

# Case Studies



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## BELGIUM

# Brabo I Light Rail



## OVERVIEW

### Location

Antwerp, Belgium

### Sector

Transport – Rail

### Procuring Authorities

Agentschap Wegen en Verkeer (AWV, the Flemish Road Agency) and De Lijn (the Flemish public transport company)

### Project Company

Project Brabo 1 NV

### Project Company Obligations

Design, Build, Finance and Maintain

### Financial Close

8 August 2009

### Capital Value

€ 178 million (USD \$254 million – 2009 exchange rate)

### Contract Duration

38 years (with the Flemish Road Agency),  
28 years (with De Lijn)

### Key Events

Scope change, refinancing, revocation of construction permit

## SUMMARY

Brabo 1 Light Rail is the first PPP project for public transport in Flanders, Belgium. The project was procured by two Procuring Authorities under two separate contracts: 1) a contract for the extension of the existing light rail network and a substantial tram maintenance depot; and 2) a contract for the comprehensive renewal of associated road infrastructure. The Project Company, Project Brabo 1 NV, is responsible for the design, construction, financing and maintenance of the project, which is based on availability and performance-based payments. The project was delivered without delay and, during its five years of operation, the most significant events were the refinancing in March 2016, revocation of the Project Company's construction permit in 2011 and challenges related to the interface of the project with a separate newly constructed part of the light rail network. In general, the project is perceived as a success by both Procuring Authorities.

The project has a bespoke financing structure associated with the earliest Belgium PPPs, where the Procuring Authorities have a shareholding in the Project Company. One of the two Procuring Authorities, De Lijn, invested in 24% of the Project Company's shares at financial close in 2009 through its investment company Lijninvest N.V., which was set up in 2007. The second bespoke feature of the project is that it includes a separate design, build, finance contract with the City of Antwerp related to the renewals

of the road infrastructure within the municipality. The City of Antwerp was primarily involved during construction, and at construction completion, the milestone payment from the City of Antwerp was used to repay the short-term finance raised by the Project Company. The City of Antwerp also has an obligation to make quarterly contributions for specific maintenance services during the operations phase.

### SUMMARY LESSONS LEARNED

- Contemplating known changes to the scope of work early (even where the costs are not known) makes it helpful to manage once the costs become known.
- Poor document control management can slow down and create inefficiencies during transition periods.
- Inadequate timing for approvals of change orders may lead to delays and create tension in the relationship between the Project Company and the Procuring Authority.
- Building on relationships with all relevant stakeholders can assist in managing issues with permitting in an efficient manner.
- The Project Company may need time to adjust into the operations phase and become fully compliant with its operational KPIs.
- Failure to meet KPIs may require proactive management from both parties to resolve the cause of non-compliance.
- Creating a working group and appointing a financial advisor during a refinancing can assist the Procuring Authority to attain a positive outcome from a refinancing of the Project Company.

### PROJECT INCEPTION

#### Goals and Objectives of the Partnership

In August 2007, the government body responsible for the delivery of the Antwerp Mobility Plan, Beheersmaatschappij Antwerpen Mobiel, launched the tender for the project. The scope of the project consists of 7km of light rail infrastructure in the eastern part of the City of Antwerp and a large tram maintenance depot for 53 trams in Wijnegem, as well as the comprehensive renewal of associated street infrastructure. The aim of the project is to facilitate the connection from the city centre to remote municipalities, in order to reduce the number of cars in the city by improving connectivity and promoting public transport. The project is part of the Antwerp Mobility Plan which was initiated in 2003, consisting of several improvement projects with the aim that, by 2020, half of all journeys in the region were to be made by public transport, bicycle or on foot.

Though the procurement was led by Beheersmaatschappij Antwerpen Mobiel, in May 2009, the Project Company

entered into the two contracts (here collectively referred to as the PPP contract) with the Flemish Road Agency and the Flemish public transport company, De Lijn. The first contract period is 28 years, including three years of construction with the possibility of an extension of 10 more years in relation to the rail network extension and maintenance depot with De Lijn. The second contract period is 38 years, including three years of construction for the renewal of the associated street infrastructure with the Flemish Road Agency.

With construction works to be carried out within a specified time period and within a constrained urban area, the Procuring Authorities' rationale for this ambitious scope was to keep responsibilities in the hands of one party and allow for the allocation of interface risks to the private sector, creating an incentive to manage them adequately. The main advantages were accountability, value for money and nuisance mitigation.

#### The Economic and Political Environment during Inception

At the time of writing this case study, the successes of projects like Brussels Airport Rail Link PPP and Brabo 1 Light Rail PPP have developed into a well-established procurement method for numerous infrastructure projects, which subsequently followed. The project reached financial close during the Global Financial Crisis, in the third quarter of 2009. At that time, there was no policy commitment to PPPs within the central government. The rationale for using the PPP model for infrastructure projects was developed by individual Procuring Authorities on a project-by-project basis.

The economic environment at the time of financial close made it very difficult for the project sponsors to arrange a long-term debt facility. As such, the project was financially closed and subsequently constructed under a 10-year loan tenor. As a consequence, the project had to be refinanced within the contract period. The Flemish Government also assisted the Project Company in mitigating against this refinancing risk by guaranteeing access to finance after five to ten years, in the event commercial refinancing was not possible at appropriate pricing.

### MANAGEMENT OF THE PPP CONTRACT

In order to understand the complexity of this project, it is important to realise that the project has two Procuring Authorities. The first Procuring Authority is De Lijn, which is responsible for the rail infrastructure and the exploitation of public transport within Antwerp and Flanders in general. The other Procuring Authority is the Flemish Road Agency, which is responsible for the provincial infrastructure connecting the different municipalities in Flanders. The final relevant government body is the City of Antwerp, which is responsible for the infrastructure of the city (streets and pavements).

During the tender process, De Lijn took the lead. In combination with the Flemish Road Agency and the City of Antwerp, a steering board was created to represent their joint interests during the construction phase. De Lijn also became involved in the Project Company as an equity investor with 24% of the Project Company's shareholding.

### Construction Phase

Other than an issue with the construction permit, the construction period progressed without significant issues. The key construction contractors during the construction period were Heijmans for the road infrastructure, Franki for the tram depot and Frateur de Pourcq for the rail infrastructure.

One issue that occurred during construction was a situation in which the Project Company's construction permit was revoked on 15 May 2011 because of public objections to the proposed developments. On 27 September 2011, a new permit was issued with some additional conditions. The equity position of De Lijn proved beneficial when the approval was revoked by the court. Together with the private equity investors in the Project Company, De Lijn worked as a partner to resolve the issue. Although construction works were suspended on the light rail section affected by the revoked permit, other works subject to different permits continued. In the end, the delay of four months did not have any material impact on the overall completion and timing of the project.

The project's construction progress was monitored by an independent certifier until completion was achieved.

### Operations Phase

Transition from construction to operations was challenging due to the loss of knowledge on the public sector side and difficulties associated with accessing data and information from the construction period. According to the Procuring Authority, a better document management system could have prevented this.

The key operations contractors are Heijmans, Franki and Frateur de Pourcq. The operations and maintenance activities are carried out in line with the operational model that was based on the financial model agreed at financial close. The Procuring Authority has access to the operational model in order to review it on an annual basis and check the actual maintenance expenditure is recorded correctly and in line with the forecasts.

The overall operational performance of the project has been good and there have been minimal deductions to date. Failures are minor and there have been no critical issues for the purposes of the KPIs. There was an issue with excessive noise due to the use of the light rail. The mitigation, however, was proactively managed by both parties. Data was collected during noisy periods and

appropriate mitigations (such as adding a lubrication installation on the tracks) were developed and implemented.

### Performance Monitoring and KPIs

Within the project, the KPIs agreed upon were overall considered to be relatively generic compared to other similar projects. The KPIs are divided into critical (24 hours to remedy, always a penalty) and non-critical (more remedial time, only a penalty after not meeting remedial deadline).

Due to the generic nature of the identified KPIs, the Procuring Authority and Project Company had more discussions about the intention and applicability of payment deductions in the initial years of the operations period. However, after two years, an operational understanding of KPIs was developed and a working solution was found by both parties. The Project Company uses software to monitor KPIs, to which the Procuring Authority has no access. The Procuring Authority reviews and validates performance failures and payment deductions recorded in the Project Company's quarterly reports and through their own data.

### Change Management

The protocol for change orders is prescribed in the PPP contract and the change procedure itself is considered well-defined and robust. However, the timelines for reviews and approvals are considered too tight.

In total, the project has been subject to several variations during operations to date (most of which were minor). One variation, however, was a key event related to rail interfaces and it is discussed in detail below under the heading "Key Events".

With regard to the changes noted, the total number is considered low for a project of this size. Most of the changes were requested by the Procuring Authority.

### ROLE OF GOVERNMENT

The roles of the Procuring Authorities differ depending on the Procuring Authorities' and other relevant government bodies' interests and jurisdictions in the project. During the construction phase, De Lijn took the lead in the relationship with the Project Company, whereas the Flemish Road Agency's interests are represented through the steering board which oversees the entire project. This board consists of two members from De Lijn, two members from Beheersmaatschappij Antwerpen Mobiel and five members from the Project Company. Beheersmaatschappij Antwerpen Mobiel and De Lijn have both been equity investors since 2009.

For the contract with De Lijn, operational issues are addressed during contract management meetings held quarterly between De Lijn, the Flemish Road Agency and the Project Company. In the event that operational issues need

to be escalated, a steering board meeting between all the shareholders on both the Procuring Authorities' and Project Company's side becomes the relevant forum. In addition, De Lijn also runs a quarterly internal steering committee meeting for all De Lijns' PPP projects, where matters of high importance are discussed on a project level, as well as an overall portfolio level.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

The relationship between the Project Company and the Procuring Authorities is good. To date, there have been no significant disagreements or disputes.

During the operations phase, the Project Company receives a unitary payment based on the availability and performance standards from the Procuring Authorities, which is subject to payment deductions. The financial relationship with the City of Antwerp was based on a milestone payment once the construction was completed. Additional to the availability payments, the Procuring Authorities contribute to maintenance costs specified in the contract.

### Team Set-Up and Staffing

During the operations phase, De Lijn has one contract manager and two technical staff.

### Communications

During construction, the parties used a SharePoint to manage documents and data. Its use during the operations phase was limited to management activities, such as financial and corporate reports, and monitoring.

The meetings during the operations phase are performed on several levels. As needed, technical people meet to discuss daily issues of a technical nature. Contract managers from the Procuring Authorities and the Project Company meet quarterly to discuss commercial matters, such as KPIs, performance failures, etc. Also, on a quarterly basis, the shareholders from the Procuring Authorities and Project Company meet at a steering board level to deal with any escalated issues as applicable. Overall, the frequency of meetings is considered adequate.

Although performed on a regular basis, audits of the project's performance are not published.

## KEY EVENTS

### Change Order

There was one major change order, which was anticipated at financial close. The value of the change was estimated at € 2 million. Because of the expansion of the light rail network of Antwerp, some technical changes to the existing

network had to be accommodated, to allow for interfaces with the newly constructed parts of the network. As a result of this change, the use of the rail infrastructure built within the scope of this project has also increased.

The costs associated with the change were borne by the Procuring Authorities and consisted of a fixed investment part to cover the capital cost of the change, whereas the increased maintenance costs are paid through higher availability payments. The amount of this payment was subject to commercial negotiations.

The key issue was based on higher usage than anticipated, which would lead to more wear and tear and increased maintenance costs. This change, however, was anticipated in the contract drafting but at financial close it was not possible to devise a formula which would estimate the impact on the asset condition and forecast the costs needed to provide additional maintenance.

This issue was therefore managed by increased (independent) monitoring to assess the asset deterioration due to the increased frequency of use. The higher than anticipated usage will then be quantified, which may result in agreement between the parties on the value of the availability payment.

### Refinancing of Senior Debt

Another key issue was the refinancing of senior debt. Due to the financial crisis at the time, the Project Company did not succeed in raising long term debt financing at financial close. As a result, a refinancing was completed in 2016 and new debt was raised for the remainder of the contract period.

De Lijn took the lead in the refinancing, as part of the overall refinancing that it was leading across its portfolio of projects. De Lijn and the Project Company created a working group for the refinancing and hired an external financial advisor. The equity position of De Lijn was particularly beneficial during the refinancing in terms of sharing risk and the project was also joined by a new lender. It took eight months to refinance.

## LESSONS LEARNED

### Contemplating known changes to the scope of work early (even where the costs are not known) makes it helpful to manage once the costs become known.

Although an increased use of the rail infrastructure and different rolling stock was anticipated at financial close, there was no relevant data available to forecast the costs associated with increased maintenance. The fact that the contract provided an option to allow for increased use made it possible to devise a formula later, which would, through carefully designed monitoring of asset deterioration, estimate the impact on the asset condition and forecast the amount of additional costs needed to provide additional maintenance. As such, there were no significant issues

related to the payment mechanism when the project scope was linked to the wider light rail network of Antwerp and some sections of the project were subject to greater usage and therefore more maintenance. The joint efforts of both De Lijn and the Project Company to assess the financial impact were perceived as exemplar by De Lijn.

**Poor document control management can slow down and create inefficiencies during transition periods.**

The transition from construction to operations was perceived as challenging by the Procuring Authorities due to staff turnover and an inadequate document control system. This made the transition slow and inefficient. It is therefore of critical importance that a document and information management system is carefully designed, adopted from financial close and continuously and consistently used throughout the contract duration.

**Inadequate timing for approvals of change orders may lead to delays and create tension in the relationship between the Project Company and the Procuring Authority.**

The protocol for change orders is prescribed in the PPP contract and the change procedure itself is considered well defined and robust. However, the timelines for reviews and approvals are considered too tight. Inadequate timings may lead to delays and create tension in the relationship between the Project Company and the Procuring Authority. A workable solution acceptable by both parties is needed as soon as the protocol for change orders is found to be deficient. This should preferably be agreed to before the contract is signed.

**Building on relationships with all relevant stakeholders can assist in managing issues with permitting in an efficient manner.**

One issue that occurred during construction was a situation in which the Project Company's construction permit was revoked because of public objections to the proposed developments. A new permit was, however, issued a few months later. Together with the Project Company, De Lijn worked as a partner to resolve the issue. Although construction works were suspended on the part of the light rail section affected by the revoked permit, other works subject to different permits continued. In the end, the delay of four months did not have any material impact on the overall completion and timing of the project.

**The Project Company may need time to adjust into the operations phase and become fully compliant with its operational KPIs.**

As a result of the generic nature of the identified KPIs, the Procuring Authority and Project Company had more discussions about the intention and applicability of payment deductions in the initial years of the operations period.

However, after two years, an operational understanding of KPIs was developed and a working solution was found by both parties.

**Failure to meet KPIs may require proactive management from both parties to resolve the cause of non-compliance.**

The overall operational performance of the project has been good and there have been minimal deductions to date. Failures are minor and there have been no critical issues for the purposes of the KPIs. There was an issue with excessive noise due to the use of the light rail. The mitigation, however, was proactively managed by both parties. Data was collected during noisy periods and appropriate mitigations were developed and implemented.

**Creating a working group and appointing a financial advisor during a refinancing can assist the Procuring Authority to attain a positive outcome from a refinancing of the Project Company.**

Due to the financial crisis at the time of financial close, the Project Company did not succeed in raising long term debt financing. As a result, a refinancing was completed in 2016 and new debt was raised for the remainder of the contract period.

De Lijn took the lead in the refinancing as part of the overall refinancing that they were leading across its portfolio of projects. De Lijn and the Project Company created a working group for the refinancing and hired an external financial advisor. The refinancing took eight months to complete.

## BRAZIL

# Hydropower Plant



*Stock image from Turner and Townsend*

## OVERVIEW

### Location

Brazil

### Sector

Energy – Power Generation

### Procuring Authority

Agência Nacional de Energia Elétrica  
(ANEEL, the Brazilian Electricity Regulatory Agency)

### Project Company Obligations

Build, Operate and Transfer

### Financial Close

Between 2005 and 2010

### Capital Value

Above BRL 500 million  
(about USD \$250 million – exchange rate  
at the time of financial close)

### Contract Duration

35 years

### Key Events

Delays in start of construction due  
to environmental licensing challenges

## SUMMARY

The Procuring Authority signed a PPP contract with the Project Company for this hydropower project in the early 2000s. However, due to challenges faced by the Project Company in securing the permits needed for construction, the project did not reach financial close until five years later. The plant has a generating capacity of above 70 MW. As per the PPP contract, the Project Company built the plant with the right to operate it until the expiry of the PPP contract, with a provision to extend the operational timeframe, before transferring the asset to the government.

This project was one of the early energy generation PPPs awarded in Brazil. The construction was delayed due to difficulties in obtaining environmental permits. The Procuring Authority consequently allowed, through a renegotiation of the PPP contract, additional time for the Project Company to complete construction. The lessons learned from this early hydropower PPP project and other projects awarded at the same time have been incorporated in the later Brazilian energy PPP contracts.

## SUMMARY LESSONS LEARNED

- Where there is a significant risk that the Project Company is not able to obtain the necessary licences, the Procuring Authority should have plans in place on how to handle resulting delays.

- Where approval is needed from an external body, such as an environmental regulator, it is advantageous to engage with that body as early as possible, preferably before financial close.
- A clear understanding of the Project Company's financial performance is important for effective management of the operations phase.
- Policies to reduce demand risk on Project Companies can provide a more sustainable investment environment for PPPs and increased private sector participation.
- Public perception of environmentally sensitive projects, such as hydropower plants in Brazil, can impact the long-term success of the sector.
- In a liberalised market, policies can be put in place to incentivise continuous innovation in energy efficiency from the private sector.
- Having a Procuring Authority contract management team that sits across several contracts can increase efficiencies.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The project was part of a wider programme of adding 2,607 MW to the generation capacity in Brazil. The projects awarded so far are expected to generate BRL 3.9 billion (USD \$2 billion) of revenue for the Brazilian government over their contract life. With an estimated total investment of BRL 4.8 billion (USD \$2.4 billion), the hydroelectric plants were built in ten States spread across five Brazilian regions: Rio de Janeiro, Minas Gerais, Santa Catarina, Paraná, Tocantins, Goiás, Rio Grande do Sul, Bahia, Mato Grosso and Pará, benefiting a population of about 19 million.

### The Economic and Political Environment during Inception

In the early 2000s, there was a big push from the Brazilian government to increase the generation capacity of its energy infrastructure. Coupled with new reform policies being introduced in the country, foreign investors became more confident about their investments in Brazil. The new government's reforms assisted in increasing the country's GDP, and as a result, more foreign investments started to flow into the country as it became an attractive emerging market.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

The Project Company has responsibility for the full design and construction of the asset, according to the specifications set out in the PPP contract. In addition

to the Procuring Authority's specifications, the Grid Operator, Operador Nacional do Sistema Elétrico, has its own requirements for the Project Company to meet.

The Procuring Authority only approves the compliance of the basic design with the specifications of the PPP contract, and is not responsible for securing the required construction permits for the Project Company. Acquiring the necessary permits, such as the environmental licences, caused delays for the Project Company, which are described in further detail under the heading 'Key Events' below.

Once construction began on the project, it proceeded smoothly and was completed about two years after financial close.

The Grid Operator had further specifications which the Project Company also had to meet. These are designed to protect the grid from damage, facilitate a smooth integration of the plant into the grid and guarantee safe operation during the operations phase, and the Grid Operator was therefore also involved in the commissioning of the project. After the approval of the Grid Operator was reported to the Procuring Authority, permission for the project to enter operations was given.

### Operations Phase

Since the start of operations, no major challenges have been faced during the operations phase. There is no power purchase agreement (PPA) or other offtake agreement with the Procuring Authority, and the Project Company is therefore responsible to sell the energy generated freely in the market (e.g. to large industrial consumers) to generate revenue. This arrangement led to a lack of revenue certainty for the Project Company, as it was relying on a small number of contracts with large industrial users. In later contracts, the Procuring Authority has introduced a clause which specifies the percentage of energy to be sold to regulated utility providers through PPAs, which increased the revenue certainty for the Project Companies.

### Performance Monitoring and KPIs

Other than during testing and commissioning, the Procuring Authority did not closely monitor performance during the construction phase. The PPP contract set key milestones that the Project Company was required to achieve, which were:

- Obtaining environmental licences;
- Start of construction;
- River flow detour;
- Start of electromechanical assembly
- Start of commissioning
- Start of commercial operation

Failure to achieve the milestones can result in payments due to the Procuring Authority, the liability for which is guaranteed by a performance bond provided by the Project Company. If there are any issues or failure in meeting the milestones, the Procuring Authority could undertake site visits to investigate the causes.

The Procuring Authority's role in the monitoring of the project reduces after the testing and commissioning phase is completed. When the power plant entered into service, the Grid Operator took over the performance monitoring of the Project Company from the Procuring Authority. The operations are monitored in real time and the associated performance monitoring reports are made available on the public domain. The Procuring Authority continues to be responsible during the operations phase for the monitoring of the Project Company's compliance with the contract terms and any breaches could lead to liabilities for the Project Company for agreed compensation payable to the Procuring Authority.

### Payment Mechanisms

The Project Company has no access to revenue prior to completion of construction and availability of the asset, so no payment mechanism is set for the construction period.

The Project Company's winning bid for the project was significantly above the set minimum bid of about BRL 300,000. The investment fee payable to the Procuring Authority of approximately BRL 2 million is broken down into annual fees, adjusted for inflation, which are paid in monthly instalments. In addition to the investment fees paid to the Procuring Authority, the Project Company is required to pay usage fees to transmission line operators to connect to the grid. The PPP contract allowed for these fees to be reduced if the generation drops below 30GW, which has occurred a number of times on the project.

Although not specific to the PPP contract, it is important to highlight some additional fees/taxes that the Project Company is required to pay. All PPP contracts in Brazil are required to pay taxes that are dedicated to fund the Procuring Authority's operations in regulating and inspecting the market. In addition, there is a "wire-charge" mechanism, where all Project Companies are required to set up a fund where one percent of their annual revenue is deposited. This fund is then used to pay for investments in energy efficiency and Research and Development (R&D).

The management of the fund is the responsibility of the Project Company. However, proof of the deposits is required to be presented to the Procuring Authority, and all R&D or efficiency projects carried out by the fund are submitted to the Procuring Authority for review. If it is found that the projects do not meet the Procuring Authority's requirements of what counts as R&D, the Project Company will have to reinvest the money spent.

### Project Company Change of Ownership

The Project Company went through a variety of changes in ownership guided by changes in the equity investors' legal structure and ownership. The changes had to be reviewed and approved by the Procuring Authority. The Procuring Authority does not believe they had a detrimental impact on the performance of the Project Company. When granting its approval for a change of ownership in the Project Company, the Procuring Authority's main concern was to ensure that the new equity investors were financially stable and technically capable to continue the operations of the project.

## ROLE OF GOVERNMENT

### Facilitating Access to Low Interest Financing

Since the 1940s, the Brazilian government has been supporting local development by providing flexible financing to developers. The main development bank in Brazil is the National Bank for Social and Economic Development (BNDES) which was founded in 1952. It offers loans at more favourable rates than commercial lenders.

The senior debt loan for the project was provided by BNDES. As BNDES is willing to take on more risk than private commercial banks, its financing solutions provided better and more attractive interest rates. The solutions provided by the bank made the project commercially feasible for the Project Company.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

### Team Set-Up and Staffing

The Procuring Authority generation team is a large team within the organisation, responsible for 200 large (greater than 30 MW) and 1,000 small hydropower projects. There are 40 people dedicated to administering the contracts and managing events such as changes and renegotiations, as well as 50 staff responsible for routine monitoring and operations. The Procuring Authority's team manages all contracts, and no dedicated teams are established for each individual project. The Procuring Authority believes it is adequately staffed, given its responsibilities.

### Training and Development

There is an annual training programme provided by the Procuring Authority to all its employees upon joining the organisation. The programme covers a wide range of skills considered key to successful management of PPP contracts. Thereafter, individual offices provide their own training programmes designed in line with specific staff requirements. These training programmes can be delivered either by experienced internal staff or by external training providers. Quite often, seminars, workshops and dedicated

courses are provided by international market leaders and institutions such as the Council on Large Electric Systems (Cigré), universities and equipment producers.

The Procuring Authority does not use a contract management manual. The required contract management skills are typically developed from on-the-job training and from experience and knowledge gained from completed and ongoing projects and academic publications.

### Communications

The relationship between the Procuring Authority and the Project Company is seen as transparent. The Procuring Authority recognises the importance of a good relationship with the Project Company and its positive effect on the success of the project. It was noted that transparency allows the Procuring Authority to help solve challenges faced by the Project Company.

The official communication between the parties is done through formal letters. However, more recently the Procuring Authority has introduced regular quarterly management meetings with Project Companies on all large contracts.

### KEY EVENTS

#### Delays in environmental permitting

The project faced significant delays due to environmental permitting. Delays to the start of construction, often for more than a year, were a major issue faced by many of the hydropower plants procured at the same time as this hydropower project. At this time, the Procuring Authority did not require an environmental assessment to be submitted with the bid, and the Project Company in question would find it difficult to get the required environmental licence in the time allowed after the contract award.

The licensing process is rigorous and requires significant research, and the requirements from the environment agencies also varied between national and state governments and from state to state. Additionally, as environmental permitting did not commence prior to signing of the PPP contract, the first time the licensing body saw the proposed design was when the Project Company submitted its application, after contract signature. This procedure increased the risk of delays, and a number of power plants were cancelled entirely. In this project, the PPP contract was not terminated, and the Project Company was given the additional time needed to obtain the required licences.

### LESSONS LEARNED

**Where there is a significant risk that the Project Company is not able to obtain the necessary licences, the Procuring Authority should have plans in place on how to handle resulting delays.**

It is common for energy generation plants in Brazil to encounter difficulties in obtaining the necessary permits or licences. If this risk has been transferred to the Project Company, the Procuring Authority needs to have a plan in place for managing the impacts of the delay, in particular, when it is due to factors outside the Project Company's control.

**Where approval is needed from an external body, such as an environmental regulator, it is advantageous to engage with that body as early as possible, preferably before financial close.**

Environmental licensing is a common challenge for project companies in Brazilian energy PPP projects. On the projects awarded at a similar time to this hydropower PPP contract award, five out of ten awarded projects failed to start construction and were subsequently terminated. To address this, the Procuring Authority has updated its procedures to require that the first of three stages of the environmental approval process is completed before the project is awarded. The new procedure is summarised below:

- The first stage is a design competition. Designers submit concept designs to the Procuring Authority, along with supporting environmental and social impact assessments;
- These concept designs are passed to the environmental regulator. The regulator's response states whether the project is feasible or not from an environmental point of view;
- If the regulator agrees that the concept design is feasible, the design receives the Procuring Authority's approval and the approved design goes ahead to procurement;
- If the regulator states that the concept design is not feasible, the designer is given an opportunity to submit re-designs addressing the issues of non-compliance and the procedure starts again;
- The second stage is the auctioning of the approved design. Bidders assess the proposed project design and submit their bids to obtain the right to build and operate the project and sell the generated energy. One of the bidders might include the original designer of the approved design but not necessarily. In the case the original designer is not part of the winning bid, the winning bidder is then required to reimburse the costs of the design development.

- Once the procurement phase is complete, the Project Company is still responsible for going through the remaining two stages of the environmental licensing process and the Project Company covers the costs associated with such environmental licensing.

