The Public-Private Partnerships in Energy Sector - Wind Power Case

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Abstract

This work was divided into five major parts. On the first one, we aimed to clarify the key points to consider in a PPP. Subsequently, the electricity and renewable energy sectors were characterized. In the third part, we sought to review all main phases of a public procurement for the construction and operation of a wind power plant, including the facilitating and hindering factors for the development of such type of projects, as well as the financial, economic and competitive issues. Special attention was given to the criteria for evaluation of the tenders, as well as to the pre-qualification stage and the negotiations with competitors. In the fourth part, a guiding list of risks associated to wind projects was proposed, trying to make a comparative analysis of what is theoritically expected and the risks actually covered in this case study contract. Finally, a detailed comparison was made between the parameters that are usually introduced in PPP projects and the ones actually used in the contract under review.

1. INTRODUCTION

The main purpose of this dissertation consists in reviewing the procurement process of a public-private partnership (PPP) established for the construction and operation of a wind power plant (WPP), namely with respect to i) the business analysis, ii) risks associated with the contract and iii) contract management.

The Public-Private Partnerships (PPP) are assumed as a privileged form of contract, which the Government, in its mission to ensure the provision of public services, uses more and more with the underlying idea of providing services beneficial to the community, and having as a basic principle of risk sharing between the partners. The main reason, that makes the public sector turn to renewable energy projects through a PPP, is that the Government cannot afford the costs of such a large scale project, and so it chooses to take advantage of the innovation, the know-how, the flexibility of private sector funding. The promotion of projects based on renewable energy, has contributed not only to sustainable development, but also for economic growth, job creation, increased competitiveness of industry, rural development and reduction of imports.

2. PPPs – PROCUREMENT MODEL

The Public-Private Partnerships (PPP) are a procurement model, marked by the disengagement of Public Administration in the economy, since it no longer has its own power to be able to implement services for the satisfaction of collective needs. This event took place mainly, because public expenditure has grown to such levels that in recent decades they have proved to be unsustainable. Hereupon and with the aim of increasing fiscal restraint and without harming the quality of services provided, there was the need to appeal for the private sector, being this, the new operator of the partnership. Basically, a private equity investment is joined, which has traditionally been seen as public investment.

According to the Portuguese legislation, a PPP is defined as "contracts or union contracts, by which private entities designated by private, are bound in a persistent manner, before a public partner, to ensure the development of an activity aimed at satisfying a collective need, and where the funding and responsibility for investment and operating obligations belong in the whole or in part, to the private partner."

As explained in the above-mentioned legislation, a PPP approach corresponds to a long-term (25 years or more), and its duration is often relevant to the infrastructure lifecycle.

PPP contract refers to a contract between a private partner and a public one, where the latter can take different forms. The public partner may be the central government, other public entities of the population and territory, or even independent legal ones incorporated in the State or Regional and Local Administration (Cabral, 2008).

Another relevant element of PPP is that the main responsibility for the construction, financing and performance of the infrastructures belongs to the private partner. In this case, the government turns from a provider role to a controlling one, being only responsible for the demarcation, specification and amount of public needs, hiring this provision in partnership with the private sector.

With this hiring process, advantages for both parties involved in the partnership, can be joined. In fact, they have two different concerns. The private concern is essentially the profit-driven return on investment for risk-taking and fulfillment of business purposes. The public concern is more complex, driven by legislation, regulation and authorities, political opinion, democratic decision-making, minimize the risk and the achievement of social purposes (Santos, 2007). As a result of this alliance, there is still a mutual added value, once the private partner receives a profit and the public partner can reduce its costs while providing the service (Value for Money).

3. THE ENERGY SECTOR

3.1 The Electrical Sector

The organization of the national electricity system (SEN) is based on the coexistence of an electric system of public utility (SEP) and an independent electric system (SEI). The SEP is responsible for ensuring the supply of electricity in Portugal, taking into account a framework for a public service bound to the power supply with adequate standards of service quality. The SEI, which comprises the non-binding electricity system (IES) and the special regime generators (PRE's), in turn, has the task of making deliveries to the SEP networks under specific legislation. Thus, operators may choose to establish contractual relationships with suppliers of last resort (CUR) under conditions approved by ERSE or negotiate other conditions directly with the traders working in the open market.

The electricity sector in Portugal is mainly divided into four main activities: Production, Transport, Distribution and Trade.

