Risk allocation and time-delays in public-private partnership (PPP) projects: the experience of wastewater treatment plants in Spain

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Abstract

An efficient risk allocation is crucial for a sound management of public-private partnerships (PPP) projects. This paper illustrates the consequences of an inadequate management of construction risk and an unsuitable transfer of demand risk. Our analysis builds on more than hundred wastewater treatment plants built and operated through PPP projects in Spain. It also shows that the involvement of many public bodies at local, regional and national level further increases the complexity of PPP projects and make time delays more likely. The findings provide useful insights for project managers in charge of PPP projects for the provision of public infrastructure.

1. Introduction

In early 2004 the regional government of Aragon (Spain) faced the daunting challenge of building 131 wastewater treatment plants with a value of app. Euro 330 million. The reason behind this initiative was to comply with the European Union regulations that made it compulsory by December 2005 to treat wastewater in all municipalities that had over 2,000 equivalent inhabitants. The regional government decided to use the public-private partnership (PPP) formula because of the lack of financial resources to build the plants.

The 131 plants to be built were bundled in 13 concession contracts of around €20-30 million, each of them covering a specific area of the region. The concession tenders were grouped in three phases (rounds), as shown in Table 1. In all cases, concession period was 21.5 years (1.5 years for the design and construction, and 20 years for the operation). As of mid-2014, 102 plants had been built and were in operation, and 14 more plants were under construction.

Table 1. Phases of the concession program

Phase	# contracts	# plants	Investment (€Million)	Bidded out	Awarded	Contracts signed
1	7	77	194	July 2005	Dec. 2005	Feb. 2006
2	3	17	43	June 2006	March 2007	May-Jun 2007
3	3	37	93	Jan-Feb 2008	Nov 2008	Dec. 2008
Total	13	131	330			

Source: Elaborated by the authors with data provided by the regional government of Aragon

PPPs have been so far scarcely used in wastewater treatment for greenfield projects, with some scattered experiences reported in Egypt, Jordan, The Netherlands, Bahrain, Australia, Taiwan, India, Mexico, Peru, Colombia and China (Pan et al., 2011; Zheng and Tiong, 2010; Vedachalama et al., 2014; Osgood and Barnes, 2010; Victorian Auditor-General's Report, 2013; Lee and Yu, 2012). In most of these countries, only one project has been built through a PPP scheme, although in most cases it has been a major project. PPPs have also been utilized in this sector for brownfield projects in some countries like Canada, United States and Poland (USGAO, 2010). The case of Aragon (Spain) represents so far the most relevant worldwide experience of the utilization of PPPs to build and operate wastewater treatment plants.

It is commonly asserted in international PPP literature that organization of construction projects through the PPP model improves on time delivery compared with traditional procured

projects, which have a bad track record (Grimsey and Lewis 2005; Li et al. 2005, Kwak et al., 2009). Our analysis shows, however, that in this case substantial time delays were also experienced even though the PPP route was chosen. The paper argues that the main reason was an inadequate risk allocation model. Furthermore, we also argue that this sub-optimal distribution of risks has also resulted in a poor financial performance of the concessionaires which has seriously hampered the future involvement of the private sector in this kind of PPPs in Spain. An additional result from our analysis is that the involvement of many public bodies at local, regional and national level further increases the complexity of PPP projects and make time delays more likely. These findings provide useful lessons regarding the future utilization of PPPs for building and operating wastewater treatment plants and other infrastructure.

The paper is organized as follows. We first review the literature background related to some aspects of PPP projects that are relevant for our study. Then, we explain the methodology that has been used in our research. In the following section, we provide an overview of the outcome of the program and discuss some significant issues regarding its implementation. We then analyze the risk allocation in the case studies. Finally, we summarize the conclusions of our research and suggest some points for further research.

2. Literature background

This paper revolves around two main points that have been extensively analyzed in the literature on PPP projects. The first one is that PPP projects avoid cost and time overruns when compared to traditional public procurement. The second one is that this happens mostly because of an efficient risk allocation. In this section we review the literature about these two points and explain what adds this paper to the existing literature.