**A clear understanding of the Project Company's financial performance is important for effective management of the operations phase.**

It was highlighted that the Procuring Authority did not have a clear view on the Project Company's financial performance. It was not clearly understood what the reasons were for the changes of ownership other than it was due to legal restructuring. Not having a clear view of the financial health and performance of the Project Company can put the Procuring Authority at risk of sudden insolvency of the Project Company.

Currently, the Procuring Authority is planning to include regular financial monitoring of the Project Company's performance in its remit. This will give the Procuring Authority the ability to assess the Project Company's financial difficulties and place itself in a position where it can better manage them.

**Policies to reduce demand risk on Project Companies can provide a more sustainable investment environment for PPPs and increased private sector participation.**

On early Brazilian PPP generation contracts, the Project Company was responsible for securing contracts to supply end users with electricity. This model did not provide high revenue certainty for the private sector as the market for large end-user contracts is not easy to forecast.

To remedy this issue and reduce the risk profile on Project Companies in energy PPP contracts, the Procuring Authority introduced a policy for future projects that provides a guarantee of a certain percentage of the generated energy to be bought by regulated utility providers. On new hydropower PPP projects, the Project Company signs two contracts; the first is the PPP contract, and the second is a PPA contract, which has a starting date approximately five years after the start date of the PPP contract. If the Project Company completes construction before the PPA start date, it can sell its electricity on the free market. Thus, in addition to allowing approximately five years to complete construction before the start of the PPA, this policy improved the revenue certainty for Project Companies, as regulated utility providers have more certain future demand.

**Public perception of environmentally sensitive projects, such as hydropower plants in Brazil, can impact the long-term success of the sector.**

The Procuring Authority noted that hydropower plants do not currently have a good reputation with regard to environmental impact, and that there are many stakeholders who wish to be involved in the discussions on future expansion of the sector. The Procuring Authority has responded to these concerns by improving its plans for the future development of hydropower plants, for example, by assessing what combination of plants would be a 'best fit' for a particular river and by involving environmental regulators at preliminary studies and planning for each individual project. How a central government addresses the energy needs at its national level is beyond the scope of this reference tool, however this example emphasises how stakeholder views can impact the direction and policy development of a sector.

**In a liberalised market, policies can be put in place to incentivise continuous innovation in energy efficiency from the private sector.**

The wire-charge mechanism generated substantial funds for investment in energy efficiency and research and development, which may not have occurred in a liberalised market without regulatory enforcement. The mechanism is therefore a tool that regulators can use to drive the private sector's involvement in improvement in the energy market.

**Having a Procuring Authority contract management team that sits across several contracts can increase efficiencies.**

The Procuring Authority generation team is a large team within the organisation, responsible for 200 large (greater than 30 MW) and 1,000 small hydro power projects. There are 40 people dedicated to administering the contracts and managing events such as changes and renegotiations, as well as 50 staff responsible for routine monitoring and operations. The Procuring Authority's team manages all contracts, and no dedicated teams are established for each individual project.

## BRAZIL

# Piracicaba 440/138kV Substation



## OVERVIEW

### Location

Piracicaba, Sao Paulo, Brazil

### Sector

Energy – Transmission

### Procuring Authority

Agência Nacional de Energia Elétrica, ANEEL (the Brazilian Electricity Regulatory Agency)

### Project Company

CPFL Transmissão Piracicaba S.A.

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

25 February 2013

### Capital Value

BRL \$109 million  
(USD \$53.5 million – 2013 exchange rate)

### Contract Duration

30 years

### Key Events

Delays in governmental permitting

## SUMMARY

The 440/138kV Piracicaba substation is a small facility situated in the inland region of Piracicaba in the state of Sao Paulo, Brazil, and is designed to connect 440kV high-voltage transmission lines that run through the state to the local grid. The project's entry into service was delayed due to permitting issues and, as a result, the Project Company submitted a request to extend the contract duration to take into account these delays. The Procuring Authority did not to grant an extension. The less complex contract led the Procuring Authority to recognise that smaller and less complex contracts could offer advantages in simplifying contract management.

## SUMMARY LESSONS LEARNED

- Optimising contract size and complexity is a key factor for effective contract management.
- Permitting can have a major impact on the construction duration, even for small-scale projects.
- Annual training across a programme of PPP projects can be an effective way to deliver structured training to contract management teams.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The goal of the construction of the Piracicaba substation is to connect the local grid to the national grid as part of a wider objective to improve the reliability of electricity services in Brazil. The facility is a step-down substation, meaning that it is designed to connect the 440kV high voltage transmission lines to the low voltage 138kV local grid. The substation is composed of two sectors: i) the first sector, or step, is the 440kV input lines into the substation and ii) the second sector, or step, is 138kV input lines into the local grid. As in all energy projects in Brazil, the goal of the partnership with the private sector is to further improve the reliability of the electricity grid by benefiting from the private sector expertise and transferring the construction risk to the Project Company.

### The Economic and Political Environment during Inception

The project was procured after the effects of the Global Financial Crisis had subsided, and before the economic challenges started in 2014. Brazil ended 2013 on a positive note with GDP growth exceeding economic forecasts, although the country was still suffering from mounting debt. Consequently, in mid-2014, when the global market sentiment turned against emerging markets with high external and fiscal imbalances such as Brazil, the economy experienced a steep downturn.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

Risks related to financing, design, construction and environmental permitting are generally transferred to the Project Company in Brazil, and the Procuring Authority is then responsible for monitoring the construction progress and the Project Company's performance. The Project Company took on responsibility for the design and construction of the asset according to the specifications set out in the PPP contract.

The Procuring Authority approves compliance of the design to the specifications of the PPP contract, and the Project Company is then responsible for securing the required construction permits and environmental permits to deliver the substation. The Project Company is also required to comply with the requirements of the national grid operator, Operador Nacional do Sistema Elétrico (the Grid Operator), as well as the owner of the high-voltage transmission lines.

The construction phase was agreed to be completed in 22 months, which included the time needed to obtain the required permits. However, obtaining the required permits took longer than anticipated, resulting in a 194-day delay. As a result, the Project Company incurred additional costs due to construction delays until the project entered operation.

The PPP contract has a fixed 30-year term (encompassing the construction and operations phases), and so any delays in construction reduce the length of the operations phase without an extension of time to the contract duration. In response to the delays during the construction phase, the Project Company requested that the contract duration be extended such that the operations phase remained of the length originally envisioned at commercial close. This was not accepted by the Procuring Authority, and the claim is now closed.

### Testing and Commissioning

The Grid Operator was involved in the commissioning of the substation, and was responsible for ensuring compliance by the Project Company with the Grid Operator's specifications and procedures. This is to protect the grid from damage and facilitate a smooth integration into the grid, as well as guaranteeing safe operation during the PPP contract period. The owner of the high-voltage transmission line was also involved in the testing and commissioning of the project.

No issues or disputes were faced during the testing and commissioning of the substation. The process was smooth and final approval was given by the Procuring Authority and Grid Operator to start commercial operation in July 2015.

### Operations Phase

The operations start date envisaged in the PPP contract was 25 December 2014. However, due to the delays faced in the construction phase, operation did not start until 7 July 2015. Since the start of the commercial operation of the project, no technical issues have been faced, and the Project Company has been receiving its availability payments. The Procuring Authority considers this project a success.

### Performance Monitoring and KPIs

#### Construction

The PPP contract sets key milestones that the Project Company is required to achieve. The key milestones, as set out in the PPP contract are:

- Start of Construction
- Start of Electromechanical Assembly
- Start of Commissioning
- Start of Commercial Operation

Failure to achieve the milestones can result in agreed compensation becoming payable to the Procuring Authority as well as the potential calling upon performance bonds.

The management and monitoring of the contract during the construction phase was done through management

meetings and a software system called SIGET (Sistema de Gestão da Transmissão / Transmission Management System) which tracks the main milestones during the development from financial close to commercial operation. Management meetings are usually held quarterly and, if necessary, site visits and inspections are performed.

Both the Procuring Authority and the Project Company have access to the SIGET software. The Project Company is required to update the project development progress data on a monthly basis to provide the Procuring Authority with visibility over the progress.

### **Operations**

The Procuring Authority's more active role in the monitoring of the project ends with the commissioning phase. Its role in the monitoring of the project is then scaled back to an oversight role whereby the Procuring Authority intervenes only if and when necessary. When the transmission line entered into service, the Grid Operator took over from the Procuring Authority the performance monitoring of the Project Company. The operation is monitored in real time and the associated performance monitoring reports are made available on the public domain.

### **Payment Mechanisms**

The payment mechanisms on Brazilian transmission PPP contracts are uniform across the projects and are availability based. The payment mechanism is such that no revenue is available to the Project Company until the asset is complete and the substation is in operation. This incentivises the Project Company to complete the construction phase in the agreed time.

The Project Company's base transmission revenue is set in the PPP contract, where it is referred to as the "allowed annual revenue" (RAP). The RAP is adjusted annually to take into account inflation, deductions and any other additional revenue (for example authorised expansion of the facilities). The RAP is broken down into monthly payments, and then further reviewed every five years to take into account any scope changes requested by the Procuring Authority, any instances of force majeure and certain other changes.

Deductions to the RAP are calculated using a mechanism referred to as the "PV". The deductions are calculated on the basis of duration of any unavailability of facilities, revenue of the facilities which are out of service, and also take into account whether the outages were planned or unplanned. The deductions are adjusted monthly and their annual cumulative total is limited to 12.5% of the RAP.

The Grid Operator (rather than the Procuring Authority itself) is responsible for paying the Project Company the RAP. The issuing of monthly bills to the users of the facility is also the responsibility of the Grid Operator, which takes

demand risk, and any non-payment of power bills should not affect the Project Company's revenue. The risk of non-payment of bills is low, as there is a large number of payers, and these groups are incentivised to pay their bills as failing to do so would result in a withdrawal of service.

## **ROLE OF GOVERNMENT**

### **Facilitating Access to Low Interest Financing**

The National Bank for Social and Economic Development (BNDES) was created to drive economic development in Brazil by providing attractive financing solutions for eligible projects. BNDES supports credit access and executes the Federal Government's credit policies for national or regional social and economic development. BNDES provided financing to the Project Company at improved rates, which contributed to strengthening the commercial viability of the project.

### **Land Acquisition**

The Project Company on substation projects is required to own the land, and land acquisition can be a challenge. In order to address this challenge, the government provides Procuring Authorities with the administrative power to expropriate land for public utilities and provide appropriate indemnification from the government.

The Procuring Authorities are empowered through an administrative act known as the Declaration of Public Utility. This act facilitates land acquisition for the purpose of the utility projects, preventing unnecessary delays to projects considered vital to providing a public service. The Project Company must own the land for substation projects, as opposed to transmission line projects where right of way is typically sufficient.

## **RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY**

### **Team Set-Up and Staffing**

The Procuring Authority's team is relatively small, and made of permanent ANEEL staff. The team consists of approximately three people at any given time. When needed, the team is supported by state lawyers and external financial advisors.

### **Training and Development**

There is an annual training programme provided by the Procuring Authority to its employees. The programme covers a wide range of skills considered key to successful management of PPP contracts.

While a training programme is provided, there is no contract management manual. The training is mainly provided based on experience and knowledge gained from completed and ongoing projects. Seminars, workshops and

dedicated courses are provided by international market leaders and institutions such as the Council on Large Electric Systems (Cigré), universities and equipment producers.

### **Communications**

The relationship between the Procuring Authority and the Project Company is transparent. The Procuring Authority recognises the importance of a good relationship with the Project Company and its positive effect on the success of the project. The Procuring Authority recognised that transparency in the relationship helps in solving challenges faced by the Project Company.

The official communication between the parties is done through formal letters. However, there are management meetings with the Project Company held every three months on this project, and every other contract managed by the Procuring Authority.

### **KEY EVENTS**

#### **Construction Delays**

Since the Procuring Authority considers the permitting period part of the overall construction period agreed in the PPP contract, the delays in the permits directly affect the construction duration. In the Piracicaba substation project, some governmental permits took longer than anticipated resulting in a 194-day delay to the start of construction. As per the PPP contract, the operations phase duration is automatically shortened by the length of these construction delays in the absence of a corresponding extension of the PPP contract.

The Project Company attempted to keep the original duration of the operations phase despite the construction delays as part of a claim for additional cost and time overruns during construction. The claim submitted by the Project Company was considered by the Procuring Authority.

The dispute resolution process on energy projects in Brazil is as follows:

- The Procuring Authority has absolute administrative authority in accepting or rejecting a claim;
- If the Project Company is not satisfied with the Procuring Authority's decision, the dispute is typically escalated straight to the judiciary.

This claim did not go beyond the first stage of the dispute resolution process. The Procuring Authority rejected the Project Company's claim and did not extend the contract duration of the PPP contract. The Project Company decided not to contest the decision, and as of the writing of this case study, this claim is resolved and considered closed.

### **LESSONS LEARNED**

#### **Optimising contract size and complexity is a key factor for effective contract management.**

The PPP contract is relatively small compared to other contracts managed by the Procuring Authority, such as transmission lines which tend to cover vast areas. The Procuring Authority highlighted that the size of the contract in this particular case had the advantage of being less complex and therefore easier to manage and less resource intensive. The Procuring Authority sees optimal complexity of the contract as one of the contributing factors for effective contract management, and it has therefore put plans in place to scale down future PPP contracts as appropriate, to ensure more effective contract management.

#### **Permitting can have a major impact on the construction duration, even for small-scale projects.**

This small-scale electricity substation project offered many advantages from the ease of contract management point of view. However, the project still suffered more than six months of delay to the start of its operations as a result of the delays related to governmental permitting issues. The risk associated with governmental permits should not be underestimated on a project of any scale.

#### **Annual training across a programme of PPP projects can be an effective way to deliver structured training to contract management teams.**

There is an annual training programme provided by the Procuring Authority to its employees. The programme covers a wide range of skills considered key to successful management of PPP contracts. All the seminars, workshops and dedicated courses are provided by international market leaders and institutions such as the Council on Large Electric Systems (Cigré), universities and equipment producers.

## BRAZIL

# 500kV Tucuruí-Jurupari Transmission Line



## OVERVIEW

### Location

Tucuruí to Jurupari, Brazil

### Sector

Energy – Transmission

### Procuring Authority

Agência Nacional de Energia Elétrica  
(the Brazilian Electricity Regulatory Agency)

### Project Company

Linhas de Xingu Transmissora de Energia Ltda.

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Commercial Close

10 October 2008

### Capital Value

BRL 926.4 million  
(USD \$423.2 million – 2008 exchange rate)

### Contract Duration

30 years

### Key Event

Dispute – caused by permitting delays, insolvency of Project Company's parent company

## SUMMARY

The Procuring Authority, Agência Nacional de Energia Elétrica or ANEEL, signed a PPP contract in 2008 with the Project Company, Linhas de Xingu Transmissora de Energia Ltda., to design, build, finance, operate and maintain a transmission line between Tucuruí and Jurupari in Brazil. The transmission line project is a large scale high-voltage transmission project that runs through the Amazon forest. The line runs through six municipalities, and connects three substations to the national grid.

Challenges related to environmental permitting, environmental conditions, adverse site conditions, tropical weather and protests during the construction phase of the project caused significant delays and have had a substantial impact on the Procuring Authority's approach to future PPP contracts with respect to estimating construction timelines for transmission projects. The Procuring Authority has since introduced additional clauses in its transmission line PPP contracts in order to better manage the risks which caused the delays in the Tucuruí to Jurupari project. The project is a good example to demonstrate how lessons learned during PPP contract management can inform the structuring of future similar projects.

## SUMMARY LESSONS LEARNED:

- Lessons learned during PPP contract management can and should inform the structuring of future similar projects, such as relating to environmental permits.
- The financial stability of the Project Company should be monitored as it could provide an early warning of future risks.
- Annual training across a programme of PPP projects can be an effective way to deliver structured training to contract management teams.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The transmission line connects three substations (Tucuruí Substation (500/230kV), Xingu Substation (500/230kV) and Jurupari Substation (500/230/69kV)) to the national grid as part of a wider objective to connect a number of isolated cities to the national grid, improve the reliability of the national grid and reduce fossil fuel power generation. The line runs through the difficult terrain of the Amazon and covers a linear distance of approximately 527 kilometres. The construction of such a large project through difficult terrain like the Amazon carries with it significant risks, such as environmental permitting, adverse site conditions, tropical weather and protests. These types of energy transmission projects in Brazil are often delivered in partnership with private partners transferring risks such as environmental permitting, financing and construction to the private partner. This project is an example of this type of a contract.

There have been two other similar PPP contracts signed under the broader objective, which cover more than 900 km of transmission lines and five additional substations.

### The Economic and Political Environment during Inception

The project was procured at the beginning of the Global Financial Crisis in 2008. As a result, the auction was delayed in the hope that financial conditions would improve. However, when it became evident that there is no short-term solution to the effects of the Global Financial Crisis, the auction process was re-initiated, and the PPP contract awarded.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

The risks related to financing, design and construction and environmental permitting in relation to the transmission lines are generally transferred to the Project Company. The Procuring Authority is responsible for monitoring the construction progress and the Project Company's performance. The Project Company is responsible for the

design and construction of the asset according to the specifications set out in the PPP contract. The Procuring Authority approves compliance of the design to the specifications of the contract and the Project Company is then responsible for securing the required construction permits and environmental permits to deliver the transmission lines. The Project Company is also required to comply with the requirements of the national grid operator, Operador Nacional do Sistema Elétrico or "ONS" (Grid Operator).

The construction phase was agreed to be completed in three years, which included the time needed to obtain relevant environmental permits; the PPP contract assumed one year for securing environmental permits. However, the time for obtaining the required environmental permits took longer than anticipated, resulting in 754 days of delay on top of the original contemplated duration of 365 days. 570 days of this delay were due to environmental permitting issues, and 184 days were due to other issues such as environmental conditions, adverse site conditions, tropical weather and protests. These delays and how they were managed is covered in more detail below under the heading "Key Events".

The payment mechanism, as explained further below under the heading "Payment Mechanism", prescribes that the Project Company is not entitled to any revenue until construction has completed. As a result, the Project Company had to take on additional costs due to the construction delays, until the transmission line started operation.

The contract has a term of 30 years. This means, subject to any successful claims brought by the Project Company, delays in the construction "eat into" the operations phase having the effect of automatically reducing the duration of the operations phase. The Project Company has brought claims for economic and financial rebalancing with respect to the delays with the aim of extending the term of the contract (and as a consequence, extending the operations phase) and also seeking additional compensation. These claims are discussed in more detail below under the heading "Key Events".

### Testing and Commissioning

The Grid Operator was heavily involved in the commissioning of the transmission line. The Grid Operator was responsible for ensuring compliance of the Project Company with the Grid Operator's specifications and procedures. This is to protect the grid from damage, facilitate a smooth integration into the grid and guarantee safe operation during the PPP contract period.

No issues or disputes were faced during the testing and commissioning of the lines. The process was smooth and final approval was given by the Procuring Authority and the Grid Operator to start the commercial operation of the transmission line on 12 June 2013; except for two transformers (500/230kV) and a Static Volt Ampere Reactive Compensator in the Jurupari Substation, which

were approved some months later. The last facility to enter operation was the second transformer in Jurupari Substation, which entered operation on 8 November 2013.

### Operations Phase

The operations start date in the PPP contract was agreed as 16 October 2011. However, due to the delays faced in the construction phase, complete operations did not begin until 8 November 2013. Since the start of the commercial operation of the lines, no technical issues have been faced, and the project is considered to be a success by the Procuring Authority.

Since the start of the operations phase, the Project Company has been receiving payments as per the PPP contract. Additional to base transmission payments, the Project Company is allowed to generate revenue from other sources by providing transmission related services to other parties, on the condition that the profits are shared with the grid users. The grid users are all producers and consumers connected to the national grid; the producers being power plants with a capacity of over 30 MW, and the consumers being distribution companies and customers with loads of 5 MW or more.

Transmission related services include allowing other parties to benefit from the optical ground wire cables and providing operation and maintenance services to third parties. The details of the available third party service revenue and the revenue sharing arrangements with respect to that third party service revenue is further explained below in the payment mechanism.

### Performance Monitoring and KPIs

The PPP contract sets key milestones that the Project Company is required to achieve. The key milestones as set out in the PPP contract are:

- Start of Construction
- Start of Electromechanical Assembly
- Start of Commissioning
- Start of Commercial Operation

Failure to achieve the milestones can result in amounts becoming payable to the Procuring Authority as well as the potential calling upon of performance bonds.

The management and monitoring of the contract during the construction phase was done through management meetings and a software system called SIGET (Sistema de Gestão da Transmissão / Transmission Management System) which tracks the main milestones during the development from financial close to commercial operation. Management meetings are usually held quarterly and, if necessary, site visits and inspections are performed.

Both the Procuring Authority and the Project Company have access to the SIGET software. The Project Company

is required to update the project development progress data on a monthly basis to provide the Procuring Authority with visibility over the progress.

The Procuring Authority's more active role in the monitoring of the project ends with the commissioning phase. Its role in the monitoring of the project is then scaled back to an oversight role whereby the Procuring Authority intervenes only if and when necessary. When the transmission line entered into service, the Grid Operator took over from the Procuring Authority the performance monitoring of the Project Company. The operation is monitored in real time and the associated performance monitoring reports are made available on the public domain.

### Payment Mechanisms

The payment mechanism is such that no revenue is available to the Project Company until the asset is complete and the transmission line is in operation. This incentivises the Project Company to complete the construction phase in the agreed time.

The Project Company base transmission revenue is set in the PPP contract, where it is referred to as the "allowed annual revenue" (RAP). The RAP is adjusted annually to take into account inflation, deductions and any other additional revenue (for example authorised expansion of the facilities). The RAP is broken down into monthly payments, and then further reviewed every five years to take into account of any scope changes requested by the Procuring Authority, any instances of force majeure and certain other changes.

The deductions to the RAP are calculated using a mechanism referred to as the "PV". The deductions are calculated on the basis of duration of any unavailability of facilities, revenue of the facilities which are out of service, and also take into account whether the outages were planned or unplanned. The deductions are adjusted monthly and their annual cumulative total is limited to 12.5% of the RAP.

The Grid Operator (rather than the Procuring Authority itself) is responsible for paying the Project Company the base transmission revenue. The issuing of monthly bills to these users is also the responsibility of the Grid Operator, which takes demand risk, and any non-payment of power bills should not affect the Project Company's revenue. The risk of non-payment of bills is low, as there is a large number of payers, and these groups are incentivised to pay their bills as failing to do so would result in a withdrawal of service.

Additional to base transmission payments, the Project Company is allowed to generate revenue from other sources by providing transmission related services to third parties, on the condition that the profits are shared with the grid users in the form of reduced bills in the following months. The payment for the transmission related services

provided also comes from the users and beneficiaries of the transmission line, specifically power generating companies, distribution companies as well as certain consumers of power (such as industrial users).

## ROLE OF GOVERNMENT

### Facilitating Access to Low Interest Financing

There are two Brazilian development banks, the National Bank for Social and Economic Development (BNDES) and Banco da Amazônia. Banco da Amazônia is a public commercial bank focused on supporting development in the Amazon by providing attractive financing solutions for the eligible projects. Unlike the BNDES, Banco da Amazônia is a commercial bank where the government is the majority shareholder.

The senior debt loan for the Tucuruí-Jurupari transmission line was provided by Banco da Amazônia. As Banco da Amazônia is willing to take on more risk than private commercial banks, its financing solutions provided better and more attractive interest rates. The solutions provided by the bank made the project commercially feasible for the Project Company.

### Right of Way

Right of Way can be a major challenge for transmission line projects such as this one. In order to address this challenge, the government provides procuring authorities with the administrative power to expropriate land for public utilities, if necessary. The relevant law facilitates Right of Way for the purpose of the utility project, preventing unnecessary delays to the project and other projects considered necessary to provide a public service. Ownership of the land is maintained by the previous owner, and payment for this right with some use restrictions is approximately 30% of the value of the land. The Project Company is required to purchase land needed for the substations only.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

### Team Set-Up and Staffing

The Procuring Authority's team consisted of approximately three technical people, as engineers, at any given time. When needed, the team is also assisted by specialists and supported by state lawyers and external financial advisors.

### Training and Development

There is an annual training programme provided by the Procuring Authority to its employees. The programme covers a wide range of skills considered key to successful management of PPP contracts. All the seminars,

workshops and dedicated courses are provided by international market leaders and institutions such as Cigré (the Council on Large Electric Systems), universities and equipment producers.

While a training programme is provided, there is no project specific contract management manual. The relevant contract management training is mainly provided based on experience and knowledge gained from completed and ongoing projects and academic publications.

### Communication

The relationship between the Procuring Authority and the Project Company is fairly transparent. The Procuring Authority recognises the importance of a good relationship with the Project Company and its positive impact on the success of the project. It was pointed out that transparency allows the Procuring Authority to help to solve challenges faced by the Project Company.

The official communication between the parties is done through formal letters, as required by the Brazilian administrative system. There are also management meetings held every three months.

## KEY EVENTS

### Dispute – Construction Delays

The construction phase faced a two year delay due to multiple reasons including delays related to environmental permitting and associated conditions, adverse site conditions, tropical weather and protests. The majority of the delay was due to the environmental permitting taking significantly longer than expected. As a result of the delays, the revenue earning period was reduced since the contract period was fixed (subject to any successful economic and financial rebalancing claims).

Before the full entry into operations, the Project Company submitted a formal claim to the Procuring Authority for economic and financial rebalancing. The Project Company claimed a loss of BRL 418 million, which would have required an increase of 45% in the RAP to cover. The requested compensation and rebalancing was based on several claims, including in relation to: 19 months of delay to obtain environmental permits, additional construction costs caused by work stoppage due to tropical weather, compliance with additional environmental conditions, delays due to social protests and cost overruns on the erection of the towers crossing the Amazon river and interfacing issues with the Belo Monte power plant. In addition, the Project Company was also requesting a contract renegotiation with respect to the profit share mechanism on the PPP contract with respect to third party services and from the sale of carbon credits.

After reviewing the basis of the petition, the Procuring Authority concluded that responsibility for construction delays was with the Project Company as it had agreed to take on the construction risks when signing the PPP contract. The Procuring Authority also decided to continue with the requirement to share profits earned from third party services; however, it was agreed that the Project Company is not obligated to share its profits from carbon credit trading.

As the parties could not reach an agreement on all claims, the Project Company escalated the dispute to court in accordance with the dispute resolution mechanism defined in the contract. As of the writing of this case study, the dispute is still in court.

### **Insolvency of Project Company's Ultimate Parent Company**

On 4 July 2017, the Project Company's ultimate parent company, Isolux Corsan, filed for bankruptcy in its home country, Spain. This triggered the sale of some of its subsidiary companies around the world. Isolux Corsan, at the time of writing this case study, had retained some Brazilian subsidiaries which are still in operation.

The Project Company, Linhas de Xingu Transmissora de Energia Ltda., which is an indirect subsidiary of Isolux Corsan, is a Brazilian company set up in order to qualify for Brazilian transmission contracts which requires it to operate exclusively in electricity transmission. The sell-off of Isolux Corsan's subsidiaries is still underway and so it is likely a change of ownership of the Project Company will occur at some stage.

