6
2009	2.6	0.7
2010	3.1	0.5

Exhibit 12 - **EBITDA in 2006 (€ m)**

	2006	**2005**	**Δ 06/05**
Iberian Market			
Generation & Supply	**1070.8**	**1049**	**2.1%**
Generation			
Portugal	872.7	784.8	11.2%
Spain	338.9	523.9	-35.3%
Supply			
Portugal	-71.3	-74.4	
Spain	-69.3	-185.4	
NEO - Renewable Energy	**146.9**	**65.7**	**123.6%**
Cogeneration	**18.2**	**19.7**	**-7.6%**
Distribution	**571.8**	**458.6**	**24.7%**
Portugal	529.8	429.4	23.4%
Spain	42.1	29.2	44.2%
Gas	**144.8**	**123.4**	**17.3%**
Portugal (Portgás - 100%)	33	30.1	9.6%
Spain	113.5	105.8	7.3%
Adjustments	-1.7	-12.5	
Brazil	**433.9**	**412.3**	**5.2%**
Distribution	360.9	341.2	5.8%
Generation	101.2	63.7	58.9%
Supply	1.3	17.8	-92.6%
Adjustments	-29.5	-10.3	
Other & Adjustments	**-80.9**	**-81.1**	
Consolidated	**2305.5**	**2047.6**	**12.6%**

Exhibit 13 – **EBITDA breakdown by segment** (in 2006)

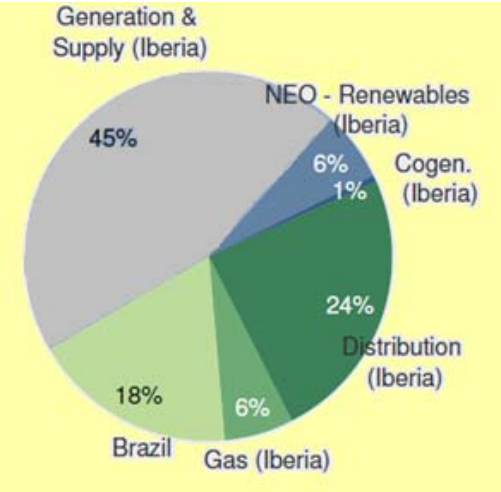


Exhibit 14 – **CAPEX main inputs**

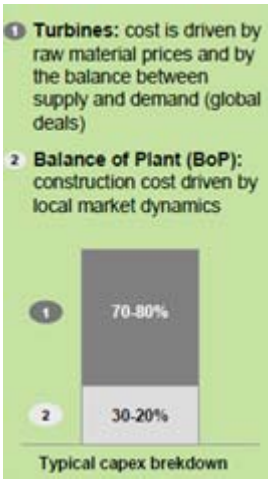


Exhibit 15 – **Turbine suppliers of EdP + Horizon** (year 2007)