3.2 The Renewable Energy Situation

In some countries, including Portugal, the creation of specific regulations and the signing of the Kyoto Protocol were decisive when it comes to stimulating the release wave of projects based on renewable

energies. Portugal currently still imports about a quarter of the electricity it consumes. However, with the aim to make Portugal more independent from the outside, the Portuguese government has bet heavily on renewable energy, both in terms of wind energy and biomass promoting competitions for the allocation of power within the network and in terms of development of mini hydroelectric (increasing its current capacity by approximately 50%) or even in terms of geothermal energy. It has also given great emphasis to the pilot project on the wave energy and photovoltaic installations, where the expectation in terms of solar energy is quite ambitious.

4. THE BUSINESS ANALYSIS – WIND POWER PLANT TENDER

4.1 Facilitating factors for the development of wind power plants

- **Projects promoters** that, in addition to consider this sector a very attractive one with regard to financial returns, are the main drivers of such projects, forming an active group of private investors with ambitious plans for the subsequent development of this sector;
- **Financial Organizations** that considering the attractiveness of this sector, support and provide the funds, necessary for its development;
- **Favorable opinion of the municipalities**, that according to the Decree-Law No. 339-C/2001 of 29 December, began receiving 2,5% of monthly fee paid by the recipient of the electricity produced in wind farms. Whenever wind farms are located in more than one municipality, the payment is shared in proportion to the installed power in each.

4.2 Hindering factors for the development of wind power plants

- **Licensing procedures** are the main weaknesses of the wind market, as they are quite complex, bureaucratic and time consuming processes, involving various administrative bodies;
- **The grid connection** for the out flow of electricity produced by wind, presents some difficulties, which results in delays in this project development. The process of connection to the national grid is the responsibility of the promoter of wind farms;
- **The environmental impact** of wind farms, which focuses mainly on the visual impact, noise and influence in birds fauna.

4.3 Competitiveness

In Portugal the wind energy market is very active and there are several promoters, although the majority (60%) is concentrated in three main groups: Iberwind, Enernova (EDP) and Generg. The number of players in the sector has increased greatly in recent years, although these will eventually form consortia with each other. This causes production of electricity by wind power to be concentrated in a very small group of entities, being possible the constant risk of entry of new promoters though.

As far as the competition among the producers of wind turbines is concerned, the quality of the turbine is the most relevant, because it is directly related to the productivity, reliability, and experience (know-how) demonstrated. As for the threat of entry of new producers in competitive terms it isn´t a very

important factor, because of the confidence and the experience factor. These two factors, along with the scale economies, provide a certain advantage to the existing producers over the new competitors.

4.4 Economic analysis of a wind farm

a) Remuneration System

The remuneration system for wind energy in Portugal follows the “feed-in” tariffs system that has emerged as an incentive to projects based on renewable energy. The basic principle of this remuneration system is intended primarily to establish a stable tariff imposed by the regulator (ERSE) and / or a bonus in addition to the market price received per MWh of electricity generated, in order to ensure a reasonable return on investment to the renewable energy producer. These rates were established in 1999 and subsequently revised by ERSE, and amended in 2001, 2005 and 2008. The restraint of the yield for feed-in tariffs for a maximum of 15 years from the date of supply of electricity to the grid was introduced in the Decree-Law No 33-A/2005. The warranty period of new tariffs, for over 15 years, can also be booked up to the first 33 GWh supplied to the grid for each MW of capacity, and it will be used whichever comes first. During this period, the regulator assures the producer the purchase all its energy production by REN, with no demand risk for the producer. However, although the tariff schemes ensure their implementation during these 15 years, the regulator may decide to increase or decrease the rate or the fixed component of tariff for electricity produced from renewable sources (EDP Renováveis, 2008). In addition, at the end of the 15 years the price will tend to approach the market price of electricity (40 €/MWh) plus a premium for the sale of green certificates. The green certificate system can be considered as a system of incentives for renewable energy sources for electricity generation in whivh the producers receive a green certificate for each MWh of energy they produce.

b) Quantity

The number of sales depends directly on the installed capacity, load factor, power purchase agreement (PPA) and the government policy, being the wind power resource availability a decisive factor in the amount of energy produced. The power purchase agreement (PPA) is an essential element to consider, because once you have the licensing process completed and in possession of the right to operate the wind farm, the developer has the sale of production energy confirmed.

c) OPEX

All the operating expenses that the developer of the wind farm has are recorded in OPEX. This means all ongoing costs and necessary to direct the project. According to EWEA (2009), the services and spare parts represent the largest share of the total cost of O&M, with about 26%, followed by administration (21%), land rent (18%), insurance (13%), power from the grid (5%) and others (17%).

d) Investment

The investment in a wind farm is a special case of investment, because the turbines represent the cornerstone of the whole process, regarding the choice of the model and its power, the definition of the groups to ensure a good efficiency, maintenance and even replacement of components. This

investment justifies the higher costs either in the initial phase or the exploration one, especially in the phases of transport and installation. In a typical structure of an investment in a wind farm, the capital cost is dominated by turbines with 75% of the total investment, representing the electrical system (10%), civil work (10%) and engineering project management (5%), the remaining 25%.