## **LESSONS LEARNED**

### **Lessons learned during PPP contract management can and should inform the structuring of future similar projects, such as relating to environmental permits.**

The project highlighted an important issue with the typical timeframes that the Procuring Authority had previously set for the construction phase of its PPP contracts. Allocating the full risks related to delays caused by environmental permitting to the Project Company may not be appropriate, as the requirements can vary significantly from one administration to another. The Procuring Authority recognised that the timelines it prescribed for project companies to acquire permits and complete construction works may not always be appropriate.

New PPP contracts now define the environmental permitting as a shared risk and allow more time for permitting. The project is a good example to demonstrate how lessons learned during PPP contract management can inform the structuring of future similar projects.

### **The financial stability of the Project Company should be monitored as it could provide an early warning of future risks.**

In this project, the Project Company has a great deal of freedom to manage its business without the involvement of the Procuring Authority. Financing arrangements, project costs and detailed financial performance information are not shared with the Procuring Authority. This has not presented any major issues so far; however, when a Project Company or its shareholders are in financial distress, the Procuring Authority feels that its ability to provide support and ensure the success of the project is limited by the lack of knowledge.

Here, the ultimate shareholder of the Project Company is currently the subject of insolvency proceedings and the Procuring Authority will find itself in a difficult position if that were to affect the Project Company. The Procuring Authority may not have the same opportunity to prepare for, or mitigate against the risks associated with such an event because of the lack of detailed information on the financial position of the Project Company.

### **Annual training across a programme of PPP projects can be an effective way to deliver structured training to contract management teams.**

There is an annual training programme provided by the Procuring Authority to all its employees across a programme of projects. The programme covers a wide range of skills considered key to successful management of PPP contracts. Thereafter, individual teams/offices provide their own training programmes designed in line with specific staff and project requirements. These training programmes can be delivered either by experienced internal staff or by external training providers. Quite often seminars, workshops and dedicated courses are provided by international market leaders and institutions such as the Council on Large Electric Systems (Cigré), universities and equipment producers.

## CHINA

# Qiaoxi District Central Heating



## OVERVIEW

### Location

Qiaoxi District of Zhangjiakou Municipality,  
Hebei Province, the People's Republic of China

### Sector

Energy – Heat Supply

### Procuring Authority

Finance Bureau of Qiaoxi District,  
Zhangjiakou Municipality

### Project Company

Zhangjiakou Yuantong Huashen Heat  
Company Limited

### Project Company Obligations

Operate, Maintain, Finance and Transfer

### Financial Close

28 September 2015

### Capital Value

RMB ¥415 million  
(USD \$62 million – 2015 exchange rate)

### Contract Duration

25 years

### Key Events

Transition of operations staff to Project Company

## SUMMARY

The Qiaoxi District Central Heating project was procured as the second stage of a two-stage scheme to improve the heating supply in the Qiaoxi District of the Zhangjiakou municipality, Hebei Province of China. The first stage covered the majority of the construction required for the improvements, which included installing new boilers as well as decommissioning old boilers. This case study is focused on the second stage of this scheme, which comprises the PPP contract (described as a Transfer-Operate-Transfer contract) for the operation, maintenance and financing of the boilers, the associated hot water pipe network and the heat exchange stations, as well as the installation of two additional heating boilers during the contract period. The Finance Bureau of Qiaoxi District is the Procuring Authority, and Zhangjiakou Yuantong Huashen Heat Company Limited is the Project Company. The operations phase of the project started successfully at the end of October 2015.

## SUMMARY LESSONS LEARNED

- It is important to focus on the needs and concerns of project employees, especially when staff are transferred to the Project Company.
- Opposition from local communities due to unexpected costs should be resolved appropriately, with such measures to be fully considered at the project planning stage.
- Detailed arrangements and adequate preparation in advance of the transition between financial close and operations is vital to ensure utility services are delivered as scheduled by the PPP contract.
- By government having an equity interest in the Project Company, it can typically appoint both a member of the board of directors and the head of the supervisory committee of the Project Company, giving it a greater level of monitoring and influence over the project.
- The experience of the private sector can help government staff to gain valuable skills and training in PPP contract management.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

Zhangjiakou has favourable conditions for central heating, as the municipality is relatively concentrated and much of the infrastructure is already in place. However, the management and operations of the services had historically been poor. A lack of maintenance and monitoring of the heating boilers led to increasing levels of sulphur dioxide pollution, and the operations of the service had become increasingly inefficient. Not only had the installation of boilers been poorly planned in the past, but local users had also independently installed their own small boilers. Zhangjiakou Hengfeng Heating Company (ZHH), the state-owned enterprise which had been operating the service for five years, had also accumulated significant debt, mainly due to uncollected pipeline installation fees and user charges.

In 2009, the regional government initiated a central heating improvement initiative, split into two stages. The first stage covered the majority of the construction works, which included the installation of eight new 70MW heating boilers, the supporting hot water pipe network, and the construction or transformation of 79 heat exchange stations. 290 small boilers in the district were also shut down. The second stage covered the operations, maintenance and financing of the outputs of the first stage, and is being delivered under the PPP contract, which is the focus of this case study.

In 2014, the Finance Bureau of Qiaoxi District initiated a competitive bidding process for the project. In 2015,

Beijing Yuantong Heat Company Limited (BYHC), a private company specialising in heat supply and management, was selected as the preferred bidder and subsequently set up the Project Company. ZHH, acting as the representative of the government, signed the PPP contract with the Project Company. The arrangements under the PPP contract include the transfer of assets from ZHH to the Project Company, which is then responsible for operations and maintenance for a period of 25 years and, after that, the assets are transferred back with no cost to the government.

The ownership of the Project Company is 90% by BYHC and 10% by the Qiaoxi District government. Under the PPP contract, the Project Company will provide improved heat supply services with an extended coverage to new areas, undertake management and maintenance of the central heating facilities, and install two additional heating boilers during the contract period.

### The Economic and Political Environment during Inception

In 2014 and 2015, the Ministry of Finance of China and the National Development and Reform Commission of China issued a series of guidelines to promote better cooperation between government and commercial entities. These emphasised that the involvement of commercial entities brings in expertise in managing risks throughout the project lifecycle, with additional improvements in technology and efficiency. There was a perception that there was a lack of competitive market pressure in infrastructure delivered by the government, as well as a lack of expertise within government organisations.

The use of the PPP model was chosen to strengthen management practices and improve project efficiency and its consequent profitability. Raising private finance from commercial entities would also help the government to free up capital for other utility projects. The involvement of commercial entities was intended to promote technology transfer and help improve the skills of government employees. This would also help the government improve management of future infrastructure projects.

## MANAGEMENT OF THE PPP CONTRACT

### Transition from financial close to operations

The main challenge the Project Company faced in the transition from financial close to operations was to ensure that the heating services continued uninterrupted. The risks involved were related to sudden weather changes, which had the potential to suddenly increase demand on heating services. The Project Company prepared itself for this by arranging for the storage of additional fuel, and by a number of BYHC's experienced maintenance employees from other municipalities providing assistance in commissioning equipment and pipelines in advance, and this was all completed two weeks ahead of schedule.

The Procuring Authority saw the benefit of developing a detailed plan in advance to assist in the asset transfer to the Project Company at financial close. During the tender process for the project, bidders including BYHC and its competitors had prepared to employ the relevant technical, financial, and legal expertise to carry out its due diligence and investigate the condition of the existing assets. This allowed it to undertake important work before financial close and helped ensure that there was no interruption in the services during the transition.

### Operations Phase

The first challenge that the project faced was the transition of staff who had previously been employed by ZHH prior to the transfer of responsibilities to the Project Company. The Project Company addressed the concerns of these staff in a number of ways, including by carrying out training and introducing a performance-based incentive scheme. This is described in further detail under the heading 'Key Events' below.

The beginning of the operations phase was successful, with the Project Company able to provide central heating for a longer period of time than what was available in preceding years, and the number of user complaints regarding heat supply dropping by 80%. The indoor average temperature in the district increased from 19.3°C to 21.4 °C, and the percentage of users who paid their bills increased from 80% to 93%. The area covered by the central heating service has increased by 20% due to the construction of the additional boilers, and the Project Company is expected to meet its 2020 coverage goal. After one heating operation period in 2015-2016, coal, electricity and water consumption were 80%, 50% and 70% respectively of the equivalent consumption figures over the same period in 2014-2015. It is estimated that 20% of the Project Company's revenue increase is due to cost savings as a result of reduced energy consumption.

### Performance Monitoring and KPIs

The PPP contract states that the Project Company is fully responsible for maintaining a high standard of heat supply services, and that it must take any necessary actions if an emergency were to occur. The primary performance indicators are that the temperature of at least 98% of the relevant households should meet the relevant heating standard, and that user satisfaction should not drop below 98%. There are termination rights in certain circumstances for the Procuring Authority should the Project Company not meet these standards.

The government began planning for the first interim review in September 2017 to cover the first two years of operations. With well-designed assessment criteria, the interim review will be conducted by a third party and focus on the management of the Project Company.

### Payment Mechanisms

The income of the Project Company comes from user tariffs for the heating supply, central heating pipeline connection fees, and other operational revenues. The level of tariffs as well as its adjustment is set by the Zhangjiakou Municipal Government, based on national, provincial and local regulations and policy.

### Community and Stakeholder Engagement

Engaging with local communities has been an ongoing challenge for the project, particularly because users were required to remove their old and failing boilers. The users were unhappy about being required to bear all of the pipeline installation fees after this removal and put up significant resistance. Eventually this was resolved with the Project Company, the government and the users agreeing to share the expenses.

### ROLE OF GOVERNMENT

In 2014, the Ministry of Finance of China listed the project as one of the first 30 projects of the national demonstration programme of PPP projects, which gained the attention of more competent heating companies than ever before, enhanced its bankability and drove more competition in the bidding process. The application for the project to be listed in the national demonstration programme had been initiated by the Financial Bureau of Qiaoxi District and then reviewed and submitted by the Financial Bureau of Zhangjiakou Municipality, and subsequently by the Financial Department of Hebei Province to the Ministry of Finance of China.

As the local government does not have the relevant technical and managerial expertise in improving district heating project's efficiency and cost-savings, it relies on the 'know-how' and technical and managerial credentials of specialised market players in the respective field. The PPP contract management has been carried out smoothly at the time of writing the case study.

### RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

#### Team Set-Up and Staffing

The Procuring Authority exercises influence and monitoring by the virtue of its equity investment in the Project Company, and consequently its presence in the governance structure of the Project Company and its right to veto decisions on health and safety and environmental issues, as described below.

The Project Company governance structure consists of a shareholders' committee, a board of directors and a supervisory committee. The State-owned Assets Operation and Management Centre of Qiaoxi District of Zhangjiakou

Municipality (authorised by the Qiaoxi District government) and BYHC form the shareholders' committee, the highest authority of the Project Company that exercises the rights and responsibilities in accordance with the Company Law of China. The committee chooses the members of both the board of directors and the supervisory committee. Remuneration matters of members of both the board of directors and the supervisory committee also rest with the shareholders' committee.

There are five members of the board of directors, at least one of which must come from the government of the Qiaoxi District. Each member of the board of directors, including the Chairman, has one vote each when decisions need to be made. There are certain items, such as health, safety and environmental protection, where the government member has veto power. The supervisory committee consists of three members, one of whom must come from the government of the Qiaoxi District and act as the head of the supervisory committee. By the government of the Qiaoxi District having representatives on each committee and board, the Procuring Authority is able to monitor the performance of the Project Company, as well as play a role in making key decisions in relation to the project.

The training for the Procuring Authority staff is primarily 'on the job' training, with employees learning from the technical expertise of BYHC. This was emphasised as operations began, as it was an effective way to improve relations between the Procuring Authority and the management of BYHC. There is no structured training programme in place for Procuring Authority staff.

### **Communications and Information Management**

The PPP contract states that the Project Company is obliged to provide information on its website, including a user safety manual, heating services and account information, as well as a complaint procedure. The Procuring Authority and Project Company staff are co-located and there are regular project meetings.

## **KEY EVENTS**

### **Transition to operations phase**

The most significant challenge that the project faced was the transition of staff who had previously been employed by ZHH prior to the transfer of responsibilities to the Project Company. The Project Company was required under the PPP contract to continue to employ all staff, and to ensure the employment conditions were compliant with national standards. Although this had been agreed, the ZHH staff were nonetheless anxious about the change. These concerns were related to differences in management style which they might not be able to adapt to, their long-term career development, as well as the pay and benefits they would receive.

The Project Company managed these concerns in a variety of ways. It focused on communication at management-level, as well as conducting training to enhance the employees' relevant technical skills. In addition, the Project Company introduced an incentive scheme to strive for continuous improvement in service performance and enhance employee morale. This scheme consisted of, for example, measuring the water and energy consumption of each heat station and calculating the cost savings achieved by the reductions in its water and energy consumption over a period of time. Those cost savings were then shared with the staff at the relevant station. There were also bonuses paid to the staff of the station which achieved the greatest savings. In addition, it was agreed in the PPP contract that Project Company employees' salaries should be higher than the average level of the whole central heating sector of the Zhangjiakou Municipality, and that employees protected by specific employment regulations, e.g. veterans, should be offered a long-term employment contract if they do not violate the rules of the Project Company.

## **LESSONS LEARNED**

**It is important to focus on the needs and concerns of project employees, especially when staff are transferred to the Project Company.**

The PPP contract required that the Project Company retain the employees of the existing operators, who were understandably anxious about the change. The Project Company addressed staff concerns by introducing 'on the job' training, as well as an incentive-based performance regime. By focusing on the concerns of the staff, the Project Company was able to motivate them to continue providing a high-quality service.

**Opposition from local communities due to unexpected costs should be resolved appropriately, with such measures to be fully considered at the project planning stage.**

Small boilers, which had been installed by users over the preceding years, needed to be removed as they were inefficient and causing pollution. Initially, such users were expected to bear all the new pipeline installation fees, however after resistance, the government agreed to share the costs. Any unexpected costs are unlikely to be welcomed by the local community, and this must be taken into account when project planning takes place.

**Detailed arrangements and adequate preparation in advance of the transition between financial close and operations is vital to ensure utility services are delivered as scheduled by the PPP contract.**

The Project Company was required under the PPP contract to provide heating services no later than the regular date of commencement of heating in the district. Between this date and financial close being reached there was only about one month for the Project Company to prepare for the transition to operations, one third of the usual time required. By arranging for the storage of additional fuel, and by a number of BYHC's experienced maintenance employees from other municipalities providing assistance in advance, the Project Company was able to carry out the transition without interruption to the services.

**By government having an equity interest in the Project Company, it can typically appoint both a member of the board of directors and the head of the supervisory committee of the Project Company, giving it a greater level of monitoring and influence over the project.**

There are five members of the board of directors, at least one of which must come from the government of the Qiaoxi District. Each member of the board of directors, including the Chairman, has one vote each when decisions need to be made. There are certain items, such as health, safety and environmental protection, over which the government member has veto power. The supervisory committee consists of three members, one of whom must come from the government of the Qiaoxi District and act as the head of the supervisory committee. With the government of the Qiaoxi District having representatives on each committee and board, it is able to monitor the performance of the Project Company, as well as play a role in making key decisions in relation to the project.

**The experience of the private sector can help government staff gain valuable skills and training in PPP contract management.**

The training for the Procuring Authority staff is primarily 'on the job' training, with employees learning from the technical staff of BYHC. This was emphasised as operations began, as it was an effective way to improve relations between the Procuring Authority and the management of BYHC. There is no structured training programme in place for Procuring Authority staff.

## COLOMBIA

## Barranquilla Airport



## OVERVIEW

**Location**

Barranquilla, Colombia

**Sector**

Transport – Airports

**Procuring Authority**

ANI (Agencia Nacional de Infraestructura)

**Project Company**

Grupo Aeroportuario del Caribe SAS

**Project Company Obligations**

Design, Build, Finance, Operate and Maintain

**Financial Close**

September 2015

(credit agreement signed in March 2016)

**Estimated Capital Value**

COP \$345 billion

(USD \$144 million – 2015 exchange rate)

**Contract Duration**

15 years (can be extended up to 20 years to reach contractual Net Present Value (NPV))

**Key Events**

Concentration of construction activities during a relatively short initial period, challenges with KPIs during construction

## SUMMARY

The Barranquilla Airport PPP consists of the expansion and operation of the airport in one of the major cities on the Atlantic coast of Colombia. It involved substantial construction works, including remodelling of the terminal and rehabilitating the runway while the existing airport was still in operation. As this project was the first airport PPP following the passing of the PPP law in 2011, the Procuring Authority adopted lessons learned from this project to inform future procurement. The project has been successful, with the first and most important phase of construction due to finish by the end of 2018. There have been a number of challenges relating to KPIs and their application during the operations phase while construction has been ongoing; and the parties have been able to overcome the challenges by working together.

## SUMMARY LESSONS LEARNED

- For brownfield projects which are in operation during construction activities, operational KPIs should be tailored to reflect the difficulties of operating during construction as opposed to during the steady operational phase.
- Provision in the PPP contract setting out a process to adjust the KPI methodology may be useful to facilitate agreed adjustments based on review by all parties.

- Workshops and continued coordination between staff involved in structuring and those joining after contract award are useful in ensuring knowledge transfer.
- It is beneficial to provide adequate incentives for the Project Company to complete construction on time.
- Heavy concentration of construction activities during a limited period, especially when carried out on an operational asset, requires well-planned management and monitoring to overcome the intrinsic challenges associated with uneven distribution of capital works.
- Lessons learned from contract management should inform future procurement.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

Barranquilla is a major economic centre on the Atlantic coast of Colombia, with a major port and links to other regional centres. It has experienced substantial growth in recent years, and it was recognised that the transport infrastructure needed to improve to meet growing demand. As the largest airport in the Atlantico department of Colombia, with traffic of 2.6 million passengers a year, it was also recognised that the quality of Barranquilla Airport needed to improve to reach international standards and better serve the region. Barranquilla Airport serves domestic and international travellers with direct routes to Miami and Panama. For this reason, the decision was made to redevelop the airport using a PPP contract, with construction and operations to take place concurrently for the first three years.

The construction work to be delivered includes the improvement of the domestic and international terminal, as well as the construction of a corporate terminal. The runway was fully rehabilitated and repaved as part of the PPP scope.

### The Economic and Political Environment during Inception

The Colombian economy has been expanding since the early 2000s, with exports including petroleum, coffee and flowers becoming a major component of economic growth. Colombia has a long history of private sector involvement in infrastructure, and the Procuring Authority, ANI, was created in 2011 as part of the central government's goal of improving infrastructure provision in the country.

The PPP law was passed in 2011, while the history of concessions in Colombia has been longer and was based on the existing concessions law which predates 2011.

This PPP law sets the guidelines that should be used by any governmental agency when contracting under a PPP scheme. This law was based on international

best practices, as well as on lessons learned from Colombia's long experience of managing concession contracts. The new legal and institutional framework enabled Colombia to structure and procure an important number of PPP projects in the past few years with the ambition to close its transportation infrastructure gap and improve its competitiveness.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

Achieving financial close was challenging for the Project Company, partly due to the fact that it was the first airport PPP contract signed by ANI according to the 2011 PPP law. From the Procuring Authority's point of view, a first financial close was reached in September 2015, however the contract did not stipulate the requirement to have a signed credit agreement between the project company and its lenders. To achieve this contractual milestone, the Project Company was not required to have committed financing in place; instead, it needed a letter of credit from its selected lenders to show their willingness to finance the project, which was not binding. In this case, the main lender is CAF, the Latin American development bank, who took some time to complete its due diligence, in particular on the project's social and environmental impact. Financing was finally agreed in March 2016, and in the meantime, the Project Company had to fund the project's operations using solely equity.

There were a number of challenges which arose during the construction phase of this project. The most significant of these was related to the airport master plan. Normally this would be made available to bidders during the procurement phase, to allow them to develop an understanding of the state of the airport at that point in time. On this project, an up-to-date master plan was not available, and therefore had to be developed during the pre-construction phase. The master plan was necessary in order to finalise the design and its completion led to, among other changes, a change of the cargo terminal location, the terminal expansion size and the location of the Maintenance, Repair and Overhaul area (MRO). Those changes did not have construction time or cost implications. The delay in developing and approving the master plan is currently the subject of a claim by the Project Company seeking a time extension, and at the time of writing, this claim was being assessed by the Procuring Authority. The time extension would allow the construction to be completed without breach of contract by December 2018.

At the time of writing the case study, construction is ongoing, and is due to finish at the end of 2018. There have been some delays, with certain elements which had been due to be completed in June 2018 but are now due to finish

in December 2018; however, this has not extended the final completion date of the contract.

The other challenge during construction was related to the large amount of construction work which needed to be completed in a relatively short period of time, and which had to take place while the airport was fully operational. The capital expenditure for the project was divided into eight periods, the first of which covered the three years between financial close and June 2018. 60% of the capital works (by value) were to be completed in this period, which covers only 20% of the overall project timeframe. This also required the development and installation of important provisional facilities, which was costly.

### Operations Phase

As this was the first airport PPP project in Colombia that was based on the PPP law passed in 2011, KPIs linked to revenue were introduced for the first time. Previous concessions did not have similar KPIs, which consequently created some challenges for the Project Company in terms of its ability to adapt to the new performance standards. For example, the same KPI measurements were applied during both the full, steady-state operations and the construction period. The Procuring Authority considers that in future PPP contracts, the KPI measurement methodology should be differentiated between construction and operation in order to take into account the challenges of operating and expanding the airport at the same time. This is explained further under the heading "Performance Monitoring and KPIs".

### Performance Monitoring and KPIs

The Project Company's performance on the Barranquilla Airport is monitored in such a way that it only receives full operational revenue when it meets the relevant KPIs. The Procuring Authority developed these KPIs by investigating best practice around the world before developing the PPP contract, however there have been some challenges relating to the measurement of KPIs during construction. The performance measures are the same for the entire contract duration, even though for the first three years there are construction works occurring at the same time as operations of the airport.

A second challenge with the performance monitoring of this project was related to the KPI assessing client satisfaction. As the measure for satisfaction was based on customer surveys, the parties felt that it was not appropriate to link revenue to this kind of qualitative measure and that the KPI should be based solely on factors that the Project Company can control. The Procuring Authority and Project Company worked together to find solutions to these challenges that were acceptable to both parties.

The contract allowed for a revision of the methodology used to measure the KPI in order to adapt to the reality of the project. The review involved the Procuring Authority, the Project Company and the monitoring party (see more details below). An agreement was reached between the three parties.

To carry out its monitoring of the project, the Procuring Authority appointed an independent project monitoring party to be "its eyes and ears on the ground" in terms of checking that the contract is executed and complied with. The project monitoring party measures KPIs, reviews documentation submitted by the Project Company and submits monthly reports to the Procuring Authority. A risk register was created during the procurement phase, and the project monitoring party assists by reviewing it as part of its regular updating. The Procuring Authority is based in Bogota, and visits the project on a regular basis, however the project monitoring party is on site every day. The appointment of the project monitoring party is only with the Procuring Authority, and not with the Project Company.

### Payment Mechanisms

The primary form of income for the Project Company is revenue from the operations of the airport, and there are no subsidies from the Procuring Authority or government. The Project Company income includes regulated revenues, such as airport-related taxes, as well as non-regulated income from airport operations. At the time of writing, the Project Company's revenue is roughly in line with expectations.

The payment mechanism during construction is such that the Project Company only receives half of the revenue it earns during the construction phase, with the other half being held in an escrow account until construction is complete. The Procuring Authority sees this as a key to success, as it provides a strong incentive for the Project Company to complete construction on time. In previous brownfield projects, the Procuring Authority realised that operational revenue was being used to finance construction, and this was delaying progress. Incentivising prompt financing and construction was particularly important for the Barranquilla Airport, given the fact that a lot of construction work was due to be completed in a relatively short period of time. As this can result in significant financing costs for the Project Company, following a new law passed in 2018, future contracts will allow for more regular milestones permitting a more progressive release of revenue as the construction advances.

The PPP contract has a defined mechanism for the Procuring Authority to allow for an extension of time. The Project Company can request, and pay for, an additional three months to complete the construction.

Once this period has expired, the Project Company can present its case for an additional 60 days to complete any remaining, non-essential works. In the case of certain one-off events, the Project Company can also request a time relief in case of delays. There is no provision in the PPP contract for economic rebalancing; if any changes regarding the economics of the project are needed, they will have to be effected through contract renegotiation.

## **ROLE OF GOVERNMENT**

ANI, as the Procuring Authority representing the interests of the government, played a leading role during the pre-feasibility of the project, procurement and ongoing contract management. Created in 2011, the agency supervises “the end to end” project process, from planning and structuring to contract awarding, contract management and handback. This extended scope of work has allowed for greater accountability and continuity and an efficient process of continuous improvement. The Procuring Authority made efforts to learn from international best practice and is continuously evaluating the procurement process and contract management, implementing improvements based on lessons learned from projects in execution.

Even though many pre-construction activities are the Project Company's responsibility under the current contract, the Procuring Authority supports the Project Company in certain pre-construction activities such as environmental licensing and land acquisition. This has allowed for smooth execution and has helped to avoid delays.

## **RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY**

### **Team Set-Up and Staffing**

The contract management team consists of three people with technical backgrounds (i.e. contract manager, relationship manager and performance manager) who oversee two PPP projects. These people manage the relationship between the project monitoring party and the Project Company and review all reports and claims that are submitted to the Procuring Authority. They come from a technical background and have a good understanding of airport operations, as well as PPP contracts. The Procuring Authority also has central support teams which provide advice and assistance to all contract management teams within ANI on specific matters, which require legal, social, environmental, financial and risk expertise.

The three contract managers who work on this project all joined at contract award. To assist with knowledge transfer, workshops were carried out with these employees,

representatives from the ANI central knowledge teams and the people who structured the PPP contract (the ANI structuring team and an external consultant appointed to advise on contract structuring). This assisted in passing on knowledge from those who knew the background and intricacies of the contract to those who were going to be in charge of managing it. The external consultants involved in the structuring worked hand-in-hand with the Procuring Authority for six months after contract signing; those advisors also provide ad-hoc support now, as and when necessary.

Given the challenges associated with knowledge transfer, the Procuring Authority is contemplating extending the support from the external consultant beyond the typical six months which is current practice.

### **Training and Development**

In addition to training and participation in local and international workshops, the ANI team in charge of airport contract management is attending cross training sessions with Aerocivil agency's personnel to transfer knowledge and share experiences.

### **Communications**

There is a management committee that meets every 15 days to discuss issues that arise and to help develop solutions. The parties represented in these discussions are the Procuring Authority, Project Company and the project monitoring party, as well as the airport authority when relevant. The Procuring Authority representatives are the contract managers, as well as others from support teams when required based on the topic of discussion. The Procuring Authority sees this process as useful, as it is agile and every party is present.

### **KEY EVENTS**

In an attempt to complete construction works promptly within an operational airport, construction was concentrated in the first three years of the contract period, in terms of both the intensity and quantum of works as well as the capital value. This uneven distribution of capital works created challenges for both parties in terms of managing and monitoring the works.

The parties agreed that the KPIs adopted from international leading practice should have been differentiated during construction and operations. A solution to this issue was adopted through an agreement to review the methodology to measure KPIs in order to reflect the reality of construction and operations being carried out at the same time. For example, the measurement of customer satisfaction was adjusted during construction.

The parties have worked together to overcome the challenges and have agreed on a solution that meets their respective objectives.

## LESSONS LEARNED

**For brownfield projects which are in operation during construction activities, operational KPIs should be tailored to reflect the difficulties of operating during construction as opposed to during the steady operational phase.**

It is challenging for the Project Company to meet operational KPIs while carrying out construction works concurrently. For this reason, it is preferable for the KPI measurement methodology during the construction phase to be adapted to the challenge that this period presents for the project.