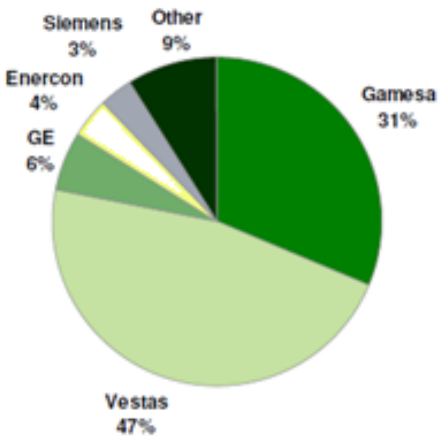


Exhibit 16 – **OPEX breakdown**

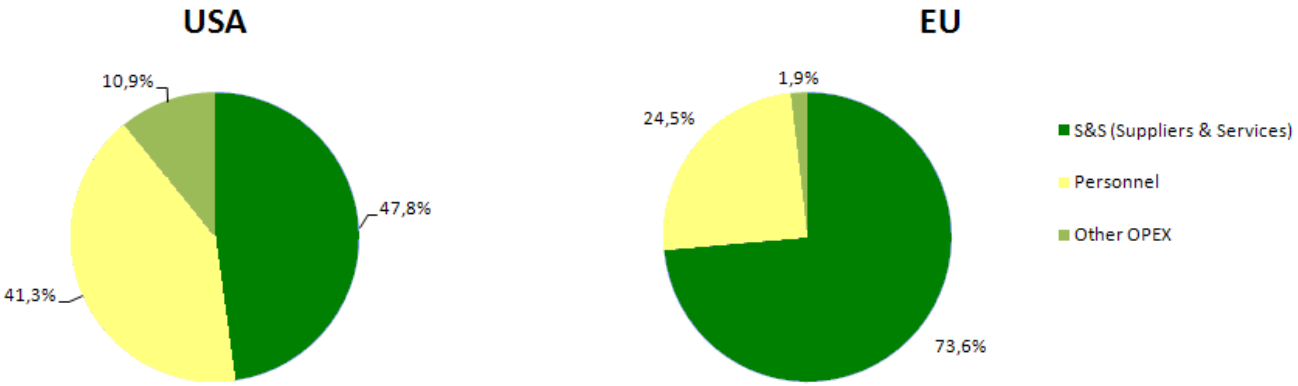


Exhibit 17 – **Institutional equity partnership structure**

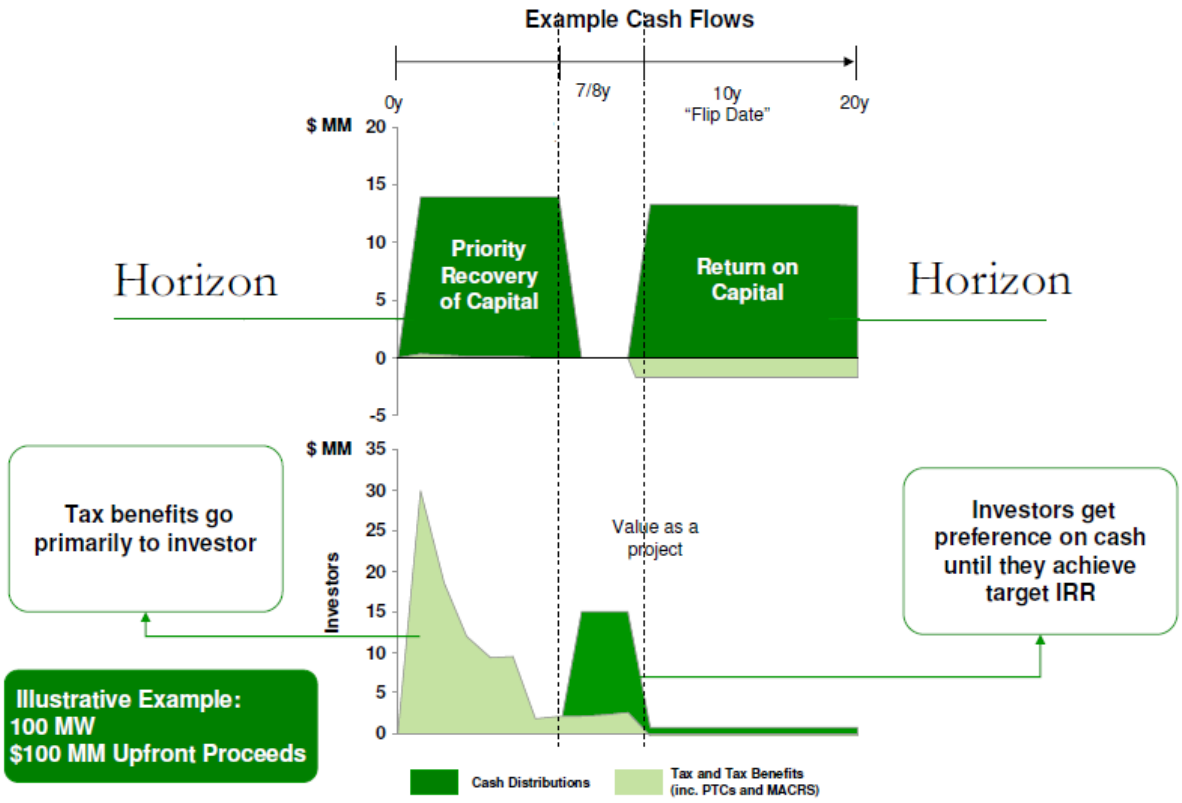


Exhibit 18 - **Institutional equity partnership structure**

	Operational CF		**Taxable Inc.**		**PTC + MACRS**	
	Horizon	Inst. Partners	Horizon	Inst. Partners	Horizon	Inst. Partners
t (expected)						
0 - Cash Flip Date ……..	100%	0%	≤ 1%	≥ 99%	≤ 1%	≥ 99%
Cash Flip Date - Flip Date …	0%	100%	≤ 1%	≥ 99%	≤ 1%	≥ 99%
Flip Date onwards ……..	95%	5%	95%	5%	100%	0%

Exhibit 19 - **Selected Financial Market Data**

Tax rate: 39%

Figure1

	February 2007
US Libor - Overnight	**5.29%**
Moody's Corp Bond AAA	**5.39%**
Moody's Corp Bond AA	**5.73%**
Moody's Corp Bond A	**5.91%**

Figure2

	Dez 2006 (US Dollars million)
Market Capitalization	14,013.9
Preferred Shares	0
Total Debt	10,090.008
total	24,103.908
D/E	0.72
Equity	58.14%
Debt	41.86%

Figure3

US Treasury Yield Rates (%)

1 mo	3 mo	6 mo	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr
4.99	5.13	5.16	5.09	4.96	4.88	4.84	4.84	4.84	4.93

Figure4

Company	Beta Asset
EdP	0.511
EDF	0.690
Endesa	0.469
Enel	0.343
Iberdrola	0.645
Union Fenosa	0.355
Acciona	0.317
FPL Group Inc	0.578
Exelon Corp.	0.764

Exhibit 20 – **Annual revenues** (in US Dollars)

Year	Operational Revenues	Total PTC
2007	128.666.880	47.934.720
2008	269.490.888	98.266.176
2009	401.248.493	141.641.480
2010	529.780.857	183.897.855
2011	592.562.522	205.029.977
2012	607.376.585	210.155.727
2013	622.560.999	215.325.323
2014	638.125.024	220.624.572
2015	654.078.150	226.032.394
2016	670.430.104	231.551.504
2017	687.190.856	137.473.881
2018	704.370.628	94.341.760
2019	721.979.893	40.291.793
2020	740.029.391	0
2021	758.530.126	0
2022	777.493.379	0
2023	796.930.713	0
2024	816.853.981	0
2025	837.275.330	0
2026	858.207.214	0
2027	537.054.439	0
2028	369.642.709	0
2029	154.522.074	0

Case-writer forecasts for installed capacity and current pipeline.

Universidade Nova de Lisboa

Faculdade de Economia

Teaching Note

Acquisition of Horizon Wind Energy by EdP

2009

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Advisor: Prof. José Neves Adelino

Teaching Note

Synopsis

At the beginning of 2007, EdP, a Portuguese electricity utility was studying the potential acquisition of Horizon Wind Energy ("Horizon"). Owned by Goldman Sachs, Horizon was a relevant player in the wind energy industry with capacity installed in USA. Requiring that EdP more than doubles its investments in renewables until 2010, this consolidation move would place the company as the 4th largest operator in the world.