There is a long history of publicly procured contracts being delayed and turning out to be more expensive than budgeted (Grimsey and Lewis, 2005; Flyvbjerg et al., 2007). Proponents of public-private partnerships argue that this formula, if properly formulated, can provide a variety of benefits to the government and that two of these benefits are savings in both cost and time in project delivery when compared to traditional public procurement (Li et al. 2005, Kwak et al., 2009). Arguably, the rationale behind this higher efficiency in managing the project is based on transferring some of the risks to the private sector. Giving the responsibility for construction and operation to a private consortium creates the incentive to keep the project on track and to prevent construction delays and cost overruns (Grimsey and Lewis, 2005; Sarmento, 2010; Hurst and Reeves, 2004).

The evidence regarding to which extent PPP projects avoid cost and time overruns is mixed. Grimsey and Lewis (2005) mention a number of studies that provide evidence of the PPP projects versus traditional procurement regarding time and cost overruns using data from the United Kingdom. However, Pollock et al. (2007) argue that some of the studies elaborated by HM Treasury do not provide such evidence. This paper adds to the literature a case study that shows that building the projects has taken much more time than estimated even though a PPP arrangement has been chosen to implement them.

Risk sharing in infrastructure projects between the public and private sector is considered to be another crucial issue in the management of PPP projects (Hodge, 2004a; Marques and Berg, 2011). Nonetheless, the identification of risks and their correct allocation is complex to determine (Medda, 2007). The main principle regarding risk sharing in PPP projects is that the agent that should bear the risk is best able to influence and control the risky outcome (Hodge,

2004b; Loosemore et al, 2006; Medda, 2007). More specifically, Liu and Wilkinson (2014) argue that the government should retain the risks that are beyond the control of the private sector.

However, in some cases risks are allocated to parties without the knowledge, resources and capabilities to manage them effectively. Ng and Loosemore (2007) argue that there is considerable evidence to suggest that risk transfer is often handled poorly between parties to many PPP projects and that these types of problems are common in PPP projects. An inadequate risk allocation is supposed to have a relevant impact in project performance. Ke et al (2013) carried out an empirical analysis to evaluate the correlation between risk misallocation and project performance. It was found that there was a significant negative relationship between project performance and the degree of risk misallocation. The smaller the degree was, the more successful the project would be. Our research adds to the literature a case study that illustrates an inadequate risk allocation and how this influences the project performance.

Finally, we have also reviewed the studies focused on the utilization of PPP arrangements to build and operate wastewater treatment plants. We found very few of these studies. Ali *et al* (2012) carries out a quantitative analysis on the valuation of minimum revenue guarantees in this kind of PPP projects. It shows that, when there are minimum income guarantees, developing the projects in various stages reduces the risk assumed by the public sector Memon (2002) discusses the use of PPPs for water supply and wastewater treatment in Japan and identifies several factors for the successful implementation of this kind of projects. The only case study we have found is Zheng and Tiong (2010), who examine the first PPP application for wastewater treatment in Taiwan. The study provides some lessons learned from this experience, mostly related to the procurement procedure. Some other projects have been reported, as explained in the introduction, but have not been analyzed in academic papers.

3. Methodology section

4. Analysis of risk transfer in these PPP schemes

In this section we analyze risk allocation in the case studies reviewed in this paper. The objective is to examine to which extent the risk sharing has been efficient and how this has influenced the outcome of the projects. The examination of risk transfer in this case-study is carried out with reference to the following key PPP risk categories: construction risk, revenue risk, operating risk and availability risk. These categories have been selected based on the classification of risks carried out by Medda (2007), Marques and Berg (2011) and Grimsey and Lewis (2002). We have focused on those risks that are more relevant for the purpose of this research.

4.1 Construction risk

The terms of reference of the tenders established that the concessionaires had 18 months for the elaboration of the construction designs and for building the plants. However, there were long delays in all projects, mostly because of problems with the availability of the lands, as well as with the authorizations for the construction and the entering in operation. In a few cases there were also problems related to the geotechnical risk.

In some projects there were also delays that were responsibility of the concessionaires. According to the representatives of the public sector interviewed for this research, the main reasons were: 1) Problems between the companies involved in the consortiums; 2) Lack of enough human resources in charge of managing the projects in most consortiums (each contract involved 8-10 plants); 3) The companies had to provide financial resources for the construction in the cases where getting the loans from the banks took more time than anticipated.

4.1.1 Lands availability

Most of the projects experienced significant delays because of problems in having the lands available. These delays were in the range of 20-50% of the period established from contract signature until starting operation. The regional government was responsible for providing the lands to build both the plants and the main sewers. The terms of reference established that the lands should be available within four months from the contract signature—otherwise the concessionaire would be entitled to an extension of the concession period. Therefore, the delays in having the lands available were compensated by the regional government with extensions of the concession period.