**Provision in the PPP contract setting out a process to adjust the KPI methodology may be useful to facilitate agreed adjustments based on review by all parties.**

As outlined above, the contract allowed for a revision of the methodology used to measure the KPIs in order to adapt to the situation faced when operating the project. The review and agreement reached involved the Procuring Authority and the Project Company, as well as the appointed monitoring party.

**Workshops and continued coordination between staff involved in structuring and those joining after contract award are useful in ensuring knowledge transfer.**

To assist with knowledge transfer, workshops were carried out with new staff joining after contract award, representatives from the ANI central knowledge teams, and the ANI team and consultants that structured the contract. The external consultants involved in the structuring, also worked hand-in-hand with the Procuring Authority for six months after contract signing and provide continued support, as and when necessary.

**It is beneficial to provide adequate incentives for the Project Company to complete construction on time.**

The Procuring Authority learned lessons from previous projects where the Project Company failed to carry out construction at the required rate of progress. For the Barranquilla Airport project, the Project Company does not receive its full revenue until construction is complete, and the Procuring Authority sees this incentive mechanism as an important factor in ensuring that construction progresses in accordance with the programme agreed in the contract.

**Heavy concentration of construction activities during a limited period, especially when carried out on an operational asset, requires well-planned management and monitoring to overcome the intrinsic challenges associated with uneven distribution of capital works.**

Carrying out construction activities on an operational asset is always a challenge due to the constraints of the working environment, disruptions created by construction activities and all associated impacts on health and safety, the environment, the level of service, etc. The objective is therefore to advance the majority of the construction works as much as possible, which then leads to uneven distribution of capital works. In this case, 60% of the value of the capital works was scheduled to be completed in period one, out of the total eight periods. This created particular challenges in terms of managing and monitoring the progress of construction works. To manage this situation, ANI increased the typical meeting frequency of the management committee from once a month to every two weeks. While the pressure to complete construction works as soon as possible will still lead to a heavy concentration of works during the first period, even in future contracts, the contracts are now structured to allow for tailored KPI methodologies for construction and operations and for a mechanism to adjust the contract if necessary to overcome the challenges emerging from unevenly distributed construction works.

**Lessons learned from contract management should inform future procurement.**

Lessons learned from PPP contract management should form a virtuous cycle with the project initiation and procurement where one phase is informing the other. The Procuring Authority in this case evaluated its future PPP procurement on the basis of lessons learned on KPIs and construction activities from this project. This becomes particularly important when a PPP project is the first of its type to be launched following a particular law. Although in this case the Procuring Authority adopted international leading practices, it became evident that it is important to adapt the KPI methodology to the local environment and carefully consider local practices, as practices which work well in some regions may not be successful everywhere and adaptations may be necessary.

## JORDAN

# Queen Alia International Airport Expansion



Image: "Aerial view of the terminal after completion" by KRISTIN HOOVER, courtesy of Foster and Partners- Photographer Nigel Young / CC BY-NC-ND 3.0

## OVERVIEW

### Location

Zizya (30 km south of Amman), Jordan

### Sector

Transport – Airports

### Procuring Authority

Ministry of Transport – Project Management Unit

### Project Company

Airport International Group

### Project Company Obligations

Built, Operate and Transfer

### Financial Close

15 November 2007

### Capital Value

JOR 695 million  
(USD \$982 million – 2007 exchange rate)

### Contract Duration

25 years

### Key Events

Renegotiation, significant changes of scope

## SUMMARY

The Queen Alia International Airport in Jordan was expanded and renovated as part of efforts of the Jordanian Government to improve tourism and promote Jordan as a travel hub. The project encountered a range of challenges relating to the initial design, as well as the challenges associated with the expansion of an operational airport. The scope changes in the project required a renegotiation of the PPP contract, resulting in a financial contribution from the Procuring Authority, which was complemented by higher than expected traffic volumes and associated project revenue.

The project also highlights how a dedicated project team helps protect the project from ongoing political changes, and how continuity of knowledge is secured through retention of key staff. The project is a good example to highlight the importance of involving end users at an early stage and the challenges in changing the workforce culture, from public to private service delivery.

## SUMMARY LESSONS LEARNED

- Early involvement of stakeholders may avoid having to undergo significant changes in scope, resulting in delays and cost overruns.
- Setting up a dedicated project team may help to mitigate risks from political and institutional changes.

- Involving end users in the construction works can streamline the progress of construction and facilitate a fast transition from one stage to another.
- Flexibility and commitment of the Procuring Authority to deal with unforeseen circumstances can have a significant positive impact on the overall success of a project.
- Early and robust transition planning will make transition phases more efficient.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

Prior to this project, Queen Alia International Airport was handling 5.5 million passengers a year, despite having a design capacity of only 3.5 million. It was ranked as one of the worst airports to visit in the world, with outdated structures and poor customer experience. This situation led the government to decide to upgrade the airport and increase its capacity, with recognition from the outset that customer experience was an important factor in the success of the project.

### The Economic and Political Environment during Inception

Two years before financial close and one year before the tender was announced, the Jordanian government adopted a comprehensive ten-year national agenda. It was an ambitious plan to build the country's economy through political and financial reforms, which included promoting partnerships between the public and private sectors and enabling the private sector to play a major role in the local economy. Development of physical infrastructure was a pillar of the agenda.

The aim to facilitate partnerships between public and private sectors combined with the physical infrastructure pillar facilitated the involvement of the private sector in driving the economy. The aviation sector was restructured by privatising the operation of airports and forming the Civil Aviation Regulatory Commission. As a result, the Queen Alia International Airport PPP was planned and announced for tendering.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

Construction was planned in two stages. Stage one included building the main terminal and its nine gates, followed by stage two, which was to complete the entire footprint of the building with additional gates. In total, the design of the airport included 25 gates. Only 17 gates would have a passenger access bridge installed, with the rest put on hold until demand required their installation.

There were many challenges faced during the construction phase. These were primarily due to the multiple scope

changes which were required starting two years after financial close, and have resulted in a delay of over a year and cost overruns of circa USD \$260 million. The reasons behind these changes could be summarised as: inadequate initial design, which was missing important elements, and various change requests initiated by the Procuring Authority. The resulting delays, coupled with the sooner than forecasted increase in passenger numbers, led to a decision to accelerate stage two. It was also decided to complete the expansion in one go, instead of gradually expanding it over the coming years. The overall cost overruns of circa USD\$260 million include the scope changes referred to under the heading "Renegotiation" below and other cost overruns which are not detailed in this case study due to sensitivities.

In total, close to 200 variations (i.e. smaller-scale changes) were implemented which were initiated by the Project Company, with the total cost borne by the Procuring Authority approaching USD \$10 million.

The site itself presented challenges, as the old terminal was small in size and had to be kept operational during construction, which eventually led to a change in the approach to construction. The original plan was to operate new gates, while construction of the terminal was still going, allowing passengers to use the new gates once they had been completed. Due to the updated design of the new terminals, this was not possible, and the entire structure needed to be completed in one go. This would have meant passengers would have had to move through a live construction site, which presented an unacceptable safety and security risk. It was therefore decided to implement a partial terminal opening, which added two years to the construction programme.

Once construction was complete, all parties were involved in the testing and commissioning of the assets with the independent certifier present. The hand-over process was described by the Project Company as conventional, and there were no unexpected issues.

### Transition from Construction to Operations

Managing the transition from construction to operations was an excellent example of successful transition management. Commencement of the operations phase was originally to be initiated and completed overnight. However, in order to prepare for this transition, the Project Company formed the "Operational Readiness and Airport Transfer" (ORAT) team two years prior to the services commencement.

In these two years, meticulous planning was undertaken and comprehensive training was provided by the Project Company, while the Procuring Authority was closely involved in the planning of the process. Continuity and transfer of knowledge was a key objective of the ORAT team, and with the short transition window, there was pressure to ensure all parties were familiar with the new

asset on the first day of operations. The two years of planning and training paid off, and there were no issues faced during the transition.

### Operations Phase

While the operations phase of the project has not faced any major difficulties so far, the biggest challenge for the Project Company was the transformation of the airport working culture from public sector to private sector service delivery. This required careful and soft introduction of changes, and in general, the Project Company has been successful in managing the transformation. It deals with a large range of stakeholders, including multiple government agencies as well as airlines, ground handlers and retailers. One way to consider the operation of an airport, to quote a Project Company's representative, is that the operator has to act like "a conductor of an orchestra". Overall, the operations phase is considered to be successful by both the Procuring Authority and the Project Company.

One notable incident occurred where an airline was late in its payments to the Project Company, which was then forced to notify the Procuring Authority that it would not be able to meet its investment payments on time. The Project Company felt this should have been taken into consideration when addressing the delay in payment of investment fees, as it was a delay by the user. The Procuring Authority acted positively in this regard to reach a conclusion in favour of the Project Company.

### Performance Monitoring and KPIs

The Procuring Authority did not contribute to the cost of the construction. The Project Company assumed the risk for timely completion and was incentivised to complete construction on time, as any delays would trigger agreed damage payments. The Procuring Authority's Project Management Unit (PMU) was continuously involved in the construction phase, with engineers making daily site visits and inspections to monitor the progress on the ground. The Project Company was required to provide monthly reports showing the construction cash flow, progress, and any issues faced. There was also an independent monitor and certifier, paid for by both parties.

The operational KPIs for the project were agreed prior to financial close. The KPIs are mainly sourced from the International Air Transport Association codes and manuals, and additional payments to the Procuring Authority apply should the KPIs not be met. The Project Company submits a quarterly report to the Procuring Authority which covers customer satisfaction, financial performance, and operational performance.

The KPIs are primarily directed towards customer experience as a driver of improvements, however rankings from international agencies such as the Airport Service

Quality Awards are also understood to be indicators of performance. The KPI regime has clearly lined up the incentives of the two parties successfully, with the Project Company encouraged to provide a high level of service as a way of increasing its revenue.

### Payment Mechanisms

The PPP contract between the Procuring Authority and the Project Company sets out the investment fees at 54% of the gross revenue earned, paid to the Procuring Authority on a quarterly basis. Additionally, the Procuring Authority transferred the collection of the "departure tax" to the Project Company, which is then to be counted as part of the gross revenue to be shared. There was no payment mechanism during the construction phase.

The revenue and financial performance is calculated through quarterly reports submitted by the Project Company. As of the time of the interview for this case study, the annual income for the Procuring Authority was USD \$120 million from direct tax and USD \$130 million in investment fees.

## ROLE OF GOVERNMENT

### Government Support and Procuring Authority

The government played an important role in the success of this project, and it was emphasised that the decisiveness and leadership of relevant government officials have contributed in effective management of the project challenges. The Project Company felt that it is enabled to enjoy the freedom to operate the airport in the way it considered most appropriate in order to manage its risk and to introduce its culture of efficiency and transparency to the airport, whilst the Procuring Authority's decision-making system was perceived as an enabler.

One example of support from the government was that the civil defence fire code was updated in order to accommodate the project's design. The designers introduced innovative fire suppression systems, which at the time were not covered by the fire code. When the adequacy of the system was proven, with reference to its use in other modern state-of-the-art airports, the code was updated to allow the use of such systems.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

### Team Set-Up and Staffing

The Procuring Authority has created a dedicated team for this project after financial close. The Project Management Unit (PMU) was formed to represent the Ministry of Transport (MOT) and manage concessions on its behalf. The team has 14 people working at any given time and is located in offices within the airport. The team has the relevant legal, financial and technical/engineering expertise.

The Project Company's staff count is significantly higher as they operate the airport themselves. However, there is a technical team of 20 under the Chief Technical Officer who reports to the CEO.

The Procuring Authority was mainly responsible for facilitating the relationship between the Jordanian government and the Project Company. Its main concern was to ensure the interests of all parties are protected fairly, and most importantly, the successful delivery of the project. This helped the Project Company to avoid managing a number of government stakeholders, as the PMU would, in case of any issues, voice its concerns to the regulatory and permitting agencies and facilitate their resolution.

### **Training and Development**

There was no training programme set for the Procuring Authority. All training was provided when needed under the discretion of the head of the PMU. Additionally, the Project Company provided joint training for its staff and the PMU staff on the operation of the new facilities.

### **Communications**

The Project Company has more than one point of contact with the government. In addition to communicating with the Procuring Authority, the Project Company also has to communicate with multiple ministries for permitting and compliance. This creates a complicated communication system, which has to be carefully managed.

A particular challenge faced by the Project Company is that since financial close, there have been 12 different Ministers of Transport. This has been somewhat mitigated by the fact that the head of the PMU remained the same until recently, which allowed for the development of a strong relationship between the Procuring Authority and the Project Company. While it was difficult to deal with frequent changes in ministers, the decision to form the PMU has paid off by isolating the project from many of the disruptive effects of the changes in the ministry.

## **KEY EVENTS**

### **Scope Changes**

There were multiple scope changes within the variations which have been submitted through the life of the project to date. The first scope change was initiated in 2009 and the latest was initiated in 2014. The reasons for the changes can be grouped into three categories.

### **Inadequacies in the project design agreed at financial close**

When the project entered the construction phase, it was discovered that some sections in the airport had not been considered in the original design. This can be attributed to not involving end users (in this case end users may refer

to airlines, security, customs, etc.) in the design process. Different end users from airlines to local authorities had specific needs which were not met by the original design, making the scope correction unavoidable.

### **Constraints of working in an operational airport**

The project was an expansion of an existing airport. The design overlapped with the existing operational assets, making it difficult to build while the airport was operational, and the old structure was limited in space. Construction works therefore needed to be adapted to mitigate safety and security risks. In most cases, the expansion was performed in stages, where a section would be completed and opened for use before moving to another one.

### **Changes in the traffic profile (passengers and aircraft)**

The airport expansion was planned in two phases, with the first phase to expand the airport to a capacity of nine million passengers a year, and the second phase to expand to a capacity of 12 million passengers a year. However, the forecast traffic volume growth and type of traffic forecasted to use the airport proved to be too conservative. The airport was starting to be used as a hub, thus seeing larger wide-body aircrafts coming in which were not considered in the original design. These developments in the traffic profile required the addition of gates and improvements to make the gates suitable for heavy jets.

### **Renegotiation**

The Project Company initiated a renegotiation of the PPP contract three years after financial close to address various scope changes and the acceleration of the stage two development. As part of the renegotiation settlement, the parties agreed that the Procuring Authority is to contribute USD \$50 million and the Project Company is to take USD \$150 million in additional debt. The contribution from the Procuring Authority was structured as 10 voluntary quarterly deductions from the annual investment fees. As for the loans, the lenders decided to refinance the original debt by both increasing the amount of loan and changing the interest rate. The original loan was already four years old and was priced on the basis of a different risk profile, thus a review of the rate and the loan tenor was done to reflect the changed risk profile. It was therefore possible for the Project Company to take on the additional debt and receive more attractive financing terms. This was also helped by the fact there was an increase in the expected revenue due to the early delivery of stage two.

The government contribution required the approval of the Council of Ministers, which is the Ultimate Administrative Body in the Jordanian government. The recommendation for the contribution was submitted by the PMU to a steering committee formed for the project, which elevated the request to the Council of Ministers.

## LESSONS LEARNED

### **Early involvement of stakeholders may avoid having to undergo significant changes in scope, resulting in delays and cost overruns.**

End users and other stakeholders should always be involved in projects of this scale. When a PPP project is planned, the Procuring Authority and the Project Company should identify the end users to understand their needs and activities. This is particularly important where there are a range of stakeholders, which, in the case of an airport, include airlines and retailers, as well as passengers. This will avoid having to undergo significant changes in scope, resulting in delays and cost overruns.

### **Setting up a dedicated project team may help to mitigate risks from political and institutional changes.**

The Jordanian Ministry of Transport (MOT) decided to form a dedicated project team for the Queen Alia International Airport expansion. The benefits of this decision were most evident when the MOT was undergoing unusually frequent changes in ministers. With the PMU being separate from the MOT and concentrated on the airport, the disruptive effects of those frequent changes were avoided. The PMU staff remained the same, ensuring continuity of knowledge and contract management. Additionally, most of the decision-making was within its remit, other than high-level strategic decisions which required escalation to the MOT. This limited the potential decision-making delays caused by the changes in the MOT. This example shows how setting up a dedicated team to deliver and manage the project helps mitigate risks from political and institutional changes.

### **Involving end users in the construction works can streamline the progress of construction and facilitate a fast transition from one stage to another.**

Expanding an operational airport presented a significant challenge in the construction phase. The process was carried out by delivering the expansion in small packages around the original structure, with operations shifting from one section to another by having contractors and end users alternate between each stage. Involving end users (represented through services such as customs, security, airlines, etc.) in the construction works helped them become ready when the time came to move their operation to a different section of the airport. This process streamlined the progress of construction and facilitated quick transition from one stage to another.

### **Flexibility and commitment of the Procuring Authority to deal with unforeseen circumstances can have a significant positive impact on the overall success of a project.**

The Procuring Authority was able to proactively manage changes and variations initiated on the project. While some variations could have been avoided, the government has shown the willingness to act as an enabler. When the Procuring Authority requested variations to accommodate its needs, it was fully prepared to take up the costs associated with them and facilitated the approval from the government.

Another notable incident occurred when an airline was late in its payments to the Project Company, which was then forced to notify the Procuring Authority that it would not be able to meet its investment payments on time. The Procuring Authority acted flexibly in this regard to reach a workable conclusion with the Project Company.

### **Early and robust transition planning will make transition phases more efficient.**

The parties understood the challenges of transition phases from an early stage, and careful planning started two years before the transition from construction to operations. The effective transition management, as well as early planning and training, ensured good transfer of knowledge from the construction team to the operations team and helped overall readiness for service commencement, which, in turn, enabled a timely and smooth commencement of the services operation.

## THE PHILIPPINES

## Daang Hari-SLEX Link Road



## OVERVIEW

**Location**

Muntinlupa to Cavite/Las Pinas, Philippines

**Sector**

Transport – Roads

**Procuring Authority**

Department of Public Works and Highways

**Project Company**

Ayala Corporation

**Project Company Obligations**

Build, Transfer and Operate

**Commercial Close**

3 April 2012

**Capital Value**

Php 2.23 billion  
(USD \$54.35 million – 2012 exchange rate)

**Contract Duration**

30 years

**Key Events**

Variation due to interface with other projects,  
delays due to land acquisition issues

## SUMMARY

The Daang Hari-SLEX Link Road, locally known as Muntinlupa-Cavite Expressway, is a 4km 4-lane toll road project. The project is a build-transfer-operate PPP and has been operational since 24 July 2015 with no material issues during the operations phase. The challenges faced in this project started early in the construction phase, where a variation had to be introduced to ensure its success. In addition to the variation, challenges were faced in acquiring land for the project, causing delays in the construction phase. The effectiveness of the parties in dealing with these challenges highlights the benefits of effective contract management in infrastructure projects. This case study is also an example of the positive role PPP units can have in advising procuring authorities. At the time of conducting this case study, the Daang Hari-SLEX Link Road project has been operational for two years.

## SUMMARY LESSONS LEARNED

- Potential interface issues with other projects should be considered during the project development and evaluation phase.
- Training of the Procuring Authority's contract management team by a national PPP unit can benefit the team by providing visibility of all challenges faced nationally in PPPs.

- Land acquisition should be dealt with at an early stage (preferably before or during the bidding stage) as it carries significant risk of additional costs and delays.
- Independent consultants may act as a mediator to prevent disputes as they offer an impartial evaluation of any issues, which can then be presented to the parties for agreement.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The PPP contract is for 30 years and has a provision allowing for an extension of up to 20 years (50 years in total from commencement of construction). According to the Procuring Authority, the objectives of the project were to benefit commuters, motorists and the general public, and to deliver strategic benefits to the region such as:

- Providing an alternative route to/from Metro Manila/Cavite
- Improving the regions' competitiveness as an investment destination
- Decongestion of the traffic in Cavite, Las Piñas, and Muntinlupa
- Reducing travel time by an average of 45 minutes from Daang Hari to Alabang Interchange
- Providing new access to the National Bilibid Prison (NBP) property, which is intended to be redeveloped into a mixed commercial, residential, and institutional estate

### The Economic and Political Environment during Inception

As of April 2012 when the PPP contract was signed, the Philippines central government was ambitious in promoting privately financed projects to improve the country's infrastructure. The PPP unit, known as the "PPP Center", was formed by the central government to promote and drive the development of PPP projects in the Philippines. It champions the country's PPP program and aims to create an enabling environment for private investment in local infrastructure projects. In addition to enabling and promoting infrastructure investment, the PPP Center advocates policy reforms to improve the legal and regulatory frameworks governing PPPs in order to de-risk projects such as the Daang Hari-SLEX Link Road project.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

The Procuring Authority was responsible for acquiring the land necessary for the project at no cost to the Project Company. The Procuring Authority granted the Project Company the exclusive rights and obligations with respect to undertaking the construction works. The Project Company was responsible for bearing the costs relating to construction.

As a sufficient amount of land was made available for construction, the Project Company commenced the works immediately upon contract signature. However, there was a delay in construction completion due to a major variation and challenges related to the acquisition of remaining land which had not been acquired as of commencement of construction. The variation delay was due to the process of redesigning the road for the inter-connection and inter-operation with another expressway. The details of the variations and land acquisition delays are further explained under the heading "Key Events" below.

### Operations Phase

The Daang Hari-SLEX link road has been operational since 24 July 2015. The project was designed for a daily capacity of 126,000 unit cars. Following the transition to operations, monthly traffic volume reports are submitted by the Project Company to the Procuring Authority. At the time of writing this case study, no issues or challenges had been faced during the operations phase.

### Performance Monitoring and KPIs

For the construction phase, an independent consultant was employed by both the Procuring Authority and the Project Company to review, monitor, and certify the milestones. Throughout the construction phase, the Procuring Authority regularly monitored, inspected and evaluated the quality of the works undertaken by the Project Company to ensure that the road was designed, constructed and equipped in accordance with the contract requirements.

In the operations phase, the Project Company is required to comply with the minimum Key Performance Indicators (KPIs) for operation and maintenance stipulated by the Procuring Authority. There are over 15 KPIs for the expressway operation and over 15 KPIs for road maintenance. Some of the KPIs include; ensuring that queuing length of 10 vehicles at the toll gates does not exceed 20 minutes during peak hours, and maintaining the transaction capacity of the toll plaza at a minimum of 400 vehicles per hour per lane for manual or mixed booths, and 900 vehicles per hour per lane for the express gates.

Other KPIs include:

- Permanent presence of the traffic safety and control system (i.e. patrol system, security surveillance system, immediate response to accidents or vehicle breakdown, etc.)
- Regarding road quality, surface roughness should not exceed three units based on the international roughness index (IRI)
- In cases of road damages, the repair of pavements or markings should not exceed the prescribed time

The KPIs are monitored by both the Project Company and the Procuring Authority during the operations phase with no involvement of an independent consultant. However, the final approval of compliance with KPIs is the responsibility of the Procuring Authority. Penalties apply for the Project Company if the KPIs are not met. So far, the KPIs seem to be working well and there have not been any complaints on the functionality of the KPIs from the Project Company or the Procuring Authority.

Minimum performance standards and specifications are generally monitored by the Procuring Authority. The Toll Regulatory Board also conducts monitoring activities for compliance with regulations on toll systems and facilities. While the Project Company is currently meeting all the agreed KPIs, it can be noted that during the defects liability period, i.e. the one-year period after construction completion during which the contractor must remedy defects as identified by the Procuring Authority prior to the acceptance of construction works, a few KPIs (i.e. road roughness and repair of the road drainage system) were not complied with. All these performance failures have since been corrected.

### Payment Mechanisms

There are no investment fees payable to the Procuring Authority during the operations phase of the toll road and no minimum traffic demand guarantee was given by the Procuring Authority. The agreement allows the Project Company to use the toll revenue collected as the primary source of income to recover the cost of its investment. Poor performance leads to fines levied on the Project Company. The fines are issued based on the monthly performance reports submitted by the Project Company.

The toll rates are assessed in each direction at the toll barrier, based on the class of vehicle. In accordance with the law, all toll rates include a 12% Value-Added Tax. The toll rate is reviewed periodically every two years and is adjusted to reflect current economic conditions. The adjustment is made based on a specified formula and is tied to the Consumer Price Index in the Philippines. Since the Project Company has taken construction and demand risk, it is not allowed to implement a toll adjustment on its own to cover construction cost overrun or lower than forecast traffic volume. Approval for the toll adjustment must be granted by the Toll Regulatory Board, a government regulatory body on toll expressways.

It is worth noting that any wrongful disallowance in toll rate adjustments may result in remedies, such as compensation from the Procuring Authority of revenue foregone by the Project Company as a result of disallowance. The reason for this is that decisions made by the regulatory authority are influenced by multiple factors, including political and economic factors. Thus, the Procuring Authority guarantees to provide a remedy for foregone revenue if toll rate

adjustments were disallowed when the Project Company had a valid reason to request the adjustment. The remedies can be in the form of direct payments or an extension of the operations period.

In addition to the toll revenue, the Project Company is allowed to develop areas in the land available within the corridor to provide commercial services for the users of the toll road. The Procuring Authority is entitled to receive 5% of the revenue generated from commercial services and activities by the Project Company.

### ROLE OF GOVERNMENT

The central government of the Philippines provides support to local governments and agencies in their PPP projects. The PPP Center operates closely with the National Economic and Development Authority and was set up to help support PPP projects. The PPP Center serves as the central coordinating and monitoring agency for all PPP projects in the Philippines. It champions the country's PPP Program by enabling Procuring Authorities in all aspects of PPP procurement and it is in regular contact with the Procuring Authority in the operations phase.

The PPP Center supports the Procuring Authorities by providing:

- Project Development and Monitoring Facility Services
- Project Development Services
- Policy Formulation, Project Evaluation, and Monitoring Services
- Capacity Building and Knowledge Management Services
- Legal Services

The PPP Center's PPP monitoring role continues into the operations phase. The PPP Center is involved in coordination activities to ensure smooth project operation. While monitoring is primarily at a high level, relying on reports submitted by the Procuring Authority, the PPP Center may also conduct in-depth monitoring and evaluation of PPP projects. This may involve focus group discussions among all concerned stakeholders.

While the PPP Center supports Procuring Authorities in setting up and promoting PPP projects, the final approval of any project lies with the Investment Coordination Committee (ICC) and the National Economic and Development Authority Board, depending on the project cost. Their decision is influenced by recommendations from the ICC's technical working group, which is made up of the PPP Center, the Finance Ministry, the Economic and Development Authority, and the Environment Department.

The Philippines government structure offers a lot of autonomy for local governments, including rights to impose restrictions, requirements, and taxes. As a result,

the Procuring Authority and the Project Company had to conduct extensive consultation and coordination activities with the Local Government Units (LGUs) to ensure compliance with all local regulations and ordinances.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

### Team Set-Up and Staffing

The Procuring Authority was actively involved on a daily basis in monitoring the project during the construction phase. An independent consultant was appointed to certify progress of works and make recommendations for the Procuring Authority's approval of all documents relating to the construction phase of the project. The independent consultant owed a duty of care to each of the parties with a duty to act professionally and independently. The parties shared the cost of the independent consultant's remuneration equally and have established arrangements where the payment of the remuneration will be made by each party on the same day each month, based on the invoice received from the independent consultant.