Being part of the broad energy industry, wind technology gains momentum as countries try to evolve from the coal-oil paradigm on electricity generation. Enhancing renewable energies is the governmental support that is being provided under different instruments. Governmental support is just one of the factors that has to be analyzed in this deal, since the strategic implications and risks involved may determine the approval or refusal to go forward with the acquisition, and the price to be paid for the American company.

Teaching objectives and target audience

Directed to finance students, this business case can be worked under two perspectives: corporate strategy of M&A operations and project valuation. For this reason, the case is recommended for Corporate Finance and Mergers, Acquisition and Restructuring courses. In the light of corporate strategy, students have the opportunity to discuss the motivations to undertake M&A operations, as well as the risks that may be involved on operations of this nature. On the analytical field, the case is structured to be either used in introductory courses (e.g. ignoring the complexity of the financing

structure, and assume a simple WACC), or in intermediate courses (exploring the full complexity of the financing process). In addition, having renewable energies as an underlying subject, the business case can also be the starting point for a discussion about this fashionable topic.

Proposed Questions

The following questions have the purpose of helping teachers to explore the potentialities of the business case. The first two questions concern strategic assessment of the operation. The following two questions regard project valuation. Finally, the last questions can introduce the discussion about renewable energies and the way that are being backed by governments.

1- *Imagine that you are a board member of EdP present in the meeting. If António Mexia asks for your opinion about the rationale of the operation, what would you have to say?*
2- *What are the main risks that should concern EdP on this deal?*
3- *What is the maximum amount that EdP should be willing to offer for Horizon's equity in US dollars?*
4- *How does that amount changes, if federal authorities discontinue their support to renewable energies?*
5- *What are the main advantages and disadvantages of wind energy, when compared with other energy resources?*
6- *How are renewable energies, particularly wind, being supported in the USA?*

- **Strategic assessment**

1- How do you analyze the strategic rationale that is presented to defend the acquisition of Horizon?

Possible answer:

The reasons presented by the administration of EdP to go forward with the deal should be carefully analyzed, as some of the arguments used may be misleading.

Starting with the argument of consistency with Business Plan 2007-2010, we consider that, by principle, it should not represent a motive to do the deal. In our opinion, business plans represent only guidelines for managers, and the rule should be value creation for the shareholders, as circumstances may change or new opportunities appear. Even in terms of consistency, it is hardly acceptable to state that Horizon "fully" fits the Business Plan: many of the states where Horizon operates are deregulated markets for electricity and renewable energies are not the core business of EdP. Moreover, the impact that the operation will have on the debt of the company – more than $4 billion dollars by 2010 – is significantly high for the current levels of debt (around €10 billion or $13 billion US Dollars). Thus, at least in the short/medium term, the financial ratios will be penalized, against the expressed instructions present in the Business Plan that claim "Strength of all financial ratios in the period".

The projection of EdP as industry leader can bring striking benefits, but the management should keep in mind that more important than size, is the efficiency of the company (meaning that EdP should avoid growth at any price). After making this remark, and assuming that EdP grows conscientiously, the benefits from industry leadership are vast, but two of them deserve our attention: economies of scale and

bargaining power. As it is said in the case study, EdP internalizes much of its operational expenses (unlike most competitors that outsource that function to turbine makers), and make it sense to assume that as the operations of the company enlarge, the company improves its ability in this field. Thus, it is reasonable to expect that operational expenses per megawatt decrease (for example by taking better advantage of spare parts, or from the real-time monitoring central), as installed capacity increases.

Larger size can also bring gains in terms of bargaining power, in particular with turbine suppliers. As Exhibit 15 shows, turbines supply will be very much concentrated in 2 operators (Vestas and Gamesa), and higher bargaining power of EdP would work not only as a counterweight with those suppliers power, but with all the suppliers of the company, creating downward pressure on their margins. Taking into consideration that turbine costs dominate the CAPEX, and in line, that CAPEX is a major expense in this business, the gains from higher bargaining power can be of great importance.

Regarding the diversification effect, administration claims that the operation would reduce portfolio and regulatory risk. Although this is true for EdP, some authors[1] argue that it should be investors and not companies to diversify, since there is evidence that corporate diversification may destroy value. This can actually be confirmed in the market, when we see groups trading at a lower price than their Net Asset Value (for example Sonae SGPS[2] during 2000 and 2001). Nonetheless, in this case we believe that investors are better off if it is the company that diversifies: either due to reasons related with market leadership (already presented) or due to financing costs. Because the pipeline of Horizon is very large, only a solid company – such as EdP – has the capacity to keep the investment plan, committing themselves to the investments projected. The

[1] E.g. Lang and Stulz (1994)
[2] From: Manuel Noronha Andrade, "Diversification, Control and Value Creation: the Case of Sonae SGPS", University of London (2003)

size of the operator and its commitment to the project are important factors when dealing with institutional investors, as the returns negotiated for equity partnerships can be a significant cost in the project.

Assuming that it should be EdP to diversify, there is no doubt that gains from diversification are significant, essentially at regulation level. Being an emergent technology, wind still relies on the support of governmental authorities to be profitable enough to attract private investors (in Portugal and Spain through feed-in tariffs, and in the United States by tax credits). If, for any unexpected reason, regulation suddenly changes in one country (e.g. if in Portugal, the feed-in tariff decreases), the business model of EdP for renewables could be seriously damaged, since much of the production is concentrated in Portugal and Spain. Besides regulatory risk, by spreading out production to other countries, EdP also becomes less dependent on the atmospheric conditions in the Iberia Peninsula.