The municipalities were in charge of making the arrangements to make the lands available for the concessionaires. The initial approach of the municipalities was not to expropriate but to negotiate with the owners of the lands (in order to reduce the political cost of taking the lands from their owners). However, this procedure proved very lengthy and, in many cases, fruitless. In the end, the officers of the regional government in charge of the program realized that it was necessary to expropriate. But the expropriation, according to the law, had to be done by the regional government (not the municipalities), and the expropriation procedure needed a long period to be carried out.

The officers of the program learnt from the experience of the early projects that they should start the expropriation procedure right after awarding the concessions. And this is what they did in the second and third phases of the program. Moreover, according to some stakeholders interviewed for this research, the experience of the projects of the first phase shows that the regional government, not the municipalities, should have been in charge of getting the lands available. And the expropriation procedure should have been used from the beginning. Furthermore, some stakeholders argue that the role of the municipalities should have been taken over but the regional government. The reason is that most of the municipalities are small (under 5,000 inhabitants) and the people in charge of dealing with these projects usually lack the preparation needed to deal with major infrastructure projects.

4.1.2 Permits and authorizations

Another source of delays in the projects was the difficulty in getting the permits and authorizations for the construction and the entering in operation. Most of the projects had problems with getting the permits and authorizations, but the delays produced because of these problems were in most cases shorter than the delays produced because of the problems in getting the lands available. Therefore, the regional government did not need to provide extensions of the construction period for this reason.

The concessionaires were in charge of getting all permits and authorizations. It was necessary to ask for them to many different public bodies at local, regional and national level. And it took very long to get them. The lack of coordination among the many public bodies involved in providing the permits made this task even more difficult. The most problematic authorizations

were the ones related to the electricity connection because it involves a particularly complex process.

Another authorization that took more time than anticipated was the one related to the supervision of the construction design. After being awarded the concessions, the concessionaires had two months to elaborate the construction design. It had to be submitted to the regional government, which had established a period of one month to approve it. But in most cases it took much longer. One of the reasons is that during the supervision of the design the regional government requested some changes because of technical reasons. Another reason is that the officers were overwhelmed with workload, especially in the first phase where seven contracts (totaling 77 plants) were launched at the same time. The public body in charge of supervising the projects and the construction process was reinforced with more staff but even though it was impossible to avoid some delays.

4.1.3 Geotechnical risk

The concessionaire was supposed to assume geotechnical risk, although theoretically these risks should normally be allocated with the public partner rather than the private. In practice it was not so clear which part had to assume this risk. The bidders had a short period of time to prepare the bids (around two months). In addition, they had no access to the land at that time because they were not available yet. Therefore, they did not have the opportunity of carrying out tests to check the geotechnical conditions of the land.

In most cases, this did not represent any problem. However, in one of the projects of the first phase there were severe problems with the foundations and it was not clear who had to assume this risk. Since in this project there were problems also with the demand projections, this contract was terminated by mutual agreement and was expected to be put out for bidding in April 2014 (to be confirmed whether has been already awarded).

4.2 Revenue risk

The revenue risk in these PPP schemes has two components: the demand risk and the formula to update annually the tariff to be paid to the concessionaire during the concession period. The regional government transferred demand risk to the private sector but this risk was mitigated through the payment mechanism. The retribution of the concessionaire is calculated according to the following formula:

$$\text{Revenue} = Q_A\, P_A + (Q_{measured} - Q_A)\, P_B$$

Where $Q_{measured}$ is the real flow in each plant. The variables Q_A, P_A, P_B had to be submitted by the bidders for each plant in their proposals. All these variables were capped in the terms of reference of the concession tenders with specific values for each plant. The maximum amounts allowed for these variables (Q_A, P_A, P_B) were established in such a way that the concessionaire had to get most of the revenue (roughly 95%) from the component $Q_A P_A$. The maximum amount allowed for Q_A was low and the maximum amount allowed for P_A was high. And the maximum amount allowed for P_B was low. In addition, the maximum amount of flow ($Q_{measured}$) that the generated revenue was capped at 1.1 Q_A (which means an increase of 10% over Q_A). This way, the concessionaire was quite sure that they were going to get 95% of the forecast revenue even with low flows.