During the operations phase, the Procuring Authority has been satisfied that the number of resources it currently has is adequate to monitor the performance of the Project Company.

### Training and Development

The PPP Center has been responsible for providing training to the Procuring Authority. As the PPP Center has visibility of all PPP challenges faced nationally, and is closely linked to the central government, it has the ability to act as a catalyst for knowledge sharing and training.

### Communications

There is a continuous line of communication between all parties, as the Procuring Authority has an office near the facility, to monitor the project closely and have an open dialogue with the Project Company.

The PPP contract stipulates that any formal notices should be issued in the form of a written letter and delivered personally or scanned and sent by electronic mail.

## KEY EVENTS

### Design Variation

Before the project was tendered, a preliminary design was developed by the Procuring Authority. However, when the Project Company submitted its initial detailed design to the Procuring Authority, it was discovered that the planned expansion of another nearby expressway was not taken into consideration in the preliminary design. Consequently, to allow for this expansion, a change in the scope of the

project design developed by the Procuring Authority was needed. This resulted in extra costs to the Procuring Authority, as it had to compensate the Project Company for the additional work. As a result, the project had to be delayed to allow time for the redesign and cost estimations.

The variation procedure is contractually defined and starts by either party sending a written notice ("Variation Notice") to the independent consultant describing the change in scope. In this case, it was the Procuring Authority that initiated the Variation Notice. The independent consultant then certifies that the proposed variation was in accordance with the minimum performance standards and specifications agreed at contract execution. The Project Company subsequently prepares a proposal setting out the necessary details and the additional cost estimates (with supporting particulars), including how the costs would be recovered. Should the variations cause a cost increase of 10% or more above the contract value, formal approval from the ICC is required. If the increased costs are below 10%, the Procuring Authority and Project Company can proceed with the agreed variation subject to notifying the ICC.

The variation in this project did require approval from the ICC as it was above 10% of the contract value. The cost of the variation was paid in a lump sum once the Project Company provided all supporting evidence to justify the cost increase.

The PPP Center has recognised the lessons learned from this variation and the identification of any adjacent and/or competing projects has now been introduced to the PPP Center's project development and tender evaluation processes to mitigate the associated risks from the outset.

### Land Acquisition Challenges

Prior to the start of construction, all parties had knowledge of the land needed for construction. Initially, a sufficient amount of land was successfully acquired to start the construction on time. However, further into the construction phase, challenges in acquiring the remaining land needed for the remaining construction activities started to emerge. The process of land and property acquisition starts with an offer based on a fair market valuation. If negotiations with the owner fail, the issue may have to be referred to the courts to seek permission for expropriation.

For one narrow piece of land, negotiations with the owners were initially unsuccessful, and high-level intervention was needed to facilitate the agreement on the use of the land. For the acquisition of some areas of the project land, negotiations with the owners were not successful and a court order had to be obtained. This process is lengthy and has resulted in delays to the completion of the works. As the Procuring Authority was responsible for land acquisition risk, there was no financial impact on the Project Company resulting from this delay. No extension of time for

construction works was required, as the issue associated with the outstanding land acquisition led only to minor delays.

## LESSONS LEARNED

### **Potential interface issues with other projects should be considered during the project development and evaluation phase.**

Failure to detect issues with adjacent and competing projects can lead to cost increases and time delays. The late identification of the clash between this project and another road expansion project has resulted in variations at the expense of the Procuring Authority. The PPP Center recognised the severity of this particular challenge in this project and other projects across the country. Therefore, in order to mitigate risks associated with adjacent and competing projects, the identification of projects which may have an interface with the project in question was introduced in the project development and evaluation phase. Projects with identified interface issues are not allowed to proceed to the next stage of evaluation until the interface issues are addressed, depending on the severity of their impact.

It is important to recognise that interface issues vary in complexity and impact on a project. Thus, it is difficult to give specific advice on how to handle interface challenges. Some interfaces are easy to remedy and are not significant enough to affect the decision on the project's evaluation, while others are. Therefore the 'Philippine's solution' is attractive, as it requires flagging interfaces during the development and evaluation process but leaves the decision to proceed without a remedy plan at the discretion of the project technical working group. This proactive method presents an example of good practice to be adopted during project inception and evaluation, as it facilitates awareness of any potential issues at an early stage.

### **Training of the Procuring Authority's contract management team by a national PPP unit can benefit the team by providing visibility of all challenges faced nationally in PPPs.**

The PPP Center has been responsible for providing training to the Procuring Authority. As the PPP Center has visibility of all PPP challenges faced nationally, and is closely linked to the central government, it has the ability to act as a catalyst for knowledge sharing and training.

### **Land acquisition should be dealt with at an early stage (preferably before or during the bidding stage) as it carries significant risk of additional costs and delays.**

Land acquisition carries significant risk of additional costs and delays. It is often a risk retained by the Procuring Authority.

The process of obtaining the necessary land requires careful stakeholder management and engagement planning. It can be

a lengthy process, and it is recommended that land acquisition challenges are addressed at an early stage in the project to avoid delays and additional costs during construction.

### **Independent consultants may act as a mediator to prevent disputes as they offer an impartial evaluation of any issues, which can then be presented to the parties for agreement.**

It was highlighted by the interviewees that independent consultants are helpful in reaching agreements between the parties involved. In this project, the consultant was commissioned by both parties, ensuring a non-biased and transparent opinion. In some respects, the independent consultant acts as a mediator in preventing disputes, as it offers an impartial evaluation of any issues, which can then be presented to the parties for agreement.

## SOUTH AFRICA

# Gautrain Rapid Rail Link



## OVERVIEW

### Location

Gauteng, South Africa

### Sector

Transport – Rail

### Procuring Authority

Gautrain Management Agency

### Project Company

Bombela Concession Company (Pty) Ltd

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

25 January 2007

### Capital Value

ZAR 24.5 billion  
(USD \$3.4 Billion – 2007 exchange rate)

### Contract Duration

19 years, 6 months

### Key Events

Disputes, land acquisition delays, design and construction changes

## SUMMARY

The case study was drafted based primarily on inputs received from the Gautrain Management Agency (GMA) (the Procuring Authority).

The Gautrain Rapid Rail Link project is an 80km rail project developed to ease traffic congestion and facilitate travel in the Johannesburg-Pretoria corridor in South Africa. It is an ambitious undertaking, being the first PPP in South Africa of this scale. The project faced a range of challenges including some difficulties in land acquisition that led to delays during construction. A number of disputes also went to arbitration, however the parties negotiated a settlement and the project is currently operating successfully. The project was delivered in two phases on 8 June 2010 and 7 June 2012.

## SUMMARY LESSONS LEARNED

- Change processes need to be clearly defined, with incentives to respond in a timely manner to avoid unnecessary prolongation of change agreement and implementation.
- Engage with stakeholders and address land access issues early to avoid the risk of failure to secure land access and delays while the construction is progressing.

- Shared data and information management systems used by the Project Company and Procuring Authority must be compatible and meet each party's respective requirements.
- Periodic meetings should not be overcrowded such that they are unmanageable and ineffective.
- The timing of Environmental Impact Assessments for linear projects is critical, so as not to cause delays on the project.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The goal of the project was to provide a rail-based commuter service in the Johannesburg-Tshwane corridor and provide relief to the road network, as well as providing a link between Sandton and O.R. Tambo International Airport. The 19.5-year project involves the design, construction, finance, operation and maintenance of a 77km long track, with the provision of 96 cars of rolling stock to transport passengers. In addition to the rolling stock, the Project Company is responsible for providing bus links to the train stations to facilitate access to the rail network, and with this, the responsibility for transporting people from their area of residence to the station and across the network falls to the Project Company. The Gautrain project was also considered to be part of South Africa's efforts to create jobs and improve social mobility through job creation and skills development to disadvantaged populations.

### The Economic and Political Environment during Inception

Public transport is widely available in South Africa, however the quality and reliability has not always met the required standard. At the time of project development, the Passenger Rail Agency of South Africa through Metrorail (the South African operator of commuter rail services) delivered over one million trips per day during 2006 and all major cities had bus services. However, the challenge was that the coverage of the public transport system did not keep pace with urban development and quality of services suffered as a result of under-investment. The government, therefore, identified the need to ease traffic congestion within the Johannesburg-Tshwane corridor, which would allow for the provision of efficient transportation and facilitate movement of people. At the time, the upcoming 2010 FIFA World Cup added time pressure to have a reliable transport system in place in Gauteng.

There was significant concurrent activity in the construction market during the construction phase of the project, with a range of other major construction projects underway in preparation for the FIFA World Cup. Five stadia were built for the games, in addition to other transport and infrastructure developments to accommodate the mass inflow of people. This increased demand created a major shortage of skills, materials, and equipment during the time of construction of the project.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

The 80km Gautrain rail line included the construction of 15km of tunnelling and a number of viaducts, stations, depots, and parking bays. The scope of the project also included supporting facilities, in addition to the rail track and rolling stock. The project was completed in two phases, with the first delivery date of 8 June 2010 and the second delivery date of 7 June 2012. Due to the upcoming FIFA World Cup, the first phase was accelerated and delivered three days ahead of schedule.

Phase 2 of the project runs from Midrand to Pretoria and Hatfield, and from Sandton to Park (Johannesburg). Phase 2 was delayed by five months due to delays associated with land acquisition and the dispute related to water ingress in one of the tunnels between Rosebank and Park. These challenges are detailed further below under the heading "Key Events".

The Procuring Authority approached the transition from financial close to construction in a proactive way by commissioning the Project Company to undertake enabling works once the preferred bidder had been identified (prior to the start of the construction phase). This was also beneficial to the Project Company itself, as it already had a team in place when construction started.

There were many challenges in the construction of the project, including difficulties in obtaining land access. Because of the time pressure arising from the need to complete parts of the system before the FIFA World Cup, some approvals from local governments along the proposed route could not be obtained prior to financial close, and in some instances, these local governments capitalised on the urgency and pressured the Project Company to deliver additional works to improve some roads. There were other problems with engaging stakeholders, such as the requirement to relocate one of the stations to accommodate property developments along the route. While land acquisition risks were retained by the Procuring Authority, the costs of relocation of the utilities and road improvements around the stations were transferred to the Project Company.

An Environmental Impact Assessment (EIA) process was successfully concluded and the necessary environmental authorisations were obtained for the project by 2009. Obtaining the necessary environmental authorisations took longer than envisaged. This delay was caused by the EIA process having to commence at the planning stage of the project and so it was based on preliminary designs. This resulted in amended EIA applications that had to be submitted to cover changes to many sections of the alignment, proposed by the Project Company.

During the construction period, some technical issues arose, including the tunnel not meeting the specifications for maximum water ingress. This resulted in a dispute that was settled along with all other disputes in an agreed settlement in 2016, which is detailed below under the heading “Key Events”.

### Operations Phase

The service provided by the Project Company and the operations contractor met and exceeded targets of availability and punctuality at an average of 99.5% and 98.6% respectively for all trips scheduled for the 2016/17 financial year. Safety and security targets have also been met and exceeded, increasing customer confidence in the Gautrain and in public transport in general. The safety of passengers and of the system itself remains at excellent levels. Recently, there has also been an improvement in the general condition and cleanliness of the station buildings, resulting from the successful implementation of intensive cleaning operations by the Project Company.

The operations of the project have been broadly successful, and the 2016/17 financial year saw an overall increase of 1% in the number of passenger trips, with the number of passenger train trips reaching 15,612,070. However, the number of users from airport stations declined due to competition with app-based cab/taxi hailing services. Consequently, a freeze on airport service fares has been introduced for 2017 to keep up with the competition.

After six years of operation and close to 80 million passenger trips, the project has had a positive impact on the provincial economy, alleviated traffic congestion and rejuvenated several inner cities in Johannesburg and Tshwane. It has created jobs and helped to re-establish the rail sector in the province. Some studies on the wider benefits of the project indicate that between 2006 and 2011, over 122,000 jobs were created by the project. For every ZAR 1 spent on the project, ZAR 1.72 has been added to the Gauteng economy. With the project’s 99 percent availability rate, less than 0.4 percent fare evasion and 98 percent punctuality of its trains, the system has generated strong demand for the expansion of the project<sup>1</sup>.

### Performance Monitoring and KPIs

For the construction phase, monitoring of performance was undertaken through milestone achievement. As part of the payment mechanism, this approach served as an effective indicator of performance during the construction phase. These milestones were monitored by the Procuring Authority and Project Company, as well as an independent certifier.

There were approximately 1,000 milestones on the project, covering over 25,000 individual activities, which made ongoing performance monitoring a challenge. There were

12 key milestones, which were spaced 4-5 months apart and were used as an indicator of integrated progress. They were also useful for judging how the civil works were progressing compared to the rolling stock and systems delivery. On completion, both parties would inspect the delivered works with an independent certifier who is the only party authorised to certify compliance and progress of the work and issue a payment certificate to the construction contractor for the completed works.

In the operations phase, there are 25 measurable criteria against which performance of the Project Company is monitored each month, with potential deductions to be applied in case of failure to meet the standards. The performance criteria are monitored by the Project Company and reported to the Procuring Authority on a monthly basis. The monitoring and recording system is as automated as possible and manual interventions are minimised, and the payment mechanism prescribes deductions to unavailability of service or poor performance.

One KPI is a social development criterion, which sets a range of monthly targets related to training and employment of male and female historically disadvantaged individuals and has related non-compliance payment deductions. This reflects the government’s objective to create jobs and improve social mobility of disadvantaged populations.

### Payment Mechanisms

The Procuring Authority provided financing in the form of a USD \$3 billion grant, while the Project Company raised USD \$360 million in debt, and USD \$70 million in equity.

It was understood from the outset that the required capital for the project was far greater than what the private sector could invest and recover from user fees. As a result, government support was the main source of funding and it came in two forms. The first is a provincial contribution to fund the construction phase, which is the bulk of the government support, amounting to approximately USD \$3 billion. The second financing contribution from the government came in the form of “a patronage guarantee” and is being provided during the operations phase.

During construction, where the first form of government contribution was provided, milestone payments were made to the Project Company, with an independent certifier commissioned by both the Procuring Authority and Project Company to monitor compliance and issue payment certificates for each payable milestone reached. This traditional milestone payment system was proven adequate for such a large project, with multiple heavy works undertaken at the same time.

For the operations phase, when revenues are above a certain threshold, profits are shared between the Project Company and the Procuring Authority, on the basis of the achievement

<sup>1</sup> <http://gma.gautrain.co.za/article/expansion-of-gautrain-rail-network>

of certain rates of return on equity by the Project Company. There is also a lower threshold, which is covered by a minimum revenue "patronage guarantee". Demand risk is therefore taken by the Project Company up to a certain level, below which the patronage guarantee is given. User fees and ancillary revenues are the main source of income for the Project Company. There is an incentive payment scheme for the Project Company for revenue growth during the initial five years of the operations period.

As for performance deductions, since the majority of the KPIs cover operational excellence and performance, any abatements resulting from failure to meet operational KPIs are generally borne by the operations contractor and deducted from its fee. So, the risk of poor performance is transferred from the Project Company to the operations contractor. The Project Company is, however, exposed to a reduction in the patronage guarantee payable by the Procuring Authority in instances where train or bus availability falls below set thresholds.

To calculate the patronage guarantee, the minimum required total revenue (MRTR) financial metric is used, which was part of the Project Company's bid submission. This metric is used to make two calculations to determine the amount of the patronage guarantee. The lesser amount of the difference between the MRTR and the actual revenue, and the difference between the MRTR and the revenue forecast is considered to be the patronage guarantee amount. As a result, the Project Company carries the risk of its revenue being below its forecast. Earning revenue above its forecast and below the MRTR reduces the guarantee payment from the Procuring Authority. Therefore, the Project Company is not incentivised to achieve revenue higher than its forecast once the initial five-year incentive scheme ended.

### **Change Management**

The change management process in the PPP contract for scope changes proposed by the Procuring Authority was broadly structured as follows:

- The Procuring Authority would issue a change notice;
- The Project Company would respond with an outline cost within an agreed timeframe;
- The Procuring Authority would then make a decision to allow the Project Company to proceed with a fully developed response based on the initial outline cost; and
- If the Procuring Authority allowed the Project Company to proceed, the Project Company would submit a fully developed response.

However, there is no time limit on when the final response from the Project Company should be submitted. This proved to be a major flaw, as there was no time limit for the Project

Company to respond with a fully developed solution. Each change had to be negotiated from first principles (with no base rates agreed prior to financial close), which added to the time required to complete the process.

In addition, there was a provision for the Project Company to refuse a change if the number of changes issued was over 15 during the construction period. As it happened, the Project Company did not enforce this right, as it became clear that more changes were needed for the project to proceed. In total, the variations implemented amounted to less than 5% of the initial capital cost.

### **ROLE OF GOVERNMENT**

This project was the first PPP of its kind in South Africa, thus requiring a certain level of adaptation by the government. The government of South Africa formed a PPP unit to promote PPPs and provide advice to Procuring Authorities on contract management and team set-up. The Ministry of Finance and Treasury provided advice and support to the Procuring Authority on this project. Initially, the Procuring Authority was the Department of Roads and Transport of the Gauteng province government. Subsequently, Gautrain Management Agency was formed following the approval of the relevant legislation by the Provincial Executive Council in December 2006. The Procuring Authority (Gautrain Management Agency) provides the necessary capacity to fulfil the province's contractual obligations and manage its relationship with the Project Company and all other stakeholders. The objectives of the Procuring Authority are defined by the Gautrain Management Agency Act. Overall, its objective is to manage, co-ordinate and oversee the project in the interest of the government as a whole and the province in particular. The Procuring Authority's responsibilities include matters such as managing the relationship between the province and the Project Company in terms of the PPP contract, managing assets and finances, liaising with all relevant government institutions and interested parties promoting the project, promoting Broad Based Black Economic Empowerment, and integrating the project with other transport services.

### **RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY**

#### **Team Set-Up and Staffing**

The approach from the Procuring Authority in terms of giving the Project Company a head start on enabling works outside the PPP contract ensured a smooth transition from financial close to construction. Both the Procuring Authority's team and the Project Company's team were strengthened after financial close with new staff being brought in to manage the project. The Procuring Authority's team was staffed with local experts and had extensive experience covering

design, major programmes management and contract management. Contract management training was also provided to new staff after financial close.

### Communications

The interviews conducted suggested that communication between the parties has been challenging to manage. Periodic meetings were the principal form of interaction between the parties, and while there were monthly meetings held for the project, these included up to 30 participants, which at times made it difficult to ensure sufficient focus due to the varied interests of the parties involved.

Weekly meetings were also held between the Procuring Authority and the Project Company's representatives to discuss key issues, and these were more productive as they involved no more than eight people at a time. The meetings with the independent certifier were seen as beneficial, as they allowed for an objective discussion on the certifier's findings and eventually evolved to being used to monitor the project's milestones.

Informal strategic-level meetings were held on a quarterly basis, with the aim of allowing the parties to socialise and build stronger relationships. This was stopped two years after financial close.

In the operations period, formal contractual meetings as well as informal coordination meetings are held on a weekly, monthly and quarterly basis.

### Information Management

A data and document management system was stipulated in the contract. The Procuring Authority selected a particular software system for all document and information management. However, the Project Company found that this was not suitable for its record keeping and internal management control, which resulted in the Project Company and its related parties using their own software for document and information management. The consequence was that the Project Company had to then convert their document and information management system to be compatible with the Procuring Authority's in order to use it.

## KEY EVENTS

### Disputes

There were multiple disputes on the project, starting in 2008 when it became clear that the Procuring Authority would not be able to provide the land access as planned. The Project Company believed that it was entitled to relief in case of delays, however it was not until the delays on the critical path reached nine months that the construction contractor accelerated the works and claimed for compensation. There

is a Dispute Resolution Board, but it was set up to deal with issues related to scope and specifications only. Any other issues can be quickly escalated to arbitration without going through the Dispute Resolution Board. In the case of this dispute, the matter went to arbitration as an amicable agreement could not be reached.

Another claim in the project was started by the Procuring Authority after it found that water was leaking into the tunnels, in excess of the maximum ingress permitted. The disagreement was escalated to arbitration. The Procuring Authority won the arbitration award for the water ingress in the tunnel and the Project Company was ordered to carry out remedial works.

In addition, a number of separate disputes had gone to arbitration, and on 18 November 2016, the Procuring Authority and the Project Company agreed to a comprehensive settlement of all disputes relating to the construction period of the project. The mutually agreed settlement brought to an end the protracted, costly and multiple legal and arbitration processes between the Procuring Authority and the Project Company.

The settlement resulted in: 1) the Procuring Authority paying the Project Company an amount of ZAR 980 million in full and final settlement; and 2) the Procuring Authority agreeing to forgo receipts of the railway usage fee in the amount of ZAR 266 million that would otherwise be payable by the Project Company.

### Delays Related to the Environmental Impact Assessment

The initial EIA process began during the planning phase of the project from 2001 to 2003. As a result of various route re-alignments and design changes proposed by the Project Company, the EIA process had to be updated during the construction phase and was completed in 2009.

The protracted EIA process spanned eight years and had two major implications: the costs associated with the EIA process were much higher than originally anticipated and EIA consultants appointed by the Project Company left the project during the lengthy process, which led to a lack of knowledge continuity.

The timing of the EIA process posed a challenge, as detailed above under the sub-heading "Construction Phase". The EIA regulation at the time did not provide for a seamless transfer of environmental compliance responsibility from the initial applicant (i.e. the Gauteng Department of Public Transport, Roads and Works) to the Project Company. This contributed to disputes between the Project Company and the Procuring Authority.

As a result of the requirement for the implementation of the EIA process by the Procuring Authority before the contract award and final design development, much of

the process had to be redone by the Project Company to address changes to the route alignment and final design development completed. The risk for the detailed EIA is commonly transferred to the Project Company at the contract award.

There have been disagreements between the Procuring Authority and Project Company related to the responsibility for compliance with the conditions attached to the authorisation to proceed with the project, as part of the EIA process. This resulted in a dispute that was resolved in arbitration.

There have also been disputes between the Gauteng Department of Public Transport, Roads and Works (as the project proponent and applicant for EIA authorisations) and some public participants in relation to the route alignment of the project, following the comprehensive public consultation process. Most of the disputes were solved by the Gauteng Department of Public Transport, Roads and Works accepting and implementing the proposals made by residents for alternative route alignments, but some disputes led to litigation which resulted in a decision in favour of the Procuring Authority.

## LESSONS LEARNED

### **Change processes need to be clearly defined, with incentives to respond in a timely manner to avoid unnecessary prolongation of change agreement and implementation.**

The process for managing scope change on the project was slow, which led to delays and increased risk for all involved. Furthermore, the change process did not distinguish between major and minor variations. As there were no base rates agreed contractually for standard costing of small changes, they were all being negotiated and agreed separately. Every change, therefore, had to be negotiated from first principles, which added to the time required to complete the process. Furthermore, the change process did not specify a time limit for the Project Company to respond with a fully developed solution for a change requested. Change processes need to be clearly defined, with contractual mechanisms to require responses in a timely manner. Not having response deadlines can lead to unnecessary prolongation of change agreement and implementation.

### **Engage with stakeholders and address land access issues early to avoid the risk of failure to secure land access and delays while the construction is progressing.**

Challenges faced in Gautrain's land acquisition highlight potential complexities and consequent delays due to land acquisition. The work required in obtaining land access should not be underestimated, as any failure to secure land on time can either halt the project or lead to significant

change. Challenges are not only due to non-supportive landowners; relevant stakeholders will also often have concerns over other issues, such as environmental impact.

Although work on land acquisition and access started before construction, this work could not be completed because of pressure to implement the project to meet the FIFA World Cup deadline. Delay on land acquisition gave local stakeholders leverage over the Procuring Authority and the Project Company, which, in this case, was evidenced through the pressure exerted by local stakeholders and landowners on the Project Company to build and refurbish some existing assets, e.g. roads near stations. Early land acquisition would reduce pressure on the construction programme and give more room for risk mitigation.

### **Shared data and information management systems used by the Project Company and Procuring Authority must be compatible and meet each party's respective requirements.**

A data and document management system was stipulated in the contract. However, the Procuring Authority and the Project Company used their own software for document and information management. The consequence was that the Project Company had to then convert their document and information management system to be compatible with that of the Procuring Authority.

The type of data sharing and monitoring systems should be carefully selected. Unsuccessful planning on data sharing and monitoring platforms can lead to additional costs for both parties, and it is clearly inefficient for either party to keep converting data from one system to the other. A compatible platform should be developed as early as possible, and if that is unachievable, then compatibility issues need to be addressed before information and documents start to pile up.

### **Periodic meetings should not be overcrowded such that they are unmanageable and ineffective.**

Periodic meetings were the principal form of interaction between the parties. Weekly meetings were also held between the Procuring Authority and the Project Company's representatives to discuss key issues, and these were productive as they involved no more than eight people at a time.

In addition, there were monthly meetings held for the project, which included up to 30 participants, making it difficult to ensure focus.

Each of the parties represented at the meeting during the construction phase had their own interests in the project and attending to each of their issues and managing the interfaces was time-consuming. It is, however, the responsibility of the Project Company to manage the interests of its subcontractors.

**The timing of Environmental Impact Assessments for linear projects is critical, so as not to cause delays on the project.**

The timing of the EIA posed a challenge for the project, as it was implemented at the planning stage of the project based on a preliminary design. Consequently, a large part of the EIA process had to be redone once the route alignments and detailed designs had been completed by the Project Company.

## SPAIN

# Segarra Garrigues Irrigation System



## OVERVIEW

### Location

Region of Catalonia, Spain

### Sector

Water – Irrigation

### Procuring Authority

Reg Sistema Segarra-Garrigues

### Project Company

Aigues del Segarra Garrigues, SA

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

8 July 2005

### Capital Value

€1.2 billion  
(USD \$1.431 billion – 2005 exchange rate)

### Contract Duration

39 years (subject to the extensions described below)

### Key Events

Scope change to ensure compliance with environmental laws, loan agreement termination, contract renegotiations

## SUMMARY

The Segarra-Garrigues Irrigation System project is an important project in the development of the Lleida province of Catalonia, Spain. The aim of the project is to transform 70,000 hectares of non-irrigated land into irrigated land, benefiting an area with a population of over 350,000 people. However, the Global Financial Crisis' effect on the Procuring Authority's financial standing created significant challenges, with lenders terminating their financing arrangements with the Project Company.

Requirements to comply with European Union (EU) environmental requirements also caused delays and limited the scope of the project. As a result of these challenges, the construction phase has been extended and is not expected to finish until 2029.

## SUMMARY LESSONS LEARNED

- Good engagement with end users at an early stage during project inception and throughout the project delivery is essential to ensure project viability.
- The Procuring Authority must carry out sufficient due diligence, to ensure that the scope of the project and any contractually prescribed reference design is compliant with all relevant legislation.

- Continuation of staff from construction through to operations improves the efficiency of managing the transition between the phases.
- Over-specification in the PPP contract, and development of input rather than output specifications, can have an adverse impact on the final design and whole-life costing.
- Government backing becomes very important in critical situations, such as lack of financing, and can mitigate the risk of project postponement or termination.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The project was initiated to increase the availability of water through the new irrigation system. This was done to allow for the development of more profitable crops, the establishment of new businesses, and other general economic benefits in the areas covered by the project. More than 16,000 land owners are currently growing crops which have a low yield and therefore low profitability, due to the lack of water available.