The highest growth potential of the American market is also a supportive motive presented by EdP to buy Horizon. Even though a fast growing market can represent a good opportunity, the return that the company is able to get from that market (in this case, the return that is provided by the established regulation) is also an important part of the equation. Therefore, it is the relation potential/return that should be analyzed to select the best markets as expansion targets.

Finally, the company claims that it expects to profit from being an early mover in the American market (through Horizon) by having privileged access to the existing electricity grid and to the most favourable locations (higher load factors). Again in this case, not only the quality of wind-farm locations should be taken into account, but also the price at which Horizon is able to get those locations is indeed an important element to be analyzed.

2- What are the main risks that should concern EdP on this deal?

Possible answer:

In our opinion, the three most important sources of risk in this deal are governmental support, evolution of capital expenditures and exchange rates, not necessarily in this order. Moreover, the impact of the operation on the company credit rating is also a risk that EdP should take into account, since a deterioration of the rating means that the cost of debt will increase.

As we computed in question 4, without federal support, Horizon loses a significant part of its value, and the loss would be even bigger if RPS are abandoned. This is explained by the significant weight that governmental support still has in making renewable sources competitive with other energy sources. In particular, the non-renewal of PTC for the period after 2008 would be a serious drawback for the capacity that Horizon expects to install after 2008 (since as it is said in the case, the installed capacity would not be affected). Even considering that renewable energies are gaining momentum (as Exhibits 3 and 4 shows), there is always the possibility that the American administration gives up on supporting renewables and decide to invest, for example, in new forms of energy efficiency or even in nuclear power.

Furthermore, even if government continues to support renewable energies, there is a chance that electricity utilities start to collect RECs – Renewable Energy Certificates – from renewable energies others than wind. In order for that to happen, however, the development stage of those renewables has to increase. Nonetheless, as soon as Horizon signs the PPAs (Power Purchase Agreement), it is, in principle, protected against REC price volatility or even electricity price changes (since under PPAs the electricity utilities are attached to a compromise of buying REC and power at

a price that is established at the beginning of the PPA). However, there is also the likelihood that spot electricity prices evolves in such a different way from forecasts (e.g. lower than expected) that those utilities will be unable to meet their commitments with renewable producers (e.g. resulting in bankruptcy). In this remote case, the revenues structure of Horizon would change, with unpredictable consequences for the company.

The evolution of capital expenditures (CAPEX) also constitutes a source of risk for this deal. As Exhibit 14 shows, turbines represent between 70 and 80% of CAPEX, and turbines are made of steel. The price of raw materials in the international markets has been increasing, and steel was not an exception. If the upward pressure on steel prices goes on, the business model of wind-farms could be significantly damaged, since CAPEX is of major importance in this industry.

Also linked to CAPEX, is the point of turbine suppliers. As it is shown in Exhibit 15, if EdP actually moves forward with the acquisition of Horizon, the dependence on two suppliers (which together will represent about 80% of the supply to EdP) can be critical. Moreover, this point is even more critical knowing that a big growth is expected for the USA. Thus, the demand for turbines will be very high and respectively, the bargaining power of those suppliers.

Finally, exchange rates should also be a concern in this deal. Because EdP is a Portuguese company that consolidates in Euros, and Horizon operates in US Dollars, the volatility of exchange rates could drastically change the value that the operations of Horizon, have for EdP. In this case, EdP has two main ways to mitigate exchange rates risk. The first option would be to match costs and revenues in the same currency: for example by raising the debt in US Dollars to cover CAPEX. The other option would be using financial instruments to hedge exchange rate through forward rates. These financial instruments allow for companies to transfer risk to counterparties, which are

willing to buy it. However, in accounting terms the use of those instruments is not straightforward, and so, exchange rate could remain as a risk source.

- **Analytical assessment**

3- What is the maximum amount that EdP should be willing to offer for Horizon's equity in US dollars?

Possible answer:

In order to arrive to a value for Horizon, the equity discounted cash flow model (aka Flow to Equity model) was used. The reason for the use of this model comes from the complexity of the financing structure of this project (since the capital structure of the project is constantly changing according to the characteristics of the Institutional Equity Partnerships), which make computations with WACC or APT very hard. Therefore, the solution was to compute levered cash flows (accounting from the flows of operational results and tax payments/benefits), and discount them at cost of equity.

During the computations several assumptions were undertaken. The most important was, probably, assuming that the value that EdP offers for Horizon, should include only the installed capacity and the current pipeline. Therefore, future projected capacity was ignored in the computations, since it was considered that EdP was able to create their own pipeline in USA without the acquisition of Horizon. In terms of installed capacity, the data from exhibit 11a was used, with a small remark. Because that data is referred to the capacity at the year end, for the years in which new capacity was installed (from 2007 to 2010), only half of the new capacity was considered for OPEX and revenue purposes.

The OPEX was computed as the product of installed capacity and the price per MW (started at $48,000 and evolved with inflation – 2.5%) (Exhibit B). The reference price for OPEX came from EdP operations, rather than Horizon's. The reason for that choice is justified by the fact that most of Horizon's capacity for the following years is still to come, and having the chance to decide its future operational model, it makes to sense to assume that it will adopt EdP's model: internalize much of the O&M (operations and maintenance) functions, since this model has been bringing good results to EdP.