4.5 Wind power plant tender – Case Study

The tender for the attribution of capacity to inject power in the electrical system of public service and associated reception points for electricity generated from wind farms was launched in July 2005. It was done the international tender for the DGEG with the aim of promoting the reduction of dependency that Portugal has to import fossil fuels, considering the European targets established. It is divided into three distinct phases (A, B and C), which for the purpose of this thesis, only treats phase A of the competition. Phase A refers to the allocation of a share of power between 800 and 1000 MW

4.5.1 Valuation of criteria and sub criteria

For the evaluation of proposals to phase A, the following 4 criteria were used: (A) Economic impact, (B) creation of an Industrial Cluster, (C) Technical Management of the system and (D) Support for Innovation, which assigned, the weights of 20%, 45%, 25% and 10%, respectively. This way, determining its strong economic and financial weight of 65%.

Given the weightings of the criteria of this tender, in which the valued economic/financial (65%) factor arises over either the management of the system (25%) or the support for innovation (10%), means that the Portuguese government, through the DGEG, strongly favoured the creation of a cluster of support for the wind sector, trying to attract investment to the country.

Criteria A concerns the economic impact, especially the way we should behave with the payment of energy produced in wind farms, sold to the public on the date of the issue of the exploitation of wind farms. It is by this that it is possible to ensure the financial sustainability at the stage of operation of the wind project.

The main considered criterion is the creation of an Industrial Cluster in support of the sector. The new industry aimed essentially to create investment and jobs in not supported areas as well as technology transfer to the country so as to perform exports rather than imports.

For each of the criteria B and C above sub criteria were also used, on which assigned weights were also related.

The B sub-criterion values the investment to the establishment of factories for the assembly of wind turbines and the creation of units of components production, in the less favoured areas, as well as surrounding ones, the creation of direct and indirect employment generated respectively at and, in the Industrial Cluster, the ratio between VAB and direct sales (VAB/Sales) which exceed 20% and for the year cruise of the industrial considered by each competitor. It also values the degree of coherence and consistency of commitments, sustainability investment, building on criteria related to the time frame for investments, as well as the Portfolio Firm Orders and the ratio of exports to sales ratios and degrees of consistency and reliance of contractual relationships.

Criterion C represented by a share of 25% is divided into five sub-criteria which value the creation of a central order of wind generation with a capacity of electronic communication with the network operators, covering all wind farms that will be licensees in order to create storage solutions for energy (wind energy, unlike, for example, the hydro one, cannot be stored, and so it is essential that this teams up with other technologies). The quality of energy produced is another criterion.

Criterion D refers to the creation of a Support Fund for Innovation for the funding of the national scientific research projects and technological development and it grants masters and doctoral programs, with particular emphasis on renewable energies (including wind energy) and energy efficiency.

4.5.2 Proposals analysis

In phase A of the wind power tender, four competitors were in competition: the Energias de Portugal (ENEOP) consortium, led by EDP, the Ventinveste consortium, led by Galp, the Novas Energias Ibéricas (NEI) consortium, led by the Spanish company Iberdrola and the consortium Ventonorte, led by Spanish Union Fenosa and Italy's Enel. All proposals were accepted for evaluation purpose.

Consortia Ventinveste and Energias de Portugal reached therefor the initial offers, the high scores for the appreciation of criteria A, C and D, placing themselves from the start, to a great advantage before the other two contestants. So the jury deliberated in the presence the results, that these two competitors were considered fit to proceed with negotiation.

Subsequently, the jury proceeded with the negotiations stage with the two competitors, admitted to this stage, where each presented their best final offers (BAFO). As for the surrounding areas, only ENEOP showed interest in investing. Another factor that put the ENEOP in advantage is the fact that all of the industrial units were to be built on the same site (Unit integrated in Viana do Castelo), while the Ventinveste proposal points to its construction in different locations. As for the business plan of wind farms, only ENEOP submitted proposal, which was considered quite detailed. The consortium ENEOP also took advantage, about the sustainability of investment and contractual arrangements.