The planned irrigation system comprised two elements. The first element is led by the National Government and covers an 85km irrigation canal (Canal Segarra Garrigues) and a dam (Albages). The second element, which is the project covered by this case study, is being undertaken by the Project Company, Aigues del Segarra Garrigues SA, and consists of the development of a water distribution network, which takes water from the canal to groups of landowners, who are then responsible for building the infrastructure to transfer the water to their individual farms.

The Procuring Authority was Reg Sistema Segarra-Garrigues, which is a public-sector company created for the project by the Regional Government of Catalonia. This company was later absorbed into Infrastructure of Catalonia. The Procuring Authority signed the PPP contract with the Project Company for the design, construction, finance, maintenance and operation of the project.

## MANAGEMENT OF THE PPP CONTRACT

### Transition Between Commercial and Financial Close

There was a major transition between commercial close and financial close. With nine equity investors and a syndicate of banks who needed to come to an agreement, the process was overly complicated and took over two years to complete. The Procuring Authority then delayed works for an additional two years, and with many changes of senior management taking place in the public sector during this time, limited progress was made. No construction works began until 2006 despite the PPP contract signing taking place in 2002, and while this may otherwise entitle the Project Company to make a claim, this was understood to be covered by the renegotiations in 2013.

### Construction Phase

The project was tendered based on a conceptual design and relevant specifications developed by the Procuring Authority. All detailed designs were developed by the Project Company after the award of the PPP contract, which were then approved by the Procuring Authority, and subsequently implemented during construction.

The original construction duration was nine years, with completion expected to occur in 2014, however as of 2017, only 50% of the network had been completed. There have been various challenges to completing the design and construction which have caused this delay. The specific challenges which had the greatest impact on the construction were related to the lack of demand from the landowners, who are the key intended beneficiaries, and the project scope change required to comply with environmental laws.

During the tender process, it was assumed that landowners would be generally supportive of the project, and would sign up in groups, agreeing to procure the additional infrastructure required to connect the water directly to their individual plots of land. This would mean the Project Company would pipe water to individual areas that would not be required to be less than 12.5 hectares (referred to as the "Minimum Irrigation Area"), with the landowners covering the costs of piping the water to the individual lots within these areas. However, due to poor stakeholder engagement combined with a lack of interest from farmers, this Minimum Irrigation Area ended up averaging 2.8 hectares. This meant that the total length of pipes has increased by approximately 30%, with a direct impact on the time and cost of construction.

A ruling by the European Court of Justice on the project's lack of compliance with the relevant legislation meant that the Project Company had to introduce what are referred to as "Special Protection Areas" for birds in the area covered by the project. This reduced the areas assigned for irrigation and added costs due to re-routing of pipes around the protected regions. This is further explained under the heading "Key Events" below.

The project's contract requirements are perceived as more prescriptive than is common for PPP contracts in terms of the prescribed design solution. For example, the PPP contract specified the use of polyester pipes, which did not turn out to be the optimal solution from the whole lifecycle point of view. However, as it was a contractual requirement, it was difficult to change.

Predicting the final cost to complete the outstanding work is complicated, but the Project Company estimates that there will be a deviation of approximately 20% from the original contract sum, with approximately half of that being attributable to the compliance with the European Union

environmental requirements, and the other half due to the increase in pipe length due to the reduction of the Minimum Irrigation Area. Both of these risks, and therefore the cost overruns, were retained by the Procuring Authority.

### Operations Phase

The transition from construction to operations is an ongoing process, with each irrigation sector starting operations once its construction is complete. This is taking longer than expected, as the landowners have to commit to joining the scheme before irrigation can begin and this does not always occur prior to construction works being completed.

An additional complication of the operations phase was agreeing the total duration of the PPP contract. The full operation of each sector begins once construction is complete and the landowners have committed to join the scheme. However, due to the size of the project, there was always going to be a significant time period between the completion of construction of the various sectors. The PPP contract stated that the operations phase was to last for 30 years, however it was unclear on how this would be measured. One clause stated that this 30-year period would begin once all construction was complete, implying that operations would take place on most sectors for longer than 30 years. Another clause suggested that the 30-year period would begin to be counted for each sector individually, so that no sector was in operations for longer than 30 years. This was finally clarified, and it was agreed that the contractual start date of operations for the purpose of determining the total duration of the PPP contract will be the day on which every irrigation sector is operational (that is, when construction of all sectors is complete), and the PPP contract and the operation of each section of the works will run for 30 years after that date.

The monitoring and reporting system for the operations phase is not as comprehensive and detailed as it is for construction. During the operations phase, the Project Company reports only water consumption and maintenance expenditure to the Procuring Authority, compared to a much wider range of performance metrics which are reported during construction. This is driven by the contractual arrangements, as construction costs are currently paid for by the Procuring Authority (as is detailed under the heading “Key Events” below), who therefore pay close attention to the construction works. Operational revenue comes entirely from user charges levied on landowners, and hence, there is less need for Procuring Authority involvement.

### Performance Monitoring and KPIs

There is a range of milestones relating to the progress of the project, including hectares available for irrigation, number of landowner agreements joining the irrigation system, hectares in operation, and increasing water consumption.

One of the challenges of the operations phase faced by the Project Company is that there are some clauses of the PPP contract that are difficult to fulfil from an operational point of view. For example, any damage to the infrastructure must be repaired within 48 hours of discovery, with deductions applied if this is not completed. This is not always feasible for the Project Company. For example, there was an incident where cables were stolen from a pumping station and replacing them required more than two days. However, the Procuring Authority believes this is necessary. A two-day delay in irrigation can seriously damage crops, and hence the requirement must be very strict. It was also agreed between the parties when entering into the PPP contract.

### Renegotiation

Various contract renegotiations took place between 2013 and 2015 to account for some changes that had occurred in the project up to that point. The changes covered by the first renegotiations were the reduction in pace of construction due to budget constraints of the Regional Government of Catalonia, as well as the change in construction scope that was required due to the requirement for the additional protected area for the birdlife. The renegotiations that occurred between 2013 and 2015, and the issues with financing and the protected areas for the birdlife, are described in more detail below under the heading “Key Events”.

It is understood that both the Procuring Authority and Project Company are now in agreement that there will be a requirement for an additional formal renegotiation of the PPP contract at a later date, to take into account the aspects that are likely to affect the financial performance of the Project Company as the project progresses. These include:

- Reduction in water available for irrigation. The requirement for additional protected area for the birdlife has limited the water available for irrigation to 300 GL/year, which is less than the 340 GL/year originally anticipated. Currently only 160 GL/year are being used, so this has not yet become an issue, however selling water is the key revenue source for the Project Company and so will have to be dealt with once the construction works are completed. The stakeholders interviewed anticipate that demand for water will be greater than what is available, given that the landowners will have already paid for construction of piping on their own land.
- To ensure financial viability of the project, the Project Company relies on landowners contributing to its revenue. If the pace at which the landowners are joining the project is slower than forecast, the Project Company may want to renegotiate a further contract extension, as it is currently taking this risk.

### Project Company Ownership

When financial close was reached, the Project Company contained nine equity investors, who were a mix of construction and operations contractors. One of these equity investors sold its shares to the remaining eight, with the largest three holding approximately 85% of the shares. This change of Project Company ownership did not cause any delays to the project and no approval was required by the Procuring Authority. The Project Company perceived it beneficial to have fewer equity investors to manage. The Project Company is also of the opinion that the equity interests of the construction companies and operating companies are well balanced, which helps to reduce the risk that one element of the project (i.e. either construction or operation) is prioritised over the other.

### Public Stakeholder Engagement

From the beginning, fewer landowners joined the scheme than had been expected, leading to a reduction in the Minimum Irrigation Area described above under the heading "Construction Phase". Many landowners considered the price of water too high and were unsure of the perceived benefits of joining the scheme. This has gradually improved, and the majority of landowners are expected to have joined once construction is completed. The Regional Government of Catalonia is committed to the project and is expected to budget around €30 million per year until 2030 to drive the completion of the construction phase, although this has not been formally agreed yet.

The main challenge with the landowners is the change in mind-set. They are used to managing non-irrigated land and changing to an irrigated system implies an investment and an additional operational cost that they will have to bear when joining the system. Also, the crops that can be cultivated on irrigated land are different, and many landowners are wary of this large-scale change.

Good engagement with landowners in irrigation projects must be a priority from the outset to ensure their viability. The Procuring Authority, together with the Project Company, is currently undertaking awareness-raising campaigns to engage the landowners. This involves the Procuring Authority running a publicity campaign to advertise the loans on attractive terms being offered to landowners to cover the cost of the additional work they are required to undertake, while the Project Company contributes to the campaign with information on success stories from the farmers who have already joined the scheme. So far this has been seen as a useful approach, as landowners are continuing to sign up.

### RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

There was some disagreement between the Procuring Authority and Project Company over how certain discussions were managed, especially those related

to environmental compliance. For example, the Project Company noted that the Procuring Authority negotiated unilaterally with the European Union environmental authorities with regard to the requirements to protect birdlife. As this was an issue that greatly affected the design and management solutions of the project for which the Project Company was responsible, the Project Company was of the opinion that it should have had some involvement in the negotiations in order to consider the impact. The Procuring Authority did not agree, and believes that the discussions with the European Union have been conducted appropriately.

### KEY EVENTS

#### Termination of the Loan Agreement

At financial close, the Project Company signed a loan agreement with a syndicate of banks to secure the financing necessary to complete construction of the project. A bespoke financing arrangement was provided to complete construction of the sectors whereby, once each sector was certified as complete, the liability for the repayment of the associated debt was transferred to the Procuring Authority under a sale of receivables model. The arrangement was for the Procuring Authority and landowners to then make regular payments over a 20-year period to pay off the debt. Operational revenue for the Project Company was to be generated from the tariffs charged to landowners who used the irrigation system.

During the Global Financial Crisis of 2007, the investment rating of the Regional Government of Catalonia was downgraded to junk status, and consequently the lenders terminated the loan agreement in 2012. The national government had a scheme at that time which allowed regional governments to borrow at a low interest rate. The Regional Government of Catalonia took advantage of this scheme to pay off all outstanding debt to the lenders, which was approximately €300 million.

When the loan was terminated, there were some sections of work which were still in construction, and hence the debt had not yet been passed to the Procuring Authority, as required by the bespoke financing arrangement described above. The Project Company absorbed the construction costs of these unfinished parts of the irrigation system and they are yet to be refunded by the Procuring Authority.

Since the termination of the Project Company's loan agreement, the Procuring Authority has been paying for the construction directly. The Project Company now acts as a project manager for the design and construction by subcontracting out the work for each of the sectors. It is then reimbursed for the work carried out. This is similar to how the Project Company managed construction prior to the termination of the loan agreement, and there was

no change in the construction contractor. Under the new arrangements, the Project Company takes limited risk for the design and construction, as the Procuring Authority assumes liability for all construction works, together with landowners joining the irrigation system and taking the responsibility for the irrigation works on their own land. The original arrangements remain in place from an operational perspective with the Project Company generating operational revenue entirely from landowners.

### **Compliance with Environmental Requirements**

The European Union Birds Directive stipulates the obligations of member states in relation to protecting birdlife, partly through requiring the introduction of what is referred to as "Special Protected Areas" to protect designated species of birds. In December 2007, the European Court of Justice ruled that Spain was failing to meet its obligations in the area covered by the Segarra Garrigues irrigation project. This required a significant change in the layout and size of the irrigated areas, and concurrently reduced the amount of water permitted to be removed from the Segre River. This added to the construction costs, which were entirely covered by the Procuring Authority, and required a renegotiation of the PPP contract to deal with the reduction in the water available for the irrigation. This was carried out by renegotiations between 2013 and 2015. One of the outcomes was to allow the extension of the construction period for 15 years on top of the original nine years, making a total of 24 years for the construction period. The operations phase remains as 30 years after construction is completed, and this remains viable as revenue from landowners is only used to cover operational costs, not to pay back any construction costs.

## **LESSONS LEARNED**

### **Good engagement with end users at an early stage during project inception and throughout the project is essential to ensure project viability.**

Engagement with end users is always important, especially when those users need to sign up to a project, i.e. pay user fees to ensure its success. In this project, it is clear that support from landowners was overestimated to begin with, leading to a lack of adequate engagement in selling the benefits of the irrigation scheme at an earlier stage.

The current awareness campaign run by the Project Company and Procuring Authority is seen as successful, as landowners are joining the project in greater numbers. Additionally, the Regional Government of Catalonia, through the Institute of Agricultural Credit, has offered soft loans to the farmers to help facilitate the inclusion of landowners in the irrigation system.

### **The Procuring Authority must carry out sufficient due diligence, to ensure that the scope of the project and any contractually prescribed reference design is compliant with all relevant legislation.**

It is crucial to ensure adequate due diligence and stakeholder consultation from an early stage of the project design and scope definition, as regulatory compliance can have a major impact on the project. This becomes particularly important for projects which are environmentally sensitive. Although the Regional Government of Catalonia approved the Environmental Impact Statement in 2002, this was not sufficient for the European Court of Justice. This led to a significant reduction of the irrigating areas and the total volume of water available for irrigation, which was prescribed in the conceptual design set out in the PPP contract. Increasing public concern over environmental issues, together with an ongoing evolution in relevant international regulations (e.g. European Union environmental regulations) may affect a PPP project at any stage.

In a similar way, any risk of challenge from environmental groups can be mitigated through earlier stakeholder engagement. This risk cannot be removed entirely, as some activists may disagree with the project at a fundamental level, however early and genuine engagement can discourage other groups from taking legal action.

### **Continuation of staff from construction through to operations improves the efficiency of managing the transition between the phases.**

Continuity of staff through transition phases improves performance. Many engineers who worked for the Project Company during the construction phase have continued through to the operations phase, and this has helped build trust between the parties. It is particularly important on projects that have a long crossover between the phases.

### **Over-specification in the PPP Contract, and development of input rather than output specifications, can have an adverse impact on the final design and whole-life costing.**

Overly prescribed specifications can limit the ability of the Project Company to innovate and develop efficient solutions. The contract requirements in this case were prescriptive in terms of the design solutions. For example, the contract specified the use of polyester pipes, which did not prove to be the optimal solution from a whole lifecycle point of view. As it was a contractual requirement, it was difficult to change.

**Government backing becomes very important in critical situations, such as lack of financing, and can mitigate the risk of project postponement or termination.**

In this project, the decision of the Procuring Authority to step in and repay the existing debt was driven by its financial exposure on other projects and its overall financial standing. Financial backing from the Spanish government was then provided to rescue the Regional Government of Catalonia as part of a wider strategy to help regional governments settle their existing debt with the loan providers. This allowed the project to continue in a situation which otherwise may have led to postponement or even termination.

## SPAIN

## Zaragoza Tramway



Image: "Tramway through Plaza Lanuza in Zaragoza" by Thierry Llansades / CC BY-NC-ND 2.0

## OVERVIEW

**Location**

Zaragoza, Aragón, Spain

**Sector**

Transport – Rail

**Procuring Authority**

Municipality of Zaragoza

**Project Company**

Sociedad de Economía Mixta Los Tranvías de Zaragoza, S.A.

**Project Company Obligations**

Design, Build, Finance, Operate and Maintain

**Financial Close**

30 November 2010

**Capital Value**

€350 million  
(USD \$465.7 million – 2010 exchange rate)

**Contract Duration**

35 years

**Key Events**

Delayed financial close and early construction before financial close was reached

## SUMMARY

Zaragoza is the fifth largest city in Spain. As was typical in other important cities in Spain, Zaragoza had a tramway since 1885. In the 1960s, investment in the tram system declined, and in 1976, the last tram line in Zaragoza disappeared, with the public transport service changed to city buses.

In June 2009, the Project Company, Sociedad de Economía Mixta Los Tranvías de Zaragoza, S.A., was awarded the PPP contract with the Procuring Authority, the Municipality of Zaragoza, to build a new tramway system, procure the rolling stock, and operate and maintain both the tramway and the rolling stock. The tramway system is 12.8km long, has 25 stops, two inter-modal parking garages and two depots, one of which is used as a main central terminal building. The 25 stops are served by both double and simple/single platforms.

Included in the PPP contract is the delivery, operation and maintenance of the rolling stock. The rolling stock is of the type Urbos 3, manufactured by Spanish company, Construcciones y Auxiliar de Ferrocarriles (CAF), who is also an equity investor in the Project Company. Each unit has five coaches, with a total length of 33 metres. An interesting design feature of the tram system is that it uses an on-board energy storage system, which accumulates the energy recovered during braking and can also charge during the 20 second stops, allowing the tram to run without an overhead power supply.

The project reached two different dates for commercial close. The first date is the provisional award and the second is the definitive award. That was the process to follow according to the Spanish law at the time, allowing one month for legal objections. This presents a last chance for any third parties to raise objections to the contract award or any irregularities that could have occurred during the tender and awarding process.

This project has won several awards, the latest being the Global Light Rail Award “Best Environmental & Sustainable Initiative”, awarded in London in October 2016.

### SUMMARY LESSONS LEARNED

- Having specialised staff dedicated to stakeholder engagement can provide opportunities to improve the service based on feedback received.
- Taking a holistic approach to addressing environmental and urban issues, as well as including the public in the decision-making process, can benefit all stakeholders and improve the overall outcome of a project.
- Collaboration can facilitate the development of innovative solutions.
- Having clear, measurable and achievable KPIs, regular independent monitoring, and facilitating data gathering in performance monitoring are all critical elements of the operations phase.

### PROJECT INCEPTION

#### Goals and Objectives of the Project

The Zaragoza Tramway project has its origins in the Zaragoza Sustainable Mobility Plan. The objective of the Zaragoza Sustainable Mobility Plan is to meet all transport needs of the city, while respecting the environment, the urban landscape and the cultural heritage of Zaragoza.

It arose from the need to equip the city with a complete transport network in response to its continued development, in addition to supporting the growing population, geographical expansion, and satisfying the needs of the people of Zaragoza in terms of travelling around the city in a safe, comfortable and efficient way.

With its daily service, the tram system is envisaged to meet the objectives of the Sustainable Mobility Plan. The co-existence of various means of transport in Zaragoza and the various links between them has led to a new form of multi-modal transport, which has offered improved comfort and flexibility for the users relying on public transport in their day-to-day activities.

The objectives of the Sustainable Mobility Plan are being achieved owing to the benefits of the project. The objectives are summarised as follows:

- Making Zaragoza a reference point for sustainability in Spain, thanks to the Sustainability Mobility Plan started by the Zaragoza Municipality.
- Bringing the city in line with other European cities that have opted to implement sustainable transport plans.
- Promoting the link between the different forms of transport in the city, thanks to its compatibility and ease of access to other means of urban transport.
- Improving alignment between different transport links, with concurrent stations or stops.
- Encouraging public participation in the use of public transport.
- Respecting the aesthetics, environment and traditional values of Zaragoza despite the changes that may occur on the streets of the city due to the introduction of a new tramway system.

This project has won 13 national and international awards. Municipalities from all around the world have visited this tram network to learn from it. This success comes from a commuter-friendly route design, which runs through the most central and populated areas, and is supported by a robust traffic demand study. Another key element in this success was the support of the shareholders (Zaragoza Municipality, CAF, TUZSA, Grupo Avanza, FCC Construcción, Acciona, Ibercaja y Concessia) and the rest of the stakeholders.

### MANAGEMENT OF THE PPP CONTRACT

#### Construction Phase

The design was developed using an existing outline design provided for the tender process. One of the key factors contributing to the project’s success is the design of the different areas and routes covered by the tram. The right of way was defined in the outline design. This selected route allows for a high number of users, who are provided with a transport link to and from areas of high demand.

The first 15 months of the construction phase were financed directly by the Project Company’s equity investors, with some funding also provided by the Procuring Authority during these initial stages. The delay in reaching financial close is discussed in more detail below under the heading “Key Events”.

The programme for construction anticipated two years for the first construction phase and another two years for the second construction phase. Substantial completion of the first phase of works was achieved six months in advance

of the date for final completion for that phase, with only minor works outstanding. At that point, as substantial completion for the first phase had been achieved, tram operation for the first phase and the corresponding milestone payment was made to the Project Company.

The construction phase also involved significant effort by the Procuring Authority and the Project Company in stakeholder management. Civil works in urban areas are complex, affecting a large number of public services and causing disruption to the daily lives of citizens and businesses in the area. To manage these public relationships with stakeholders, the Project Company employed a specific communications director. There were also information offices set up in several places around Zaragoza, so any individual or business could seek information about the project or any issues arising related to the construction phase.

### Operations Phase

As the construction programme anticipated two years for the first construction phase and another two years for the second construction phase, the operations phase under the PPP contract allows 33 and 31 years for the operations, for construction phases one and two respectively. This allowed the Project Company to start operations of the first constructed phase at the same time it was undertaking the construction of the second phase. This meant the Project Company was incentivised to finish the construction phase as soon as possible, to receive the relevant milestone payment and start operating and receiving the user-fee project revenue.

A customer service office was set up from the beginning of operations and is required to be operational during the entire operations phase as set out in the PPP contract.

### Performance Monitoring and KPIs

During construction, the Procuring Authority carried out intense monitoring of the works. This was a key element in the successful delivery of the works on budget and on time. A joint team comprising representatives of the Procuring Authority and the Project Company was created to supervise the works.

KPIs during the operations phase are also considered one of the key factors for success of the project. The key performance indicators in the PPP contract are called "Quality and Availability Indexes". There are around 15 indexes related to several aspects, like delays, cleanliness, etc. For every index, there is an associated payment deduction. The Payment Per Demand or Availability (PPD) is the amount paid by the Procuring Authority to the Project Company for the quality and availability of the tram's service.

These KPIs are thoroughly monitored by the Procuring Authority, which has four people full time in charge of controlling the quality of service.

Some KPIs associated with delays, for instance, are automatically generated by the software that controls the operation of the trams, which controls all aspects of the service (times of arrivals and departure in all stations, speed, location of the trams, etc.). Other KPIs are monitored via inspections carried out by the Procuring Authority.

KPIs seem to be working for both the Procuring Authority and for the quality of the service. From the Project Company's point of view, this monitoring is perceived to be too strict. However, undoubtedly this high level of monitoring is supporting the excellence in service and maintenance of all assets.

### Payment Mechanisms

In the construction phase, lump sum payments were made upon the completion of pre-defined construction milestones. Not achieving these milestones in the time specified and to the required quality was subject to deductions of up to €12 million (10% of the total subsidy payable by the Procuring Authority). This incentivised the Project Company to complete the milestones on time.

In the operations phase, the Project Company has three sources of revenue. The first is an availability payment (PPD) to the Project Company for the quality and availability of the trams' service. This payment depends on fulfilment of the KPIs described above under the heading "KPIs and Performance Monitoring".

The second source of income is a Payment Per User (PPU). This source has two parts; the first PPU income is received from the users as direct fares, and there is a second part that comes as a shadow payment, as the Procuring Authority pays an agreed amount for each user. The third, and final, source of revenue available to the Project Company is park and ride fares and advertising. This final source represents a small proportion of the total revenue sources.

The demand risk is shared between the Procuring Authority and the Project Company. The parties agreed a specific baseline level, and if the actual project revenue from user fees is more than 10% below the baseline level, the losses are shared 50-50 between the parties with no limit. If the revenue from user fees is over 20% above the baseline level, the Project Company retains 10% of the gains and the Procuring Authority the remainder (i.e. 90%).

For indicative purposes, the total of current income and revenue of the Project Company consists of 15% from quality and availability payments, 84% from payment per user revenue and 1% from park and ride fares. The stakeholders interviewed expect that these percentages will change in the future, when the tram will have a higher number of users, changing the percentages to 10%, 89% and 1% respectively.

In addition, the Project Company is required by the PPP contract to create a reserve account prior to starting the 10th year before handback. Then, every year until handback, starting with the 10th year before the handback and including the year of the handback, the Project Company must deposit in this reserve account 5% of the availability payments that the Project Company receives from the Procuring Authority. Any rolling stock improvements are expected to be covered by the reserve account.

### Change Management

As the design and construction risk was fully stepped down from the PPP contract to the construction contractor under the construction contract, claims for cost overruns and time delays were submitted in the first instance by the construction contractor to the Project Company. The Project Company would review and assess the validity of each claim made by the construction contractor and submit a corresponding claim to the Procuring Authority for its review and approval. No specific challenges have been identified by the stakeholders interviewed in relation to change management.

### Environmental and Urban Issues

Environmental aspects of the project were given a high priority from the beginning of the project. Considerable improvements of the existing green areas of the construction site have been undertaken.

For every tree that had to be removed for the construction of the tramway, two trees have been planted elsewhere. Also, the selection of the trees was carried out through a participative process, where neighbours and business owners were involved in the final selection of the tree species.

There is a stretch of 2km in the old town where an On-Board Energy Storage System (OESS) in the trains is used; this system avoids the need for overhead catenaries or any other system to charge the trams when they are rolling on this section. The OESS mounted on the trams are only charged while they are stopped at stations. Additionally, this system allows a reduction in the trams' electricity consumption when they are operated under catenary sections by means of storing the braking energy. The application of this innovative solution has a positive effect on total energy consumption and the visual impact of this infrastructure in a sensitive urban environment.

This project was also conceived as an opportunity to renovate the areas of the town affected by the construction of the tramway. The Project Company refers to the work in different streets of Zaragoza as a façade-to-façade intervention, providing a holistic approach to construction, instead of focusing solely on the infrastructure itself.

The Procuring Authority's approach in taking advantage of the construction of new infrastructure to improve the town's appearance is a good lesson on environmental integration and public engagement.

### Managing Disputes

The project did not have any disputes and any disagreements were generally handled through personal discussions between the senior management of the Project Company and the Procuring Authority.

In Spain, there are often no specific provisions for dispute resolution. All public contracts are regulated by the "*Ley de Contratos del Sector Público*" (Public Sector Contracts Law). This law regulates all contractual relationships between public administrations and private companies. If there is no agreement between the parties, the dispute goes directly to court.

## KEY EVENTS

### Delay in reaching financial close

Financial close was delayed due to the economic crisis in Spain in 2009, which affected the negotiation between the Project Company and its lenders, and delayed an agreement. However, the Project Company chose to begin the design and construction works in August 2009, before financial close had been reached. Financial close didn't occur until November 2010, so this meant that the design and construction for both the tramway and the rolling stock were mainly financed by the Project Company's equity investors for the first 15 months, although some financing was also provided by the Procuring Authority in these early stages. The first phase of the tramway system was inaugurated in April 2011.

The decision to start construction works and take the risk for the costs of the construction phase for more than a year demonstrates the scale of risk taken by the equity investors and their commitment to the project.

## LESSONS LEARNED

### Having specialised staff dedicated to stakeholder engagement can provide opportunities to improve the service based on feedback received.

During the construction phase, the Project Company's employment of a communications director responsible for the stakeholder communication strategy was considered successful for stakeholder engagement and management. During the operations phase, the existence of a customer service office is also a good way to manage communication with end users and the general public, and an opportunity to improve the service based on feedback received.

**Taking a holistic approach to addressing environmental and urban issues, as well as including the public in the decision-making process, can benefit all stakeholders and improve the overall outcome of a project.**

Environmental aspects of the project were given a high priority from the beginning. For every tree that had to be removed for the construction of the tramway, two trees have been planted elsewhere. Also, the selection of some of the trees was carried out through a participative process, where neighbours and business owners were involved in the final selection of the tree species.