The mitigation of demand risk has had two positive consequences: 1) There was a lot of competition for all projects (although it decreased in the consecutive phases of the program); 2) Only one contract has been renegotiated, and the reason was not a financial problem of the concessionaire.

The size of the plant was dependant on the design flow (Q_D) that was estimated for each plant by the regional government. The regional government carried out thorough assessments of the demands estimated for each plant. They took into account the current population (both the usual one and in vacation periods), the existing industries, and the estimated growth of both population and industries.

The analysis of the revenue risk transferred in these PPP schemes has two components: 1) The flow Q_A and the tariff P_A; 2) The formula to update annually the tariff to be paid to the concessionaire during the concession period.

4.2.1 The flow $Q_A(m^3)$ and the tariff $P_A(€/m^3)$

As already explained, the variables Q_A, P_A and P_B had to be submitted by the bidders for each plant. These variables had a great weight in the awarding criteria, as shown in Table 2. All these variables were capped in the terms of reference of the concession tenders with specific values for each plant. The maximum amount allowed for Q_A was quite low compared to the maximum amount allowed for Q_D in order to make sure that the real flow was going to be above Q_A most of the time in all plants. In fact, Q_A is around 30%-50% of Q_D in most cases. As already explained, the concessionaire obtains roughly 95% of their revenue through the component Q_A P_A.

Table 2. Awarding criteria

Criteria	Points
Economic criteria	
- Q_A, P_A, P_B	30
- The lowest investment cost	5
- Certificate of a bank securing financing of the project	5
Technical criteria	
- Related to construction	30
- Related to operation	30
Total	*100*

Source: Regional Government of Aragon

As of mid-2014, the real flow in roughly 95% of the plants is higher than Q_A but well below Q_D in almost all cases. This shows that the estimations of the regional government for Q_A were accurate. But the assumptions for Q_D proved too optimistic. This led to build most of the plants bigger than what was really needed. It helps understand these wrong estimations that at the time of carrying out the demand studies (in the period 2005-2007) the construction of new houses was booming in Spain and the perspectives of population growth were very high. A few years later the perspectives are much gloomier because of the burst of the housing bubble and the global financial crisis.

4.2.3 The formula to update the tariff to be paid to the concessionaire

In the concessions of the first phase, the formula for the yearly update of the tariff P_A to be paid to the concessionaire was:

$$I = 0{,}75 + 0{,}25\ CPI_n/CPI_0$$

Therefore, only 25% of the revenues were indexed to inflation. This raised a lot of complaints by the concessionaires. They claim that the percentage of variables costs is much higher than 25%.

In the second and third phases of the program, this formula was changed to:

$$I = 0{,}58 + 0{,}42\ CPI_n/CPI_0$$

which means that the percentage of costs indexed to inflation increased from 25% to 42%.

The formula to index P_B to the inflation is different but its impact on the concessionaire's revenue is very low.

Therefore, the concessionaires assumes the risk of potential increases of some costs that are not under their control but that have a great potential impact on their profits. In wastewater treatment plants, electricity cost has a great influence because it represents roughly 30%-40% of the total operating cost. In Spain, electricity cost has escalated in the past few years—it has increased by 65% in from 2006 to 2013 because of the liberalization of the electricity market (INE, 2014). However, the formula established in the terms of reference for the yearly update of the tariffs to be paid to the concessionaires does not reflect it. The concessionaires claim that the sharp increase of electricity costs is an unforeseeable risk and its consequences have to be assumed by the public sector. However, the public sector argues that the terms of reference of the concession tenders established that this risk was assumed by the private sector.

4.3 Operating and availability risk

The regional government has transferred this risk to the concessionaire through two ways:

1) If the plant interrupts its functioning the concessionaire is penalized.
2) The public body in charge of supervising the operation of the plants controls every week the quality of the water that comes out of the plant. If it does not meet the standards set in the terms of reference of the concession tender, the concessionaire is penalized.

5. Outcome of the program and discussion of some relevant issues regarding its implementation

As of mid-2014, the regional government of Aragon had managed to build 102 wastewater treatment plants and 14 more plants were under construction (out of 131 initially planned). However, there were long delays in all cases, most notably in the projects of the first phase. The terms of reference established a period of 18 months between the sign of the contract and the entering in operation. But most projects have experienced delays that are in the range of 40%-50% of this period. Two concession contracts (out of 13) were terminated by mutual agreement and another one was renegotiated (but the plants were built and in operation).