The grouping ENEOP was the winner of the first phase of the competition and it signed a contract with DGEG on 27 October 2006, for a minimum of 17 years (minimum life expectancy of the Industrial Project). Since the proposal by a consortium led by EDP showed quality and contract soundness, was worthy "exceptional merit" and the power was not only awarded 800 MW it would be, if it was a winner with a normal proposal, but 1000 MW. The total amount to the overall power awarded, the consortium was entitled to more 200 MW, which are the result of 20% over-equipment for each wind farm to be built, giving a total of about 1220 MW of wind capacity to be installed.

5. RISKS

The risk in public-private partnerships is a major factor and it is essential that it is well-managed to succeed in this mode of procurement. The distribution of responsibilities and risks between the private partner and the public one is a major issue for a PPP. Furthermore the private partner is entrusted with the responsibility of building the most important operation; however this does not necessarily mean that it carries all the risks. With this type of procurement, it is intended that each partner does

what it is best geared and prepared to, ensuring that services and infrastructure are provided as efficiently as possible.

Of all the renewable, we only considered the risks associated with wind, because it is the feature that involves more hazards and is the main theme of the dissertation. Although the wind contract, subject of study, does not have a risk matrix or a discriminating study of all the risks that can happen in a wind project, this is the best way to identify, evaluate and allocate them for the partner with a better management, as mentioned in the following table:

Risk Type	Risk Discription	Risk Allocation		Probability	Impact Level
		Public	Private		
Planning and Desing	• Definition of projects *outputs* • Adequacy of construction Projects as defined in specific design	X			
Construction	• Delays in the commissioning of the wind farm • Risk of failure of wind resource • Uncertainty about geological and environmental conditions • Equipment damages during operation or during the installation • Difficulty in providing material		X		
Security	• Accidents during the construction and operation stages		X		
Grid Connection	• Risk of non-generation of power pre-agreedX • Loss of entitlement to power not available		X		
Accessibility	• Risk of damage of existing roads • Risk of occupation of private property		X		
Licences and Expropriations	• Acceptance of expropriation • Obtaining licences for constrution and operation		X		
Environmental	• Obtaining DIA • Location of wind farms on migratory routes (barriers to certain species of birds and risk of death)	X	X		
Operation and Maintenance	• Uncertainty of the availability of wind (losses caused by wind intermittency, failures of income) • Facilities state • System reliability • Availability of equipment • Uncertainty about the quality of maintenance services • Risk of availability of infrastructures		X		
Technological Risk	• Uncertainty about used technologies		X		
Performance Risk	• Uncertainty about the quality of service for maintenance • Growing demand in service quality		X		
Demand and competition	• Location and displacement of enterprises • Threat about the coming of new competitors into the business		X		
Financial Risk	• Risk of insolvency of lenders • Uncertainty about rising inflation • Evolution of the financial burden • Amendment of conditions of tariff by the regulatory authorities		X		
Legal Risk	• Likelihood of new legislation with an impact on the structure cost • Stricter regulations	X			
Force Majeure	• Natural disasters, vandalism, war, epidemics	X	X		

Low Medium High

With regard to the study of risk-sharing contract in the wind analysis, one can conclude that the vast majority of the risks studied, which may occur in this type of projects, are part of the contract. As we might expect, in a PPP contract, the risks are mainly transferred to the private sector, except for the risk of planning and design and the environmental risks, legal, force majeure, demand and competition. It is also referred that the risks most likely to occur are those related to the safety factor (workers`), the accessibility to wind farms, operation and maintenance, technology, the performance of the private partner, and behind all those risks, the ones related to the financial factor.

6. CONTRACT MANAGEMENT

The Portuguese government, through DGEG, appears here as a promoter of public tenders based on renewable energy in order to develop a commonwealth service. Following the tender, the wind promoter chosen will be the one that best suits the requirements and then a public-private partnership (PPP) will take place. In turn, the private company then proceeds to the recruitment of suppliers either services or equipment.

6.1 PPP contract management – Case Study

In accordance with Partnerships Victoria (2003), to implement a PPP contract management process three steps are required: development of strategic plan development and implementation of the monitoring process and a systematic review.

The first step corresponds to the development of a careful plan in order to define the strategy for monitoring the contract, able to answer to questions about tools and processes that should be required for the project, as well as the knowledge about the human, financial and technological resources available and the deadline for the development of the contract.