Adopting a broad perspective towards this kind of infrastructure development in urban areas, and an openness to innovation, has generated benefits for all stakeholders and improved the overall outcome for the city. Taking advantage of the construction of the new infrastructure to improve the town's appearance is a good lesson on environmental integration and public engagement.

**Collaboration can help the development of innovative solutions.**

Collaboration, having an open mind about innovation, and adopting a strategic view about the introduction of an On-Board Energy Storage System (OESS) in the trams in specific areas of the town (with specific social and cultural interests) provided benefits to both parties and users.

**Having clear, measurable and achievable KPIs, regular independent monitoring, and facilitating data gathering in performance monitoring are all critical elements of the operations phase.**

Regular and independent monitoring of the quality of the services provided by the Project Company contributes to the satisfaction of the users and enables transparency and accuracy in the final payments to the Project Company.

UNITED KINGDOM

# Central Berkshire Waste Project



Image: "User drop off bays in Berkshire waste recycling center" courtesy of Re3 (Reading Borough Council, Bracknell Forest Council, and Wokingham District Council)

## OVERVIEW

### Location

Central Berkshire, United Kingdom (UK)

### Sector

Waste Disposal

### Procuring Authority

Reading Borough Council, Bracknell Forest Council, and Wokingham District Council (Re3)

### Project Company

Re3 Ltd

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

31 October 2006

### Capital Value

£48 million  
(USD \$93.9 million – 2006 exchange rate)

### Contract Duration

25 years

### Key Events

Dispute – Revenue Calculation

## SUMMARY

The Central Berkshire Waste project is a success story in terms of collaboration, overcoming challenges and the ability to adapt to changes. This private finance initiative (or PFI, as it is referred to in the UK) is a PPP for waste handling, treatment, transfer and disposal services which was conceived as part of a partnership between the Reading Borough, Bracknell Forest, and Wokingham District Councils. Since the date of financial close, it has lived through turbulent economic and political times, and it is currently operating in an environment that is very different from the time in which it was conceived.

The key event in this project is a difference of interpretation over revenue calculations. The parties had gone through different resolution processes, and the possibility of escalating the disagreement to the UK High Court was considered. However, both parties committed to reaching a negotiated settlement, and in finding a solution they demonstrated the effectiveness of clear communication and collaboration.

## SUMMARY LESSONS LEARNED

- Setting up a parallel informal audit to address issues with KPIs which no longer meet the Procuring Authority's goals may, in some circumstances, provide a suitable short-term solution.

- Co-location of the Procuring Authority and Project Company can help to more efficiently resolve issues at an early stage.
- Setting up an informal variation procedure may provide a solution if the formal variation procedure proves to be unworkable. It also highlights the need to set appropriate time periods when negotiating the PPP contract.
- Setting up a small, closed government industry network can have a positive impact on a program of PPPs in a particular sector, including through the sharing of knowledge.
- To help ensure that legal drafting is pragmatic, lawyers should be well supported by people who are involved after financial close, such as contract managers.
- Assigning employees who have not been involved in the lead-up to the dispute to the negotiations may provide independence required to resolve the dispute more efficiently.
- Processes of periodically reviewing KPIs may need to be considered to be included in PPP contracts to keep the project relevant to the needs of the time.
- Setting too stringent KPIs with small payment deductions may not provide enough incentive for the Project Company to achieve them.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

In 1998 the Reading Borough, Bracknell Forest, and Wokingham District Councils found themselves responsible for both disposal and collection of waste due to a change related to the organisation of local authorities. The three councils decided to partner together to address European Union and UK waste targets, which resulted in the creation of a joint committee known as the Waste Disposal Board.

The PPP contract was for the construction of waste handling, treatment, transfer and disposal facilities in Reading and Bracknell, the ongoing operations of these facilities, as well as receipt of municipal waste. The aim of developing these facilities was to increase household recycling to 50% and achieve 75% diversion from landfills no later than 2031.

The procurement partnership (Procuring Authority) was named Re3 to represent the three councils. The Project Company then chose to use the name of the partnership and call itself Re3 Ltd. While both the Project Company and the Procuring Authority carry the same name, there is no common ownership. The Project Company is owned entirely by private investors.

### The Economic and Political Environment during Inception

The project reached financial close in the third quarter of 2006. At this time the central government was ambitious in promoting private finance initiative PPP projects, and there was strong support for achieving waste targets. Financing for big projects was possible, and local councils were confident that they would be able to continue to pay for large and complex facilities.

The current environment in waste PPPs in the UK is completely different from the environment when the project was initiated. Much of the funding for local authorities in the UK comes from the central government, and after the Global Financial Crisis, and the introduction of austerity measures, the central government started to reduce this funding and support. Local authorities are responsible for funding waste PPPs, and they are finding themselves re-evaluating these projects, as their unitary payments are becoming unaffordable.

Currently, two waste projects are under the spotlight in the UK. In Manchester, a project was terminated after re-evaluation by local authorities and private parties, while in Sheffield, the City Council and the Project Company are in discussions over whether to continue.

## MANAGEMENT OF THE PPP CONTRACT

### Construction Phase

The construction phase for the development of the Central Berkshire Waste project did not see any significant disputes or delays. The construction of the facilities was due to take three years, and the Procuring Authority had a three-stage step-up payment mechanism. This meant that achieving certain construction milestones related to the two facilities in Reading and the facility in Bracknell affected the unitary payment, with each step-up increasing the portion of the unitary payment that was payable. This payment mechanism structure was in place to incentivise the Project Company to meet their construction milestones on time.

As the Project Company had taken the risk for design and construction, the construction contractor was self-monitoring the construction with the council monitoring "in the background". An independent certifier was also appointed by both the Procuring Authority and the Project Company to verify compliance with the output specifications, monitor progress and approve achievement of the construction milestones.

The risk monitoring system used by the construction contractor adopted a programme-based critical path method. This uses the theory of constraints, which is a methodology for identifying the most important barriers to achieving the goal and then improving that barrier so that it is not a limiting factor any more. The progress was

then continuously compared against the contingency time available (or float), whilst managing the risk of one activity or particular area compromising all the contingency available. The construction was completed on time, however it is difficult to assess how much of this was the result of the risk monitoring system employed by the construction contractor.

The councils were cautious not to take on additional risks, which was in line with the standard waste PPP contract they have adopted (the Waste Infrastructure Delivery Programme (WIDP)<sup>1</sup> Project Agreement). The councils rarely went further than attending weekly update meetings, and interventions were kept to a minimum as any more pro-active interventions would have been perceived as a precedent by the Project Company and could have implied that the Procuring Authority was taking on construction risk.

The sign-off of completion was eventually formalised following a detailed inspection performed by the Procuring Authority, the Project Company, the construction contractor, the operations contractor and the independent certifier.

### Performance Monitoring and KPIs

There are about 70 Key Performance Indicators (KPIs) in total contained in the PPP contract, including the secondary indicators, and while they are generally monitored by the Project Company and the operations contractor, the Procuring Authority performs a certain level of monitoring as well. The Project Company is currently meeting the KPIs consistently, and any payment deductions are minor. However, a small number of the KPIs are causing some tension, due to the Project Company viewing them as “draconian” and unachievable and the Procuring Authority seeing them as a continuing incentive for performance. This small number of KPIs have relatively low payment deductions and the Project Company’s view is that they don’t incentivise performance.

The KPIs for the project were set at the signing of the PPP contract, over 10 years before the writing of this case study, when the focus was on diverting waste from landfill. The Project Company was given the autonomy to achieve this however it saw fit, for example through incineration of waste. However, current government policy is now more focused on recycling and meeting recycling targets related to the circular economy. The KPIs therefore do not correspond well with the current goals of the Procuring Authority, as the Project Company is able to meet the KPIs without necessarily increasing the percentage of waste that is recycled. The KPIs are considered as “of their time”.

<sup>1</sup> The Waste Infrastructure Delivery Programme was established by UK Department for Environment, Food and Rural Affairs (also commonly known simply as Defra) to support local authorities to accelerate investment in the large-scale infrastructure required to treat residual waste.

To help address issues which are not fully covered by the current PPP contract, the Procuring Authority introduced a parallel process with an informal audit, reported back to the joint board, represented by Project Company and Procuring Authority members. The audit covers aspects which the Procuring Authority consider to be important, but are not covered properly by the KPIs. These are often more subjective indices, and hence may be better suited to an informal process.

The audit is shared publicly on the Reading Borough, Bracknell Forest, and Wokingham District Councils’ websites, however it is not advertised widely, as it does not exist to apportion blame or criticise the Project Company. Rather, it is published online to ensure that, should the performance with regards to these metrics drop, other councils and local authorities would be able to refer to it and proactively manage their own contracts, either with the same private partner or with others. The Procuring Authority is pleased with this process and did confirm that it was extremely helpful in addressing issues not monitored by the KPIs. The Project Company sees the audit as comprehensive and has no issues with the way in which it is currently implemented. However, this audit is not expected to last indefinitely, as it is not a requirement under the PPP contract and circumstances may change.

### Payment Mechanisms

For the operations phase, the unitary payment is linked to availability, a minimum tonnage guarantee by the Procuring Authority and subject to payment deductions linked to the performance KPIs. Above the baseline payment, there’s a cascade based on how the waste is treated (i.e. recycling or landfill), and the savings due to avoidance of landfill tax are a principal driver for the Project Company to recycle waste. A gain share mechanism exists, which allows for up to 50% of the savings due to avoiding landfill tax to be shared with the Procuring Authority. However, recently the baseline threshold has not been reached due to a fall in waste tonnage.

Availability payments are only made after the certification is issued by the lenders’ technical advisers. After the facility is certified, the performance-related payments are made based on the operational performance, which is measuring the amount of waste on the basis of weighbridge tickets and evidence of activity.

Over the year, an operational model is used by the Procuring Authority to forecast the expected level of business and type of processing to estimate how the payments will be allocated. Payments made are then reconciled with evidence submitted to ensure the accuracy of revenue calculations. The final reconciliation takes place six months after year-end.

## Change Management

Any material changes to the PPP contract have to abide by applicable procurement regulations. However, for smaller changes, the parties have found a way to smooth the process. It starts by one party submitting an informal notice of change, which explains the nature of the change and the reasons behind it. Keeping in mind that the change should be within regulations and the remits of the PPP contract, the informal notice is issued one month before the formal notice is issued. This is done to give each party the opportunity to review the notice, suggest amendments, and adapt to its implementation before it is formalised.

## ROLE OF GOVERNMENT

It was evident that the success of this project was partly due to the support from central government organisations and programmes. Two years from financial close of the project, the UK government initiated the Waste Infrastructure Delivery Programme to support local authorities in accelerating investment. The WIDP provides advice to local authorities and facilitates knowledge sharing between them. The WIDP's advices come in the form of published guides, and physical presence upon request. The contract management guides produced by the WIDP have contributed to the success of this project, and the knowledge sharing events organised by the WIDP have created a safe environment for local authorities to share knowledge effectively and directly.

WIDP was established by the Department for Environment, Food & Rural Affairs (also commonly known simply as Defra). WIDP provides commercial support to the relevant waste projects in England. For local authorities contracting waste private finance initiatives, the availability and expertise of WIDP acts as a counter balance to the private sector's commercial capability and budget. This did prove to be instrumental in the dispute, described under the heading "Major Events" below. The dispute process lasted for four years with significant costs incurred due to multiple adjudication proceedings.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

### Team Set-Up and Staffing

The Procuring Authority's project team was hired specifically for this project, and the majority of the members of the Procuring Authority's team who were involved in the procurement process have remained through the construction phase and into the operations phase. On the contrary, all Project Company staff who worked on the bid moved on once the PPP contract was signed. It was mentioned that there is a level of duplication of roles between the Procuring Authority and the Project Company.

This was seen as a poor allocation of resources that contradicts the spirit of the partnership, as there should be no need for two employees performing the same role for each party.

At the moment, the Procuring Authority has four employees working on the project. This was explained to be adequate, and while additional support would be useful this is unlikely to be affordable. For example, the Procuring Authority foresees a need to monitor the Project Company's financing obligations. The Procuring Authority did express the intention to work with the WIDP on this task.

### Training and Development

There is no structured training programme in the Procuring Authority's contract management team. The Procuring Authority did have a training budget, however, it was not fully utilised, and staff training is provided on a case by case basis. The WIDP also provides assistance with guidance and knowledge sharing which local authorities need for their development.

### Communications

From the three councils that make up the Procuring Authority, Reading Borough Council acts as the administrating authority. Thus, this council takes up the role of leading communications with the Project Company and stakeholders. The current strategy for public outreach is through social media, which has proven to reach more people at a lower cost than the previous arrangement of scheduling public meetings.

The Procuring Authority and the Project Company are co-located in a single location for the operational management of the PPP contract. This has helped greatly in building a strong relationship between the parties. The day to day interactions acted both as a deterrent to hostile behaviour and facilitator in building strong relationships. The nature of the relationship has matured to the extent that both parties continued to operate amicably even after a period in which they took wholly different positions on the sharing of revenue.

### Information Management

Both parties started with a shared information platform for data sharing, however this proved to be more complicated than was required for a project of this scale. The remedy was to take advantage of the co-location set-up and work together instead of using a virtual space.

## KEY EVENTS

### Dispute – revenue calculations

In 2010 a formal notice of dispute was issued by the Procuring Authority, five years after financial close, regarding the calculation of excess revenue. The parties went through multiple adjudication proceedings, and the dispute was almost escalated to the High Court before a resolution was reached for the benefit of each party.

One of the factors leading to the dispute appears to be a reduction in amount of waste collected from 2009 onwards. The reasons behind this reduction are hard to pinpoint to one single cause, as an interplay of various factors probably contributed to this, such as demographics (e.g. changes in local population, the nature of residential developments), a reduction in consumption (and hence waste generated) due to the Global Financial Crisis, or changes in local authorities' operational policies (e.g. collection versus disposal). The reduction in tonnage changed the financial outcomes for the Project Company, and in this context financial flows and payments came under close scrutiny. This led to the Project Company interpreting the PPP contract in a different way to the Procuring Authority, which took the view that the Project Company was withholding payments related to excess revenue.

While there were provisions in the PPP contract for dealing with disagreements of this kind, eventually the parties reached a stalemate. From the point of view of the Project Company, this was broken by bringing in people who had strong relationship building skills who then focussed on improving the relationship with the Procuring Authority. As the staff were new, they had a more independent view as to what had occurred previously and were able to take a more pragmatic approach.

It is important to note that the lack of agreement on the precise workings of the PPP contract, as well as ambiguity in the PPP contract itself, led to this dispute reaching a stalemate. A difference in views between two parties to a contract is common, especially given the length and complexity of this kind of project, and the challenge is therefore to find a way to overcome these disagreements without risking ending up in dispute. In this case a better understanding of what the PPP contract required would have helped improve outcomes for all parties.

As part of the solution adopted, the parties have negotiated some changes to the PPP contract conditions and payment mechanism to provide additional clarity and remove any residual ambiguity.

## LESSONS LEARNED

**Setting up a parallel informal audit to address issues with KPIs which no longer met the Procuring Authority's goals may, in some circumstances, provide a suitable short-term solution.**

An informal, parallel audit is conducted on aspects that aren't well covered by the KPIs in the PPP contract. The Procuring Authority introduced the parallel process, which is reported back to the joint board, represented by Project Company and Procuring Authority members. The audit covers aspects which the Procuring Authority consider to be important, but are not covered properly by the KPIs. This is published online, and has encouraged the Project Company and the operations contractor to improve their performance in these areas.

This is a salient point both in terms of the issues with the initial setting of KPIs in a PPP contract at its signing and also outlines an approach to dealing with outdated KPIs.

**Co-location of the Procuring Authority and Project Company can help to more efficiently resolve issues at an early stage.**

The Procuring Authority and the Project Company are co-located in a single location for the operational management of the PPP contract. Co-location of the offices helps greatly with relationship building on a day-to-day basis, and in particular during challenging times, such as disputes. Face to face interaction between the parties helps to resolve the issues before they are escalated through the formal contractual mechanisms.

**Setting up an informal variation procedure may provide a solution if the formal variation procedure proves to be unworkable. It also highlights the need to set appropriate time periods when negotiating the PPP contract.**

The parties have introduced an informal variation procedure which they go through before the formal notice stipulated under the PPP contract is issued. This helps both parties familiarise themselves with the change, and allows tweaks to be made before it is introduced formally. Change orders and variations during the operations phase are in many instances driven by changing market needs and any changes in the Procuring Authority's policies or other external factors, which is common in long-term PPP contracts.

This practice, in this case, demonstrates a successful method of addressing the issue of variation procedures in the PPP contract that do not provide the parties with enough time to familiarise themselves with the issues. It also highlights an interesting lesson for the drafting of PPP contracts and the need to set appropriate time frames within the variation procedures to allow the parties to deal with the issues properly.

**Setting up a small, closed government industry network can have a very positive impact on a program of PPPs in a particular sector including through the sharing of knowledge.**

A small, closed industry network, such as the WIDP in the UK, helps promote best practice and knowledge sharing. The members are comfortable to talk openly to their peers and share lessons learned, and the WIDP has also issued a contract manual which is widely used and considered helpful. This kind of network can provide transactional support and any other contract management advice on specific issues, and helps the members stay abreast of topical issues and challenges faced by fellow members.

**To help ensure that legal drafting is pragmatic, lawyers should be well supported by people who are involved after financial close, such as contract managers.**

It is important, to minimise areas of ambiguity, that when drafting the PPP contract, both parties agree on terms and processes addressing interfaces and grey areas in the PPP contract before contract signing where possible to mitigate the risk of different interpretations and disputes. Lawyers should be well supported by contract managers and other relevant people involved after financial close to ensure legal drafting is pragmatic.

**Assigning employees who have not been involved in the lead-up to the dispute to the negotiations may provide independence required to resolve the dispute more efficiently.**

It is natural for people who are involved in a disagreement to have strongly held views. When a dispute escalates, it can be beneficial to involve employees who have not been involved in the lead-up to the dispute and focus more on relationship building and negotiation.

**Processes of periodically reviewing KPIs may need to be considered to be included in PPP contracts to keep the project relevant to the needs of the time.**

The nature and length of PPP contracts demands some degree of flexibility for reviewing and re-assessing KPIs. The needs of the market and the users will not likely remain the same all the way through to the end of a project as they were during inception. KPIs should be reviewed regularly to assess whether they have become outdated with regard to the current market or public needs. Processes of reviewing, adding, or discarding KPIs may need to be considered to be included in the PPP contract in order to keep the project relevant to the needs of the time.

**Setting too stringent KPIs with small payment deductions may not provide enough incentive for the Project Company to achieve them.**

There are about 70 KPIs in total contained in the PPP contract. The Project Company is currently meeting the KPIs consistently, and any payment deductions are minor. However, a small number of the KPIs are causing some tension, due to the Project Company viewing them as “draconian” and unachievable and the Procuring Authority seeing them as a continuing incentive for performance. This small number of KPIs have relatively low payment deductions and the Project Company’s view is that they don’t incentivise performance.

## UNITED KINGDOM

## Intercity Express Programme



Image: 'Class 800 Trains with Train Operating Company (TOC) Liveries' Courtesy of the UK Department for Transport

## OVERVIEW

**Location**

United Kingdom (UK)

**Sector**

Transport – Rail / Rolling Stock

**Procuring Authority**

UK Department for Transport

**Project Companies**

Agility Trains West Ltd and Agility Trains East Ltd (collectively, the Project Company)

**Project Company Obligations**

Design, Build, Finance and Maintain

**Financial Close**

July 2012 (Great Western Route, as part 1 of the project) and April 2014 (East Coast Route, as part 2 of the project)

**Capital Value**

£5.7 billion  
(USD \$8.892 billion – 2012 exchange rate)

**Contract Duration**

27.5 years

**Key Events**

Changes required due to delays in electrification of the Great Western Main Line, refinancing

## SUMMARY

With large numbers of intercity trains on the UK rail network approaching the end of their service life, and additional capacity required to serve increased passenger numbers, the Procuring Authority, the UK Department for Transport, awarded two contracts to supply, finance and maintain a fleet of new trains. Given its scale, the project was split into two parts; one for the Great Western Main Line and one for the East Coast Main Line, with each of the Project Companies (namely Agility Trains West Ltd and Agility Trains East Ltd) being responsible for the trains for one of the main lines. As the two arrangements take the same form, this case study will largely refer to one PPP contract and one Project Company. The UK private train operating companies (the Train Operators) will pay the Project Company to use the trains, subject to performance and availability standards being met.

The electrification of the Great Western Main Line, originally due to be completed by 2015, was delayed, and the Procuring Authority took the decision to increase the number of bi-mode trains (electric plus diesel capability, rather than solely electric) for that particular line and to reschedule delivery.

At the time of writing this case study, almost half of the trains required to operate on the Great Western Main Line had entered into service operation.

## SUMMARY LESSONS LEARNED

- Changing external advisors at key moments may create additional risks to a project.
- A strong relationship between the Procuring Authority, the Project Company and other key stakeholders can help to mitigate the potential impacts of new issues.
- Resourcing is required to manage all relevant stakeholders, particularly where there are complex interfaces between multiple parties.
- Risks related to third parties with which the Project Company does not have a direct agreement will typically be retained by the Procuring Authority, which means it will have to manage those third parties.
- Where Procuring Authorities can share in a potential refinancing gain with the Project Company, they should be mindful of potential opportunities in the financial markets as they may lead to substantial benefits for the Procuring Authority.
- Variation provisions in PPP contracts should be workable and not overly complex. There are also times when the Procuring Authority should adopt a flexible approach to facilitate delivery of the broader benefits of the project.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The Intercity Express Programme project was initiated in 2005, with the Procuring Authority's business case showing that, at that point in time, trains were only just providing sufficient capacity to meet demand, and that existing trains were approaching the end of their expected service life. Major investment was required to ensure that high capacity, reliable services would be able to be provided over the medium- to long-term. The Procuring Authority ran a procurement process for a new fleet of trains for the two regions, and given its scale, the project was split into two parts, both of which reached commercial close in July 2012. The two lines are:

1. The Great Western Main Line, covering the region to the west of London. These works included 57 trains, the development of two depots and the refurbishment of one depot. It reached financial close in July 2012.
2. The East Coast Main Line, covering the intercity routes from London along the east coast of the UK. These works included 65 trains, two refurbished depots and one new-build depot, and it reached financial close in April 2014.

The decision to pursue a public-private partnership (PPP) model to procure the required rolling stock was taken due to the size of the undertaking and a desire to drive

value for money for the public sector. The common procurement route for trains in the UK is for private train leasing companies (referred to in the UK as Rolling Stock Operators, or ROSCOs) to procure and then lease new rolling stock to the Train Operators. However, with 122 new trains to be brought into service (consisting of 866 individual carriages) as part of this project, with a total capital value close to £5.7 billion, this was judged to be too large to follow this common route. The size of the deal also influenced the rationale for delaying financial close of the East Coast trains, as there may not have been sufficient capacity in the financial markets to complete both parts of the project simultaneously.

Some of the challenges of the project were anticipated before commercial close. The PPP contract included the concept of 'contemplated variations', which allowed the Procuring Authority to request variations should certain circumstances arise. These challenges included the following:

- The government was required to play a key role in managing the interests of various stakeholders. The UK rail network is operated by private Train Operators who bid to run a section of the network (a "franchise") for a period of time, generally seven years. The two main lines of the project (Great Western and East Coast) are run by separate franchises and were operated by different Train Operators during the design and manufacturing phase. The Procuring Authority needed to play a substantial role in managing these stakeholders in the development of detailed specifications during the design phase to agree a uniform base specification.
- The operation of the electric trains on the Great Western Main Line was dependent on the electrification of the line itself. When the PPP contract was being finalised, the plan was to electrify the line from London to Cardiff in Wales, which is approximately 145 miles (232km). Electrification of the line is the responsibility of Network Rail, who is the owner and manager of UK rail infrastructure. There was a risk that this work may be delayed, and the materialisation of this risk is described below under the heading "Key Events".

The contractual arrangement for the project is based on two agreements. The first agreement is the Master Availability and Reliability Agreement (referred to here as the PPP contract) between the Procuring Authority and the Project Company. It includes the guarantee that the Procuring Authority will require the Train Operators to enter into a contract with the Project Company and provide availability payments for the rolling stock throughout the life of the contract. The second agreement is the Train Availability and Reliability Agreement (the Interface Agreement) directly between the Train Operators and

the Project Company. The Interface Agreement defines the requirements for maintaining and making the trains available to the Train Operators for use on the network, as well as the corresponding availability payment obligations due to the Project Company. Delivery and maintenance of the rolling stock is passed down under a supply and maintenance contract from the Project Company to Hitachi Rail Europe, who is also the majority equity investor in the Project Company.

### **Project Company Organisation**

The contractual arrangements described above (the PPP contract, the Interface Agreement and the supply and maintenance contract) are on the same terms for both the Agility Trains West Ltd and Agility Trains East Ltd Project Companies, which were both initially owned by Hitachi (70%) and John Laing (30%) as equity investors.

The equity investors made the decision to establish a single management team working across both projects due to the commonality of contractual structure, ownership, and train design, delivery and operation. This management team was primarily resourced from long-term secondees from the equity investors. This structure proved extremely valuable in providing an effective single point of contact with the Procuring Authority team, who were also managing both contracts. Consequently, the Procuring Authority was constantly aware of the developing circumstances of the projects, particularly around delayed electrification, and could facilitate the negotiation and agreement of the variations ultimately required to address those issues.

This approach also meant that the Project Company, its equity investors and their financial advisors could develop a strong team to work with the lenders to raise the finance for both projects (and the additional loan agreements required for the subsequent variations). Hitachi's relationship with Japanese banks was also important for this.

### **The Economic and Political Environment during Inception**

The discussion on new intercity rolling stock began in the mid-2000s, with the project information released to the market in 2007. The preferred bidder, the Agility Trains consortium led by Hitachi, was selected in 2009, but the project was subsequently put on hold. This was due to the reduced capacity of the financial markets to provide finance as a result of the Global Financial Crisis, as well as the decision made in 2009 to electrify the Great Western Main Line, changing the requirements for the project. There was also another significant rolling stock procurement programme running at a similar time (Thameslink, where the preferred bidder was chosen in June 2011), as well as the major M25 highway project, which together had the potential to stretch the resources of the Procuring Authority and the financial markets.

In March 2010, a value for money review was carried out on the project, and the government also conducted a comprehensive spending review on all government expenditure. Additionally, there was a change in government in the UK in 2010. It was finally decided in 2011 to continue with the project, with the Agility Trains consortium remaining as preferred bidder.

## **MANAGEMENT OF THE PPP CONTRACT**

### **Construction Phase**

The Procuring Authority played an important role during the design and manufacturing phase of the project. At financial close, the Procuring Authority had developed a technical specification for the trains describing the output requirements, however the design specifications from the tender stage were limited. Targets had to be clarified, the specification had to be finalised into detailed design requirements, and these had to be reviewed. Input into all these stages was needed from both of the affected Train Operators, who sometimes had differing views. The Great Western Line has substantial demand from commuters who travel regularly into London, while the East Coast Line is used more for discretionary travel, and hence the specific needs (in terms of design and technical specifications) of the two lines can differ. During the design and manufacturing process, the Procuring Authority relied on their technical advisors, and considered it important to keep the same advisors throughout the entire process. In addition to providing the rolling stock, the Project Company was also responsible for constructing and refurbishing train depots.