Regarding CAPEX, forecasts for new capacity cost prepared by EdP were used. According to those forecasts, the installation of new wind farms will cost $1.8 million dollars per Megawatt. (Exhibit A)

Besides operational and capital expenses, the remaining significant cost was related with the financing process. The way Horizon used to finance new production is through Institutional Equity Partnerships (IEP), and in this valuation, it was assumed that this model will continue (since it is the option which guarantees that EdP are granted total access to tax credits provided by the American authorities). According to the information provided in the case, these institutional partners finance 50% of CAPEX in exchange for a return of 6%. In order to simply the computations, it was assumed that a single IEP was established, and only for the capacity that will start operating in 2008 until 2010. (Exhibit C)

The mechanism of these partnerships can be briefly explained as follow: after launching a new wind-farm (that was 50% financed by the institutional partners), EdP gets the operational results generated by the facilities until it reaches the total recover of capital (the remaining 50% of CAPEX) – in this case, this will happen in year 2012. After that, the yearly operational results go to the Inst. Investors until they reach a

required IRR on its investment – here, will be around 2013. The amount that EdP has to pay to those investors is 50% of CAPEX, accruing annual interests at the rate of 6% with additional features concerning taxation. Since the launch of new partnership, Inst. Investors are in charge to pay the taxes that arise from operations, but at the same time, receive the Production Tax Credits (PTC) and MACRS (it was computed as the fiscal gain of being allow to depreciate assets in 5 years rather than 20) as they are generated. In conclusion, the liability to Institutional Investors accrues interest, but is reduced by the tax credits that they receive before they get the operational profits. Because these investors get totally paid after 7 years before the forecasted 10 years, after 2013 the PTC go directly to EdP. Moreover, it was assumed that after those partners get refunded, they keep a stake of 3% in the company. This corresponds to the proportional 5% of the TEI in the total capacity of the company.

Regarding cost of capital, the cost of equity was used as required by the Flow-to-Equity model to discount the levered cash-flow. Therefore, to the regular free cash-flow, it was added/subtracted the cash flows to the Institutional Equity Partners. This makes sense because, besides funds from institutional partners, the company decided to finance the project through shareholders' loans. Thus, the discount rate used had to be the rate required by shareholders (cost of equity). In order to get the cost of equity the CAPM model was performed. The risk-free rate used was the 30-year US Treasury Yield Rate. For the expected market return, the best predictions that we can have are past returns. Following that idea it was decided to use the arithmetic average of the annual return of MSCI USA Index[3] since 1996 as expected market return. The advantage of this index is that it includes a wide range of American companies. The final piece to perform CAPM was beta. Since unlevered beta of many EdP's peers was

[3] In Net terms (in order to include dividends in the return), and expressed in US Dollars.

available, the option was to average them to get a "proxy" for the industry unlevered beta. After adjusting this beta to EdP's capital structure, we get the leveraged beta, necessarily to CAPM. Bringing together all these parts, the overall result for cost of equity is 8.88%. (Exhibit H).

Depreciation was also an important factor on the valuation. As said before, tax benefits from MACRS (accelerated depreciation) go to the equity partners. Thus, the depreciation rate used by EdP in the project should be 5% (the regular rate without benefits).(Exhibits D, E, F, G). To quantify the reward from MACRS, we computed the difference between depreciate the capacity (involved in the Partnership) in 5 and 20 years, and then multiplied by the tax rate to get the fiscal gain from MACRS. (Exhibit G).

The overall result from the computations indicates that Horizon's equity is worth $2,421,812,977 US Dollars. (Exhibit I)

4- How does that amount changes, if federal authorities discontinue their support to renewable energies?

Possible answer:

If federal authorities stop supporting renewable energies, both MACRS and PTC will be discontinued. Because RPS – Renewable Portfolio Standards – are managed at state level, it was assumed that they will be maintained. Without tax credits, EdP no longer needs to have institutional partners involved in the projects, having the possibility to raise debt at cheaper prices. For that reason, it was assumed that those equity partners were substituted by ordinary debt under the current capital structure of EdP (Debt/Equity = 0.72). It was also assumed a debt rate of 5.91% which was the yield

trading in the market for corporate bonds with rating of A (the grade of EdP at that time).

Having all the computations completed, we concluded that without federal support, Horizon's equity only worth $1.246 billion (Exhibit J). This means that without the federal support, the project loses about half of its value.

- **Renewable Energies**

5- What are the main advantages and disadvantages of wind energy, when compared with other energy resources?

Possible answer:

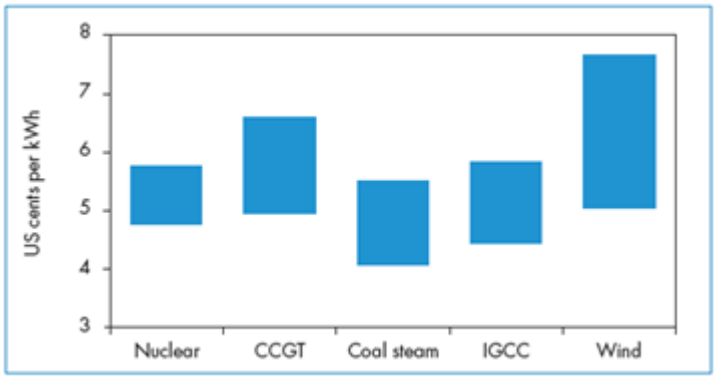
According to the figures present in the world energy outlook 2007 from OECD, wind energy is leading the renewable panel. Among other reasons, the driver that seems to differentiate Wind from other renewable resources is the economic competitiveness that it already achieves, when the environmental conditions are reasonable favourable. (see picture below). Knowing that the main challenge for renewable energies nowadays is their cost competitiveness, that is probably the reason for wind leadership.

On the website of EdP, the company enumerates a bunch of advantages of wind technology. Many of the reasons presented by EdP and environmental organizations are highly biased, supported many times on doubtful or super-optimistic assumptions. For this reason, only the most significant and less disputable factors will be referred.

Starting with the advantages, wind is an inexhaustibility resource that produces no greenhouse gas emissions while operating. Wind energy allows countries to reduce their foreign dependence, as well as the reliance on fossil fuels, as long as they possess favourable conditions. Because wind farms are normally installed in remote areas, it can

bring value for useless lands, but at the same time, does not obstruct that activities such as agriculture or livestock, being developed around turbines.