The second step, as defined by the same literature, should address essential issues, namely:

a) Contract management

The contract management is a fundamental issue in the monitoring of projects, since it establishes several procedures, either in terms of ensuring strong relations between the partners in all phases of the project, including conflict situations, or in terms of ensuring compliance in all stages of monitoring. It requires a thorough knowledge of legal documentation of the project, as well as the commercial interest of the parties, operating issues related to services and legislative and regulatory context associated with the project. However, it is defined not only for ensuring compliance with the obligations and responsibilities under the contract, but also for ensuring the effective monitoring of issues related to performance, risk, payments, reporting and change.

b) Performance monitoring

A key issue in monitoring a PPP contract is to monitor the performance of the private partner being in conformity with the results and outputs set out by the public partner in the contract. Also, it is necessary to ensure that both risks and changes are monitored, with the underlying idea that *VfM* is achieved. Above all, strong focus on continuous improvement of services is essential, being

established for this purpose at an early stage, rules of good communication between the parties. For this purpose, it is important to carry out regular meetings in order to keep track of achievements and performance in all phases of the implementation schedule of work as well as to implement corrective actions for bringing the conditions initially laid down, in the presence of any failure of the private partner.

The private partner´s performance should be regularly reviewed by comparison with the values of the indicators (KPI's) defined previously for each specification output. However, it should be noted, that once there is the possibility of change of the circumstances throughout the lifetime of the project, that the KPI's are always subject to revision.

The reports of performance evaluation are intended to assess whether the services are delivered in accordance with the required parameters, and to evaluate the corrective measures taken by the private partner, whenever the performance standards are not met.

c) Relationship management and dispute resolution

With the long term of PPP projects, it is important to note that underlying the question of a good relationship between the parties involved, there are key aspects to be understood such as the mutual benefit in the partnership and the understanding of the objectives of each party as well as the common ones.

d) Contract flexibility

Being the long term a main feature of a PPP contract, it is natural that the number of variables can change throughout the lifetime of the project, being therefore inevitable that the change can be foreseen in the contracts. These changes can be imposed by specific issues raised by the public or even by changes in legislation that cause impact on the contract. The issue of flexibility of a PPP contract is a very important point because it is the parameter that ensures the ability of the private sector to respond effectively to the changes proposed by the public partner (Australian Government, 2006). These changes can result in an impact on the risk profile of the project and some significant variations in costs, with a direct impact on the *VfM* of the project. So, it is important that procedures are agreed prior to the changes in the contract so that the change is monitored efficiently, maintaining good communication between the parties and thus avoiding divergences.

e) Contingency planning

According to that described in Partnerships Victoria (2003), the unexpected occurrences are usually divided into three types, namely: situations which can interrupt service delivery but do not involve default by the private partner (force majeure); situations involving the interruption of service for failure on the part of the private partner, because the services delivered do not meet the output specifications; negligence on the part of private partner , which do not result in a disruption of service delivery. According to the same source, in the PPP contracts three types of contingency processes should be considered: business continuity, step-in and defaulting plans.

To implement a monitoring process of a PPP contract, the third and final step down over the life of the project, establishes a systematic review of the strategy for monitoring the contract with a view to updating and improvement of the model.

There are some aspects referring to the monitoring and management of contracts wich, incorporating most of the models tested for PPP, had no echo in the Portuguese model of the wind power tender considered. We can refer, for example, that there are no step-in or contingency plans. However, the issue of flexibility of the contract is widely demonstrated in numerous clauses, and we can ensure that no gaps were left. We consider that unforeseen circumstances out the date of the contract could be integrated later in case of considerable evidence. It is further understood, that the wind contract analysis includes all points that appear interesting, especially those related to performance monitoring and the monitoring of the relationship between the parties as well as conflict management.

7. CONCLUSION

This work aimed to achieve three main objectives, which are considered to have been achieved. The first objective referred to the analysis of a PPP contract relating to a wind energy project, focusing on understanding the factors of access and competition aspects related to a business of this nature. The analysis of the risks associated with this sector was the second objective to be achieved. The third objective concerns the analysis of the conditions stipulated in the contract between the promoter of wind farms Wind of Portugal and the public authority (state, in this case, DGEG) as well as the comparison to a contract such as PPP. Given the advantages highlighted in the proposal submitted by the consortium Eólicas Portugal, compared to its competitor in the negotiation phase, award in this competition is considered completely fair.

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