As of mid-2014, the outcome of each phase of the program is as follows:

- Phase 1. All projects have been built, but one of the contracts has been renegotiated because the municipality did not build some main sewers it was supposed to build.

- Phase 2. One of the contracts, which involved only one big plant, has not been built and was terminated by mutual agreement. The main reasons were: 1) Some problems with the foundations; it was not clear who should assumed that risk; 2) The plant had to be built for 133,000 equivalent inhabitants but the government realized that the projections of population's evolution were too optimistic and that it was enough to design the plant for 70,000 equivalent inhabitants.

- Phase 3. As of mid-2014, all projects of one of the contracts have already been built. The projects of another contract are under construction. And the third contract of this phase was terminated by mutual agreement in January 2002. The main reason was that the concessionaire did not get the financing for the projects. This contract has been divided into three smaller contracts. One of them has already been put out for bidding and the two others will be shortly.

The PPP program implemented by the regional government of Aragon to build and operate wastewater treatment plants basically followed the standard procedure that has been common in Spain for toll roads, field in which this country has an extensive experience. This helps explain how the government managed construction risk and allocated demand risk. According to the representatives of the public sector interviewed for this research, an additional reason for transferring demand risk to the private sector was to make sure that the PPP program abided by the EU regulations in order to be considered an off-balance operation for the public sector.

According to the interviews conducted for this research, the rush in implementing the program led to establishing excessively short periods of time for some tasks, like getting the lands available (four months), elaboration of the construction designs by the concessionaires (two months), and the supervision of each construction design by the regional government (1 month).The regional government wanted to build many plants in little time. On the one hand, they wanted to comply with the European Union regulation that made it compulsory by December 2005 to treat wastewater in all municipalities that had over 2,000 equivalent inhabitants. On the other hand, for political reasons—it was a way of getting votes in the following regional and local elections.

The private sector showed a lot of interest in participating in the PPP program and the competition for the projects was high. The number of bidders for each contract was between 13 and 18 in the first phase, between 16 and 19 in the second phase, and between 10 and 13 in the third phase. Most consortiums included companies with extensive experience in wastewater treatment, many of them big companies operating at national and international level. Some consortiums also included small local companies.

Arguably, the private companies were willing to assume demand risk and to make aggressive bids for various reasons. First, in the period 2005-2007 it was still easy to get financing for the projects, in most cases with low interest rates. Second, among Spanish companies of construction and utilities sectors, there is a long tradition of submitting aggressive bids in order to win the contract with the expectation of future renegotiations. Third, in those years there was a feeling of general enthusiasm in Spain because of the booming economic situation and all companies were willing to compete in order to expand their business.

In most cases, it was relatively easy to get financing for the projects. All projects were financed through project finance although the banks asked for recourse to the sponsors until the plants were in operation and had all authorizations. Most of the projects were financed before the global financial crisis. Therefore, most of the concessionaires got the financing in a period of

time usual for project finance (10-12 months). Debt was around 75% of the initial investment in most cases and the spread over Euribor was around 100 basis points. However, in some cases, this spread increased sharply up to 300 basis points because of delays in payments to the banks (it was so established in the clauses of the financing). Two of the three contracts of the third phase have not been able to get external financing (debt). One of them has been financed entirely with resources provided by the sponsors in the form of equity and the other one was cancelled. The three contracts of the third phase were awarded in November 2008 when the global financial crisis had already started.

As of mid-2014, almost all concessionaires were experiencing poor financial performance. It was not possible to get data about the profits or losses of the concessionaires. But all representatives of the concessionaires interviewed for this research claimed that they were obtaining an extremely low profitability or even losing money. Moreover, they don´t expect the profitability to increase over the period of the concession because the flows are not expected to increase significantly. The reason of this poor economic performance is that they won the concession estimating a very modest profitability (because of the high competition). And the revenue turned out to be lower than expected and some costs significantly higher than expected. Some concessionaires also claim that the investment cost was higher than estimated because the mentioned delays increased overhead costs.

6. Conclusions

Between 2005 and 2014, the regional government of Aragon managed to build 102 wastewater treatment plants and 14 more plants were under construction as of mid-2014 (out of 131 initially planned). However, the implementation of this PPP program was somehow problematic. Most of the projects experienced significant delays, in many cases up to 40-50% of the period established from the contract signature until entering in operation. Furthermore, two concession contracts (out of 11) were terminated by mutual agreement and another one was renegotiated (but the plants were built and in operation).