On the disadvantages' side, the main issue is intermittency of production, meaning that complementary resources are needed to match electricity supply and demand. In this point, producers argue that although irregular, annual amounts of wind are quite stable. Nonetheless, complementary resources are still needed to match day-to-day mismatches. Because wind farms are often installed in remote and dispersed areas, costs to adapt the electricity grid are seen as a minus for Wind. Although disputable, visual impact of turbines is being increasingly talked. The noise that it producers, can also be claimed as disadvantage.



In: World Energy Outlook 2006, IEA

6- How are renewable energies, particularly Wind, being supported in the USA?

Possible answer:

It is logical to separate the support that is being provided to wind energy at two levels: federal and state level.

At state level, the most relevant instrument is RPS (Renewable Portfolio Standards). RPS require that within 2015 and 2020 (varies from state to state) a fix

percentage (10%~20%) of the energy provided by electric utilities, come from renewable sources. More ambitious states such as California or New York anticipated their targets for 2010/2013. In many cases, there will be penalties for companies that fail the targets. The first state to include a RPS in the legislation was Texas in 1999, and the amount increased to 27 states by 2007. This solution is very market-oriented, since utilities can choose the cheaper energy (currently is Wind) to fulfil their standards.

Unlike RPS that were only established in some states (with different requirements), wind energy is also being supported through federal instruments that are equally applied in all the country. The most significant ones, according to the case, are MACRS and PTC. Starting by MACRS, which is an acronymic that stands for Modified Accelerated Cost Recovery System, it allows companies to apply depreciation rates of 20%. This is very important for wind power producers, because much of the costs are initial costs, mostly turbines. Another important instrument is PTC – production tax credits – which applies to the first 10 years of production of new turbines. For the year 2007, the tax credit is of $19 /MW produced, increasing in line with inflation. Being an important support to the investments in the wind industry, PTC represent also a risk source for companies since they need to be renewal every 3 years. In the past, it already happened that in two occasions, PTC were not renewed in time and retroactive laws were required to re-establish them. The consequences of this are well expressed in this quote from AWEA[4]: “When the PTC has lapsed in the past, wind energy investments have fallen 73-93% in the following years”.

[4] AWEA stands for American Wind Energy Association.

References

Books

- **Gaughan, P.A**. 2007. Mergers, Acquisitions and Corporate Restructurings, 4th edition, John Wiley and Sons, Inc;
- **Copeland, Tom, Tim Koller, Jack Murrin, and McKinsey & company Inc.**. 2005. Valuation: measuring and managing the value of companies, 3rd edition, John Wiley & Sons, Inc;
- **Saunders, Anthony, and Marcia Millon Cornett**. 2008. Financial Institutions Management: a Risk Management Approach, 6th edition, McGraw-Hill International Edition.
- **Ross, S.A., R. Westerfield, J. Jaffe, and B. D. Jordan**. 2008. Modern Financial Management, 8th edition, McGraw-Hill International Edition.

Institutional Information

- **Material information released though CMVM by EdP (during 2007):** FR12592, FR14214, FR14138, FR14308, FR14151;
- "**Prospecto** de Oferta Pública de Subscrição e de Admissão à Negociação no Eurolist by Euronext Lisbon", by EdP Renováveis, 2008.
- **EdP – Energias de Portugal, SA**: Relatório e Contas: 2006 e 2007.
- **EdP – Energias de Portugal, SA Presentations**: Acquisition of Horizon Wind Energy (March, 2007); edp 2010 Business Plan Presentation (January, 2007); 2007 Results (March, 2008); Financial Results 2006 (March 2007); Investor Day Presentation (Janueary, 2008);
- **EdPR – EdP Renováveis, SA Presentations**: Company Presentation 2007 (December, 2007); September, November, December Road shows 2008; EdP Investor Day (November, 2008);

European Legislation

- **Renewable Energy Road Map.** Renewable energies in the 21st century: building a more sustainable future [COM(2006) 848 final], Commission of the European Communities.

- **Directive 2001/77/EC** of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy soures in the internal electricity market.
- **Commission Communication** of 26 November 1997 on energy for the future: renewable sources of energy – White Paper for a Community strategy and action plan [COM(1997) 599 final].
- **Commission Green Paper** of 20 November 1996 on renewable sources of energy [COM(1996) 576 final].

Miscellaneous

- **International Energy Agency** reports: World Energy Outlook 2006 and 2007;
- Bloomberg database;
- **Global Wind Energy Council** reports: year 2006, 2007, 2008
- **United Nations Environment Program** report: Global Trends in Sustainable Energy Investment 2007.
- **American Wind Energy Association** reports: Annual Wind Industry Report, Year Ending 2008, Market Report, Year Ending 2007;
- **European Commission**: World Energy Outlook 2050 (2005); A quality environment: How the EU is contributing (October 2005); Energy and environment report 2008;
- **Equity Research Reports**: EDP Renováveis by BBVA Research, SA (July, 2008), Morgan Stanley (July, 2008); Company Report/Initial Coverage by ESN (July, 2008); Espírito Santo Research (July, 2008);
- **Peers websites**: FPL (www.fpl.com); IBERDROLA (www.iberdrola.es); ACCIONA (www.acciona.com); ScottishPower/PPM (www.scottishpower.com); ENDESA (www.endesa.es/Portal/en/default.htm); BABCOCK & BROWN (www.babcockbrown.com); INVENERGY (www.invenergyllc.com);
- **Company websites**: Horizon (horizonwind.com/home); Zilkha Biomass Energy (zilkha.com/);
- **Media**: Jornal de Negócios, Forbes, WSJ, The Sunday Times, BNet.