Our analysis shows that an inadequate management of construction risk was a relevant cause for the delays in building the plants. The main reasons for the delays were problems in having the lands available. The experience of this program, particularly in the projects of the first phase, shows that the regional government, not the municipalities, should have been in charge of getting the lands available, and that the expropriation procedure should have been used from the beginning. Another source of delays in building the plants was the difficulty in getting all permits and authorizations for the construction and the entering in operation. The concessionaires were in charge of this task and they had to deal with many public bodies at local, regional and national level. The involvement of so many public bodies and their lack of coordination further increased the complexity and made time delays more likely.

The paper also shows that an inadequate transfer of revenue risk has led to a poor financial performance of the concessionaires. In this concession program revenue risk had two components: demand risk and the formula to update the tariff annually. Theoretically risks should be allocated to the part best able to manage it. However, in these projects demand risk was transferred to the concessionaires although they can do nothing in terms of demand management--the volume of flows coming to the plants cannot be influenced in any way by the concessionaires.

In this program demand risk was mitigated since the payment scheme allowed the concessionaire to get roughly 95% of their estimated revenue with a relatively low flow in the

plants. This is something that has been found in other studies analyzing PPPs for transport infrastructure in Spain, particularly light rail (Carpintero and Petersen, 2013). The public sector mitigates demand risk mostly by very attractive calculation models for the private partner which essentially assure the private partner a high proportion of the forecast revenue even with low demand. The paper illustrates the mitigation of demand risk makes much easier to have high competition for the contracts and makes much more difficult to have severe financial problems in the concessionaires. A counterexample of this is the case of many Spanish toll roads awarded between 1996 and 2003, most of which are in an extremely bad financial situation because of the lack of traffic (Vassallo et al., 2011). But the problem of mitigating demand risk is that it involves a contingent liability for the public sector that can be very relevant.

The other source of revenue risk in this program was the formula to annually update the tariffs to be paid to the concessionaire. This formula establishes that only part of the tariff (between 25% and 45%, depending on the projects) is updated annually linked to inflation rate. However, some costs—particularly electricity cost, which represents 30%-40% of the total operating costs—have escalated in the first years of operation. This has also contributed to the poor financial performance of the concessionaires.

A major argument for utilizing the PPP model over traditional procurement methods is the prospects of minimizing time delays and cost overruns. The findings in this study, however, illustrate that time delays were significant in these PPP projects and that this was mainly due to an inadequate management and transfer of key risks in the projects. The 131 PPPs for waste water treatment constitutes one of the largest bundles of PPPs examined in international PPP research, though the empirical context is limited to one region in Spain. Further studies including other services and countries are warranted to broaden our knowledge on time delivery and risk transfer and management in PPPs.

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Appendix. List of Interviews

1. AngelCajigas, General Manager, Asociación Técnica para el Tratamiento del Agua (ATTA), September 30, 2013.
2. Luis de Lope, Managing Director, Aqualia (FCC), October 22, 2013.
3. Oscar Peláez, Project Manager, International & Concessions Department, Aqualia (FCC), October 22, 2013.
4. Javier Carpintero, General Manager, iConKrete, former CEO of Grupo Ortiz, February 25, 2014.
5. Jose Antonio Martinez, Jefe de Área de Coordinación y Seguimiento de Planes, Instituto Aragonés del Agua, Gobierno de Aragón, March 12, 2014.
6. Alberto Cobelo, Director de Infraestructuras, SARGA, Gobierno de Aragón, March 12, 2014.
7. Javier Fernández González, Manager, InstitutionalBanking, La Caixa, March 20, 2014.
8. Miguel Angel Fernández, General Manager, TEDAGUA, April 14, 2014 (telephoneconversation)
9. Luis Rein, CEO Power Concessions, Isolux Infrastructure, April 23, 2014 (telephoneconversation)
10. Manuel Ros, Technical Manager, Elecnor Concesiones, April 25, 2014.
11. Luis Miguel López-Mier, ConstructionDepartment Manager, Acciona Agua,April 29, 2014.(telephoneconversation)
12. Abdón Acevedo, General Manager, SOCAMEX (Grupo Urbaser), May 19.
13. Juan Luis Recio, Concessions Director, SOCAMEX (Grupo Urbaser), May 19.