Exhibits

Exhibit A – in US Dollars

CAPEX	year	CAPEX	**TEI Contri (50%)**
CAPEX / MW	2007	1.080.000.000	540.000.000
1.800.000	2008	1.260.000.000	630.000.000
	2009	900.000.000	450.000.000

Exhibit B – in US Dollars

OPEX	year	capacity	Nominal Cost	opex w/ inflation
OPEX / MW	2007	0,8	38.400.000	38.400.000
48.000	2008	1,6	76.800.000	78.720.000
	2009	2,25	108.000.000	113.467.500
	2010	2,85	136.800.000	147.318.638
	2011	3,1	148.800.000	164.247.358
	2012	3,1	148.800.000	168.353.542
	2013	3,1	148.800.000	172.562.381
	2014	3,1	148.800.000	176.876.440
	2015	3,1	148.800.000	181.298.351
	2016	3,1	148.800.000	185.830.810
	2017	3,1	148.800.000	190.476.580
	2018	3,1	148.800.000	195.238.495
	2019	3,1	148.800.000	200.119.457
	2020	3,1	148.800.000	205.122.443
	2021	3,1	148.800.000	210.250.505
	2022	3,1	148.800.000	215.506.767
	2023	3,1	148.800.000	220.894.436
	2024	3,1	148.800.000	226.416.797
	2025	3,1	148.800.000	232.077.217
	2026	3,1	148.800.000	237.879.148
	2027	1,8	86.400.000	141.576.460
	2028	1,2	57.600.000	96.743.915
	2029	0,5	24.000.000	41.317.714

Exhibit C – in US Dollars

P&L Institutional Equity Partners

Year	EBiT	Capital to Recover	PTC	MACRS	Tax paid	TEI		Liab to TEI
						Cash OutFlow	Cash InFlow	
2007	73.341.840	466.658.160	47.934.720	0	13.781.414	13.781.414		505.846.694
2008	190.770.888	905.887.272	98.266.176	63.180.000	28.032.937	28.032.937		1.032.784.258
2009	287.780.993	1.068.106.279	141.641.480	136.890.000	47.796.777	47.796.777		1.314.016.610
2010	382.462.220	685.644.059	183.897.855	189.540.000	83.775.644	83.775.644		1.103.195.395
2011	428.315.164	257.328.896	205.029.977	189.540.000	101.199.762	101.199.762		876.016.904
2012	439.023.043	-181.694.147	210.155.727	189.540.000	105.268.756	105.268.756	181.694.147	452.456.800
2013	449.998.619	-631.692.766	215.325.323	105.300.000	109.439.475	109.439.475	268.418.361	0
2014	461.248.584	-1.092.941.350	220.624.572			220.624.572		
2015	472.779.799	-1.565.721.149	226.032.394			226.032.394		
2016	484.599.294	-2.050.320.443	231.551.504			231.551.504		
2017	496.714.276	-2.547.034.719	137.473.881			137.473.881		
2018	509.132.133	-3.056.166.852	94.341.760			94.341.760		
2019	521.860.436	-3.578.027.288	40.291.793			40.291.793		
2020	534.906.947	-4.112.934.235						
2021	548.279.621	-4.661.213.856						
2022	561.986.611	-5.223.200.468						
2023	576.036.277	-5.799.236.745						
2024	590.437.184	-6.389.673.928						
2025	605.198.113	-6.994.872.042						
2026	620.328.066	-7.615.200.108						
2027	395.477.978	-8.010.678.086						
2028	272.898.794	-8.283.576.880						
2029	113.204.360	-8.396.781.241						

Exhibit D – in US Dollars

		Depreciation Rate	
year	Capex	1/5	1/20
>2007	1.800.000.000	360.000.000	90.000.000
2007	1.080.000.000	216.000.000	54.000.000
2008	1.260.000.000	252.000.000	63.000.000
2009	900.000.000	180.000.000	45.000.000

Exhibit E – in US Dollars

Depreciation with MACRS (5-year)

YEAR	I	II	III	IV	TOTAL	Inst Equit Part
2007	360.000.000				360.000.000	0
2008	360.000.000	216.000.000			576.000.000	216.000.000
2009	360.000.000	216.000.000	252.000.000		828.000.000	468.000.000
2010	360.000.000	216.000.000	252.000.000	180.000.000	1.008.000.000	648.000.000
2011	360.000.000	216.000.000	252.000.000	180.000.000	1.008.000.000	648.000.000
2012		216.000.000	252.000.000	180.000.000	648.000.000	648.000.000
2013			252.000.000	180.000.000	432.000.000	432.000.000
2014				180.000.000	180.000.000	180.000.000

Exhibit F – in US Dollars

Regular Depreciation (20-year)						
YEAR	I	II	III	IV	TOTAL	Inst Equit Part
2007	90.000.000				90.000.000	0
2008	90.000.000	54.000.000			144.000.000	54.000.000
2009	90.000.000	54.000.000	63.000.000		207.000.000	117.000.000
2010	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	162.000.000
2011	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	162.000.000
2012	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	162.000.000
2013	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	162.000.000
2014	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	162.000.000
2015	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2016	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2017	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2018	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2019	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2020	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2021	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2022	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2023	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2024	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2025	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2026	90.000.000	54.000.000	63.000.000	45.000.000	252.000.000	
2027		54.000.000	63.000.000	45.000.000	162.000.000	
2028			63.000.000	45.000.000	108.000.000	
2029				45.000.000	45.000.000	

Exhibit G – in US Dollars

Gain on MACRS for IEP		
Year	Diffe (20% - 5%)	Fiscal Gain
2007	0	0
2008	162.000.000	63.180.000
2009	351.000.000	136.890.000
2010	486.000.000	189.540.000
2011	486.000.000	189.540.000
2012	486.000.000	189.540.000
2013	270.000.000	105.300.000
2014	18.000.000	7.020.000

Exhibit H

	USA		
Mkt return	10,80%	D/(D+E)	41,86%
Risk-Free	4,93%		
Mkt premium	5,87%	E/(D+E)	58,14%
Rs	0,093137	Beta equity	0,7468
		Beta unlevered	0,5189
Rd	0,0591		
WACC	0,069241		

Exhibit I

US dollars	2007	2008	2009	2010	2011	2012	2013	2014	(..)	2025	2026	2027	2028	2029	2030
Revenues	128.666.880	269.490.888	401.248.493	529.780.857	592.562.522	607.376.585	622.560.999	638.125.024		837.275.330	858.207.214	537.054.439	369.642.709	154.522.074	
OPEX	38.400.000	78.720.000	113.467.500	147.318.638	164.247.358	168.353.542	172.562.381	176.876.440		232.077.217	237.879.148	141.576.460	96.743.915	41.317.714	
EBiTA	90.266.880	190.770.888	287.780.993	382.462.220	428.315.164	439.023.043	449.998.619	461.248.584		605.198.113	620.328.066	395.477.978	272.898.794	113.204.360	
D&A	90.000.000	144.000.000	207.000.000	252.000.000	252.000.000	252.000.000	252.000.000	252.000.000		252.000.000	252.000.000	162.000.000	108.000.000	45.000.000	
EBiT = EBT	266.880	46.770.888	80.780.993	130.462.220	176.315.164	187.023.043	197.998.619	209.248.584		353.198.113	368.328.066	233.477.978	164.898.794	68.204.360	
Income Taxes @38%	101.414	17.772.937	30.696.777	49.575.644	66.999.762	71.068.756	75.239.475	79.514.462		134.215.283	139.964.665	88.721.632	62.661.542	25.917.657	
Net Income	165.466	28.997.951	50.084.216	80.886.576	109.315.401	115.954.286	122.759.144	129.734.122		218.982.830	228.363.401	144.756.346	102.237.253	42.286.703	
D&A	90.000.000	144.000.000	207.000.000	252.000.000	252.000.000	252.000.000	252.000.000	252.000.000		252.000.000	252.000.000	162.000.000	108.000.000	45.000.000	
CAPEX	540.000.000	630.000.000	450.000.000	0	0	0	0	0		0	0	0	0	0	
TEI - $ IN	13.781.414	28.032.937	47.796.777	83.775.644	101.199.762	105.268.756	109.439.475	220.624.572		0	0	0	0	0	
TEI - $ OUT						181.694.147	268.418.361								
terminal value												468.000.000	216.000.000	252.000.000	180.000.000
FCF	-436.053.120	-428.969.112	-145.119.007	416.662.220	462.515.164	291.528.896	215.780.258	602.358.694		470.982.830	480.363.401	774.756.346	426.237.253	339.286.703	180.000.000
	100%	100%	100%	100%	100%	100%	100%	97%		97%	97%	97%	97%	97%	97%
FCF to EdP	-436.053.120	-428.969.112	-145.119.007	416.662.220	462.515.164	291.528.896	215.780.258	584.287.933		456.853.345	465.952.499	751.513.656	413.450.135	329.108.102	174.600.000
DF @7,5%	1	0,914798242	0,836855824	0,765554237	0,700327671	0,640658522	0,58607329	0,536138816		0,201305568	0,18415398	0,168463737	0,154110331	0,14097986	0,128968128
Disc CF	**-436.053.120**	**-392.420.190**	**-121.443.686**	**318.977.528**	**323.912.167**	**186.770.471**	**126.463.046**	**306.800.483**		**90.070.893**	**84.037.791**	**123.992.432**	**62.403.186**	**45.440.962**	**22.053.550**

Exhibit H

US dollars	2007	2008	2009	2010	(...)	2026	2027	2028	2029	2030
Revenues	128.666.880	269.490.888	401.248.493	529.780.857		858.207.214	537.054.439	369.642.709	154.522.074	
OPEX	38.400.000	78.720.000	113.467.500	147.318.638		237.879.148	141.576.460	96.743.915	41.317.714	
EBiTA	90.266.880	190.770.888	287.780.993	382.462.220		620.328.066	395.477.978	272.898.794	113.204.360	
D&A	90.000.000	144.000.000	207.000.000	252.000.000		252.000.000	162.000.000	108.000.000	45.000.000	
EBiT	266.880	46.770.888	80.780.993	130.462.220		368.328.066	233.477.978	164.898.794	68.204.360	
Income Taxes @38%	101.414	17.772.937	30.696.777	49.575.644		139.964.665	88.721.632	62.661.542	25.917.657	
Net Income	165.466	28.997.951	50.084.216	80.886.576		228.363.401	144.756.346	102.237.253	42.286.703	
D&A	90.000.000	144.000.000	207.000.000	252.000.000		252.000.000	162.000.000	108.000.000	45.000.000	
CAPEX	1.080.000.000	1.260.000.000	900.000.000							
terminal value							468.000.000	216.000.000	252.000.000	180.000.000
FCF	-989.834.534	-1.087.002.049	-642.915.784	332.886.576		480.363.401	774.756.346	426.237.253	339.286.703	180.000.000
DF @7,5%	1	0,935243149	0,874679748	0,818038242		0,280263264	0,262114297	0,245140601	0,229266067	0,214419519
Disc CF	-989.834.534	-1.016.611.220	-562.345.416	272.313.950		134.628.214	203.074.715	104.488.056	77.786.928	38.595.513