The electrification of the Great Western Main Line was not part of the project. However, those works needed to be completed in order for the new electric trains to be tested and then used. When Network Rail did not deliver on time, the programme for manufacturing the rolling stock had to be altered to increase the number of bi-mode trains, and the design of the depots had to be updated to cater for the bi-mode trains' diesel engines. This is described in more detail under the heading "Key Events" below.

### **Operations Phase**

At the time of writing this case study, the operation of trains on the Great Western Line had just begun. The data collected by the Procuring Authority on the initial performance of the line will be used to evaluate the original business case, in terms of the benefits of the new rolling stock and the maintenance requirements.

### **Payment Mechanisms**

The project was set up such that the Project Company does not receive any revenue until trains enter service, at which point it receives availability payments, which are paid

by the Train Operators to the Project Company for each train in service and are subject to payment deductions. There are no additional payments from the Procuring Authority, though the availability payments payable by the Train Operators are guaranteed by the Procuring Authority. This arrangement incentivises the Project Company to bring the trains into service as soon as possible, as it was not receiving any revenue during the design and manufacturing stage.

The Train Operator pays the set availability payments to the Project Company on the basis of a specified number of trains being made available to the Train Operator at the start of each operational day. The Train Operator is responsible for returning the train to the Project Company at the end of the day. Under the performance regime, deductions can be levied by the Train Operator if trains are not made available for passenger service at the start of the operational day, or if train faults impact service provision during the day.

Further deductions can be imposed under the KPI regime for aspects relating to the condition of the trains themselves, such as cleanliness. A form of score board for 84 agreed KPIs is set out in the contract to monitor the KPI regime. The KPIs are divided into two groups; presentation of the physical condition of the train (e.g. scratches) and cleanliness. The Project Company populates these scoreboards every time the train is handed over to the Train Operator and the scoreboards are reviewed again during regular performance review meetings.

The set availability payment is paid in advance, with deductions applied retrospectively. This performance regime is a significant change for the Train Operators, who generally lease their other rolling stock and are responsible themselves for their maintenance. The Project Company is aware that this process will need to include a transition period for the Train Operators, and it has been working with them in advance of the trains coming into operation to avoid confusion and disagreement at a later stage. The Procuring Authority is also paying particular attention to the performance regime during the initial operational period.

### **Change Management**

There have been a number of variations during the design and manufacturing of the rolling stock, primarily due to the delays and changes to the programme for the electrification of the Great Western Main Line. The original intention had been to electrify the line to Cardiff. However, this was then changed to extend electrification to Swansea, a decision which was later reversed. Each of these changes implied an alteration to the type of train being delivered, as well as changes to the depots, which are also part of the project.

The largest, most time-consuming variations to the project were fundamental and all essential if the project was to respond to the delays in the provision of the electrified infrastructure. The subsequent commercial negotiations were complex and time-consuming. It should also be recognised that the complexity of the contracts, their variations, and the need to secure the lenders' approval inevitably meant that external advisors needed to be heavily involved. Nevertheless, both parties worked collaboratively to overcome these challenges. The Procuring Authority recognised that the primary objective had to be the achievement of fair, and properly established, negotiated and agreed pricing, as well as other operational and contractual amendments.

### **ROLE OF GOVERNMENT**

The role of the Procuring Authority during the design and manufacturing phase was substantial and clear. During the operations phase, this role will be significantly reduced, as the payment and performance mechanisms are predominantly between the Project Company and the Train Operators. In the interim period, where trains are starting to be introduced into the network, the Procuring Authority's role is less clear. The Procuring Authority is managing this to ensure it is not exposed to additional risk during this period.

### **Refinancing**

A refinancing occurred on the project in 2014. The East Coast phase of the project reached financial close in 2014, and the financing terms were better than those offered for the Great Western financing in 2012. The opportunity for refinancing was identified by Her Majesty's Treasury, with the Procuring Authority issuing a Refinancing Notice to request that the Project Company take advantage of the financing opportunity available. The final arrangement of the refinancing was an "all lender agreement repricing", where the lenders who had originally signed up agreed to new terms. The PPP contract sets out a schedule for sharing the refinancing gain between the parties. The refinancing was completed in a relatively short period of time, with 80% of the gains payable to the Procuring Authority resulting in approximately £60 million in savings.

### **RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY**

#### **Team Set-Up and Staffing**

The Procuring Authority team on this project is relatively small, and external advisors are used where specific technical, legal and financial expertise is required. Having most of the Procuring Authority staff continue from the tender negotiations into the implementation of the project was beneficial for retention of knowledge.

There was a change in the legal advisors used by the Procuring Authority, which created inefficiencies, as documents and knowledge had to be transferred. This may have been avoided by continuing with the same legal advisors or managing the transition between legal advisors more effectively.

### Training and Development

As this was the first PPP of this nature that the Procuring Authority had completed in recent times, the Procuring Authority had limited experience in managing this type of contract. Furthermore, the most recent introduction of a new train fleet prior to this project was in the early 2000s. As a result, there was a lack of expertise early on, and so this had to be developed and brought in. The Procuring Authority has since focussed on project management and assurance, with gradual improvements in commercial expertise, procurement and contract management.

### Communications

The Procuring Authority and the Project Company are both primarily based in London, which has enabled a collaborative relationship through face to face interactions. This was done consciously by both the Procuring Authority and the Project Company, helped by the fact that their concerns are often aligned. This collaboration and alignment of concerns helps to avoid an adversarial relationship between the two parties. The parties have not, however, co-located, which the Procuring Authority sees as positive due to the necessary degree of separation it provides.

### Information Management

The Procuring Authority has not prescribed an information and data management system. The Project Company submits reports via email in advance of monthly review meetings. There was a shared data management system used during the design phase, as well as a shared risk register, however this was done for practical reasons rather than as a strict requirement. This has allowed the parties to adapt their working styles to the circumstances.

## KEY EVENTS

### Dealing with the Delay to Electrification

The rolling stock for the Great Western Main Line was originally due to be split between 29x five-car bi-modes, 15x eight-car bi-modes and 13x eight-car electric trains. Bi-mode trains are electric trains that are equipped with underfloor diesel generators to provide propulsion where lines are not electrified. There had never been plans to electrify all the lines on which intercity trains operated on the Great Western network. Having part of the fleet bi-mode allowed continued operation onto the non-electrified routes and also a degree

of operational flexibility, in particular to use non-electrified diversionary routes during engineering work or disruption. There were contractual commitments to provide the electrified track for both testing as well as for operations.

In early 2015, it became apparent to both the Procuring Authority and Project Company that the planned electrification of the Great Western Network, necessary to support both pre-commissioning and testing activities as well as the eventual operational deployment of the primarily electric IEP fleet, was not going to be delivered according to Network Rail's original timetable.

To mitigate this forecasted delay and its associated implications, the Project Company and Procuring Authority worked to develop a number of contractual variations that: (i) converted the electric-only IEP trains into bi-mode IEP trains able to run without overhead wires, (ii) made the necessary modifications to the depots to accommodate and service diesel trains and (iii) addressed the commercial consequences of the delay in the provision of the necessary testing infrastructure and the resultant delay to the original entry into service date.

The Procuring Authority and Project Company were able to deal with this challenge successfully due to the strength of the relationship between the two parties, and also the commitment of the Project Company, together with its manufacturing contractor, Hitachi, to deliver the rolling stock with as little delay as possible. A commitment to finding a practical way to overcome challenges was seen as vital by all parties and, again, working closely with Hitachi, a revised delivery schedule was agreed, and the costs of delay were mitigated. There have been no formal disputes between the parties.

## LESSONS LEARNED

### Changing external advisors at key moments may create additional risks to a project.

The project has highlighted the importance of keeping the same key staff and advisors for a long period of time wherever possible, especially on long-term and complex contracts such as PPPs. A Procuring Authority will almost always rely on external advisors on technical, legal and financial issues in complex transactions, and changing the advisors part way through the project, particularly at key phases, creates additional risks and should be avoided where possible. In this example, the Procuring Authority was required by central government policies to retender advisory contracts, which resulted in a change of some of its advisors.

**A strong relationship between the Procuring Authority, the Project Company and other key stakeholders can help to mitigate the potential impacts of new issues.**

The strength of the relationship between the Procuring Authority, the Project Company and Hitachi allowed the Procuring Authority to deal with challenges caused by external factors, such as delays in the electrification of the rail line. In this case, a collaborative approach combined with a payment mechanism which incentivised the private partner to deliver the trains as quickly as possible allowed the track electrification issues to be addressed with minimal delay to the project itself. This was also helped by the drive and commitment of the Procuring Authority team's leadership, which, in this case, was vital to overcoming challenges.

**Resourcing is required to manage all relevant stakeholders, particularly where there are complex interfaces between multiple parties.**

The effort required to manage a range of stakeholders should not be underestimated, particularly in a multi-faceted environment such as the UK rail industry. In this case, the process of managing two Train Operators during the design and manufacturing phase was more challenging than anticipated, as it required additional effort and resources to balance the desires of two different operators which were not always aligned.

**Risks related to third parties with which the Project Company does not have a direct agreement will typically be retained by the Procuring Authority, which means it will have to manage those third parties.**

The electrification of the Great Western Main Line and the works required under the project were both independent and interdependent projects, and at the time of signing the PPP contract, Network Rail was an independent company with which the Project Company did not have a relevant, direct agreement. The Project Company and the Procuring Authority agreed that the Procuring Authority should retain the risk for electrification delays caused by Network Rail. Network Rail was reclassified as an arm's length public body in 2014, which means that it retains operational independence but the board of directors reports to the UK Secretary of State for the Department for Transport. While this change now gives the Department for Transport some additional influence over Network Rail's performance, management of Network Rail's performance to deliver on time remained a risk for the Procuring Authority. The delays and costs caused by the delay in electrification demonstrate the impact third parties can have on the overall programme of works. The complexities and unique features of the UK rail industry led to the eventual materialisation of this risk.

**Where Procuring Authorities can share in a potential refinancing gain with the Project Company, they should be mindful of potential opportunities in the financial markets as they may lead to substantial benefits for the Procuring Authority.**

Refinancing can sometimes be used to extract value and generate savings from a project, and it is common in advanced PPP markets for PPP contracts to allow the Procuring Authority to request refinancing and share in the Project Company's savings. In order to do so, the Procuring Authority must have the necessary expertise to recognise that an opportunity exists in the financial markets, and to carry out the process quickly enough to take advantage of market conditions. Refinancing the project resulted in substantial benefit for the Procuring Authority.

**Variation provisions in the PPP contracts should be workable and not overly complex. There are also times where the Procuring Authority should adopt a flexible approach to facilitate delivery of the broader benefits of the project.**

The Intercity Express Programme included a concept of "contemplated variations", which defines a process for one party to request a variation should certain circumstances arise. The concept was designed to simplify the process in agreeing changes where a certain level of agreement of likely changes was understood between the parties at the time of signing the PPP contract. In this case, the circumstances were more complex than anticipated, with electrification delays being much greater than what would have reasonably been expected. This meant the "contemplated variations" clauses weren't completely helpful, and the Procuring Authority decided to adopt a flexible approach.

USA

# I-495 Express Lanes



## OVERVIEW

### Location

Virginia, United States of America (USA)

### Sector

Transport – Roads

### Procuring Authority

Virginia Department of Transportation

### Project Company

Capital Beltway Express LLC

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

21 December 2007

### Capital Value

USD \$2.069 billion

### Contract Duration

80 years

### Key Events

Transition from contract signing to construction, and from construction to operations

## SUMMARY

The I-495 Express Lanes PPP (generally referred to in North America as P3) project consists of the construction of two additional high-occupancy toll (HOT) lanes per side along a 14-mile segment of the Interstate 495 highway (I-495) in the state of Virginia.

The I-495 is an interstate highway which surrounds Washington D.C. and is widely known as the “Capital Beltway”. The I-495 Express Lanes project, also known as the “E-ZPass Express Lanes”, consists of the expansion of a 14-mile segment of the I-495 extending from the Springfield Interchange to a point north of the Dulles Toll Road, in the state of Virginia. The project began when the Procuring Authority, the Virginia Department of Transportation (VDOT), signed an agreement with the Project Company, Capital Beltway Express LLC, in April 2005. However, financial close was not achieved until December 2007. The Project Company’s equity investors comprised of Fluor Corporation and Transurban at financial close.

A number of challenges arose during project delivery. By working collaboratively in a focused project office, committing appropriate resources to meet peak production periods, and working closely with the Project Company, these challenges were overcome and construction was completed ahead of schedule. The project opened early, on budget and with an industry-leading safety record.

## SUMMARY LESSONS LEARNED

- The level of Procuring Authority oversight must align with the risk profile of the PPP project. The Procuring Authority may also need to commit additional resources during peak production periods to meet its contract management obligations.
- Early and comprehensive public engagement with key stakeholders can deliver a better project for the community and for the project sponsor.
- Robust and early customer engagement with end users before operations begin, especially where new and unknown technologies are involved, is critical to a successful opening of a tolled facility.
- Allocation of operational responsibilities should be based on which party is best positioned to manage assigned responsibilities.
- Ensure adequate time is built into the project schedule for testing and commissioning of complex tolling and traffic management systems.
- Promoting opportunities for disadvantaged businesses, including small, women-owned and minority-owned businesses, can help the Procuring Authority meet broader policy objectives.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

In the early 2000s, the Procuring Authority began advancing plans for a traditional highway expansion to help address growing congestion on the Capital Beltway I-495 in Virginia. The plan faced significant opposition from the community, because it was considered unaffordable, required the demolition of more than 350 homes and businesses, and did not provide the transit options needed to support the local business district. In 2002, the private sector proposed an alternative plan under the Public Private Transportation Act – to build four new HOT lanes that would expand capacity and deliver new travel choices, including a network for buses and carpools. The Procuring Authority embraced the proposal. A partnership with the private sector and tolling would help the Procuring Authority deliver improvements more quickly and with fewer tax dollars, provide new travel choices, and reduce impacts on the community and the environment. The new approach would also reduce the number of homes which needed to be demolished from 350 to just eight.

The Procuring Authority advanced a competitive procurement, a series of environmental reviews, and a public engagement process for the new project. In 2005, local leaders voted to include HOT lanes as part of the

region's long-range transportation plan. In 2007, the Procuring Authority finalised a long-term partnership agreement with the Project Company to design, build, finance, operate, and maintain the USD \$2.069 billion HOT lanes project.

The Project Company's equity investors provided a substantial upfront equity commitment to help fund construction and financed the rest of the project through Private Activity Bonds (PABs) and a Transportation Infrastructure Finance and Innovation Act (TIFIA) loan. PABs are tax-exempt bonds issued by or on behalf of local or state government, to provide special financing benefits for qualified projects. The financing is most often for projects of a private party, and the government generally does not pledge its credit. The TIFIA loan program has a strategic goal to leverage limited Federal resources and stimulate capital market investment in transportation infrastructure by providing credit assistance in the form of direct loans, loan guarantees, and standby lines of credit (rather than grants) to projects of national or regional significance. The arrangement enabled the state of Virginia to leverage private capital to translate every state tax dollar into four dollars of transportation improvements.

According to the project website<sup>1</sup>, the project supported 31,000 jobs and injected approximately USD \$3.5 billion into the economy. The Project Company contracted USD \$490 million of work to disadvantaged businesses and small, women-owned, and minority-owned businesses, which was the largest contribution in Virginia's history for such businesses for a single transportation project at the time.

## MANAGEMENT OF THE PPP CONTRACT

### Transition from financial close to construction

Design plan development, and design review and approval processes initially took longer than anticipated. Through additional resources, improved processes, and a focused, collaborative effort, both parties were able to bring the project back on schedule.

### Construction Phase

During construction, the existing eight-lane (four lanes per carriageway) Beltway was widened to a 12-lane facility, consisting of four general-purpose lanes per side and two HOT express lanes per side, located to the left of the general-purpose lanes. Construction required the replacement of more than 50 overpasses and bridges and the reconstruction of ten interchanges. The project also added direct connections between the Capital Beltway I-495 and the existing I-95/I-395 high-occupancy vehicle (HOV) lanes.

<sup>1</sup> [www.p3virginia.org/projects/i-495-express-lanes/](http://www.p3virginia.org/projects/i-495-express-lanes/)

Construction began in June 2008 and was completed ahead of schedule and on budget, opening to traffic on November 17, 2012. Buses, motorcycles, and vehicles with three or more people are permitted to use the express lanes for free; other vehicles must pay a toll. The toll rates change dynamically according to traffic conditions, which, in turn, regulates demand for the lanes and keeps them operating at high speeds. Tolls are collected solely via electronic means using E-ZPass transponders; no cash toll booths are available. All vehicles using the Express Lanes, including those traveling for free under the high-occupancy vehicle provision, must have a transponder.

The speed limit on the lanes was increased from 55 mph to 65 mph on June 24, 2013, after a Procuring Authority study concluded an increase in speed would not pose a safety risk.

The Project Company was responsible for monitoring quality control and quality assurance of the design and construction, in accordance with the contract and the project management plans it had developed. The Project Authority provided compliance monitoring through independent verification and assurance to ensure contract requirements were met. In addition, project schedule progress and contract compliance were monitored and certified through a general engineering consultant, appointed by the Procuring Authority.

A risk management protocol was adopted by both the Procuring Authority and the Project Company, which was focussed on financial and schedule risk. Primavera P6 was used as the base software to manage the project schedule and to assess potential project schedule risk. In addition, the project team met weekly to resolve identified project risk and scope change items. The risk management protocol also tracked the Procuring Authority's potential financial liability for its retained risks.

### **Transition between Construction and Operations**

The initial communications program to educate drivers started in January 2012 for the November 2012 opening of the I-495 Express Lanes and continued for six months after the opening. Multiple communication approaches were used to educate the entire region on new rules, requirements, and entry and exits of the new system. Drivers were required to buy an electronic transponder to use the system and could elect to purchase an E-ZPass Flex transponder that could be switched to the "HOV" setting when eligible for free use of the road (with three or more occupants). The entire system opened in November 2012 ahead of schedule. Some adjustments were made immediately following project opening due to unanticipated driver behaviour. Overall, initial toll revenues were lower than expected during the first two years of operations.

The drivers were slow to adapt to the new system. The behaviour of the drivers started to change once they realised the benefits the lanes provide, and became increasingly familiar with the dynamically tolled facility, the first-of-its-kind in Virginia.

### **Payment Mechanisms**

All Project Company revenue comes from tolls. The Project Company is required to undertake self-monitoring of its performance, with oversight from the Procuring Authority. The philosophy of this approach is that it is in the interest of the Project Company to keep the roadway open and in good condition, so that drivers will want to continue to use it and continue to pay the tolls. There is monthly and quarterly reporting provided by the Project Company, as well as a small number of KPIs associated with payment deductions in case they are not met. The Procuring Authority meets with the Project Company every month to discuss general operations, tolling and overall performance.

### **Change Management**

The number of changes implemented on the project is considered to be standard. There were some adjustments to the project scope, mainly related to civil works to accommodate approximately USD \$125 million in Procuring Authority-directed changes, and no extensions of time were granted. The Procuring Authority financed (or partnered with other agencies to finance) these changes implemented to accommodate and improve the expanding roadway network in and around the project. These were considered to be typical changes to a large project developed over several years.

The Procuring Authority set up a major project office that assisted in the process of managing changes (see following sections for more information on the major project office) and to reach resolution among the parties on an expedited schedule that was much faster than typical Procuring Authority scope change approval timeframes for routine projects. The major project office meant that the Procuring Authority had staff dedicated to reacting quickly to change management.

### **ROLE OF GOVERNMENT**

The Procuring Authority established an independent major project office to manage the review and approval of early design packages immediately following commercial close. The major project office housed project staff with some additionally hired resources where needed, maximising collaboration among the project team and ensuring focused, timely reviews. The government support was adequately resourced, project-focused, and allowed decisions to be made quickly and for the benefit of both parties to the contract.

## RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

The Procuring Authority described its relationship with the Project Company as collaborative, transparent and successful. This positive relationship allowed the parties to make full use of the Procuring Authority's major project office, and to overcome early delays and deliver the construction phase ahead of schedule, on budget, and with an industry-leading safety record.

### Team Set-Up and Staffing

The Procuring Authority considers its resources and set-up as adequate for the project, once the major project office was in place to enable it to fully meet its obligations. A general engineering consultant was engaged immediately after financial close and provided support for the design approvals and monitoring of the construction progress. The Procuring Authority also received some financial advisory support from third party consultants prior to financial close and during contract development.

On two subsequent projects, the Procuring Authority did not appoint a general engineering consultant after financial close. On these subsequent PPP projects, the Procuring Authority has been able to procure an engineering monitoring team during the procurement phase, to assist in the development of the project contract and documents and to then continue to assist the Procuring Authority in administering the contract through design and construction.

The majority of training for the Procuring Authority staff was delivered on the job.

## KEY EVENTS

### Transition from financial close to construction

Design plan development, and design review and approval process initially took longer than anticipated. Through additional resources, improved processes, and a focused, collaborative effort, both parties were able to bring the project back on schedule. Both parties committed to a collaborative and proactive engagement. The Procuring Authority set up a major project office, providing space for a project-focused team to identify and resolve project issues, and to streamline plan reviews and approvals.

### Challenges to transition to Toll Day 1

The high-occupancy tolling concept was new for end users and initial toll revenues were lower than anticipated during the first two years of operations. The users were not familiar with the new tolling system and the benefits it provides.

## LESSONS LEARNED

**The level of Procuring Authority oversight must align with the risk profile of the PPP project. The Procuring Authority may also need to commit additional resources during peak production periods to meet its contract management obligations.**

The Procuring Authority needs to commit appropriate resources throughout the various phases of project delivery and must be able to increase resources during peak production periods (both design and construction). There can be a misconception that the Procuring Authority's responsibility for project oversight is minimal, which is not accurate. Change management, in particular, requires dedicated resources to meet agreed approval timeframes. Following a slow start on final design development and plan approvals, the Procuring Authority committed dedicated resources to the project, in the form of a major project office, in order to carry out the required reviews and approvals, as well as any other activities that they were best placed to do. This helped to expedite progress and assisted in schedule recovery, resulting in opening the project 45 days ahead of schedule.

**Early and comprehensive public engagement with key stakeholders can deliver a better project for the community and for the project sponsor.**

Initial plans for the project included just one access point into the region's largest employment centre – Tysons Corner. After early feedback from major employers, elected officials and transit advocates, the project team changed the scope of the project to include three major entry and exit points to serve the busy commercial area. By proactively engaging stakeholders early (and outside the traditional public hearing process), the parties were able to work collaboratively to develop a transportation solution that provided a better outcome, helping to diffuse traffic congestion in the area.

**Robust and early customer engagement with end users before operations begin, especially where new and unknown technologies are involved, is critical to a successful opening of a tolled facility.**

The initial communications program started in January 2012 for the November 2012 opening of the I-495 Express Lanes and continued for six months after opening. The robust campaign included multiple tactics required to educate the entire region on new rules, requirements and entry and exits. The I-495 Express Lanes has new entrances and exits, and limited access at certain locations. In addition to a new type of facility, customers also needed to learn where they could get on and off the network. This was a big hurdle for travellers. Communications approaches included

multi-media advertising, on-road banners and dynamic messaging signs, community events, business briefings, direct mail pieces, and incentive programs to drive adoption of the E-ZPass.

**Allocation of operational responsibilities should be based on which party is best positioned to manage assigned responsibilities.**

The I-495 Express Lanes project included construction of both the Express Lanes and general-purpose lane improvements. The Procuring Authority transferred most operational responsibilities and risk to the private sector for the Express Lanes assets, and most responsibility for shared assets, such as sign structures and bridges. This required careful planning to ensure effective coordination and to establish clear responsibilities. The Procuring Authority retained the responsibility for snow and ice removal on the I-495 Express Lanes project in order to achieve benefits of scale and synergies associated with region-wide efforts and to ensure a consistent approach and prioritisation across the transportation network. A partnership agreement provides a framework to ensure both the Procuring Authority and Project Company are incentivised to work together to achieve optimum operations of the overall transportation network.

**Ensure adequate time is built into the project schedule for testing and commissioning of complex tolling and traffic management systems.**

Detailed planning and coordination for the road opening and commencement of tolling should begin at least one year prior to the anticipated opening date, including interagency coordination, customer education, pre-operations planning (e.g., vehicles, staffing enforcement, familiarity with operating system, construction staging to support for final road works etc.). Preparation of opening plans should be closely coordinated between the Procuring Authority and the Project Company, law enforcement, and other transportation and community partners to ensure a smooth and safe opening for customers. Extensive testing of the end-to-end system is critical to verifying the accuracy and reliability of revenue collection and enforcement activities, as well as ensuring a positive experience for toll-paying customers. Developing a “hyper care” period at the initial opening that includes intensified resourcing across all partners can help identify and quickly respond to inevitable start-up challenges.

**Promoting opportunities for disadvantaged businesses, including small, women-owned and minority-owned businesses, can help the Procuring Authority meet broader policy objectives.**

The Procuring Authority had a policy of prioritising disadvantaged business enterprises and small, women-owned and minority-owned businesses, with approximately USD \$490 million of work awarded to these organisations by the construction contractor through a variety of construction sub-trade packages. This was a relatively new concept at the time. The Procuring Authority played an important role in training and preparing small businesses to participate in contract opportunities.

USA

# Port of Miami Tunnel



Image: "Port of Miami Tunnel entrance from MacArthur Causeway" by Pietro / CC BY-SA 4.0

## OVERVIEW

### Location

Port of Miami, Florida,  
United States of America (USA)

### Sector

Transport – Roads

### Procuring Authority

Florida Department of Transport

### Project Company

MAT Concessionaire, LLC

### Project Company Obligations

Design, Build, Finance, Operate and Maintain

### Financial Close

15 October 2009

### Capital Value

USD \$920 million

### Contract Duration

35 years

### Key Event

Dispute due to unforeseen ground conditions

## SUMMARY

The Port of Miami Tunnel is one of the first public-private partnership (PPP, generally referred to as P3 in North America) projects in the State of Florida. The Port of Miami had only one access point through the city of Miami and was the cause of major traffic congestions in the city. A solution was needed to divert the incoming traffic away from the city centre. The solution was to connect the interstate network with the port through a tunnel. This would divert incoming traffic from the network away from the city.

Being one of the early PPP projects in the State of Florida, the Procuring Authority, the Florida Department of Transport, did not have significant experience in managing PPP contracts. In addition, the state and city could not provide the financial contribution necessary for the project. The support needed for the realisation and success of the project was provided by the federal government. The Florida Department of Transport provided all the technical, legal and financial expertise needed to manage and deliver the project. The Federal Highway Administration provided a loan of over USD \$340 million out of its Transportation Infrastructure Finance and Innovation Act (TIFIA) credit assistance programme.

As a result, the significant federal support in combination with the state, county, and city local knowledge ensured the success of the project. Despite challenges faced in unforeseen ground conditions leading to a dispute, the project was completed ahead of schedule and under budget.

## SUMMARY LESSONS LEARNED

- Active community outreach and involvement is vital to the success of any major infrastructure project.
- Collaboration between different levels of government may be required to successfully deliver large infrastructure.
- Sharing of risks beyond the control of either party can have a positive impact on the working relationship between the parties.
- Involving the operations contractor during design and construction can assist from an operational perspective to ensure operations KPIs are understood and achievable.
- Early discussions on the interpretation and practicality of operations KPIs with the operations contractor can make for a smoother transition between construction and operations and help to avoid misunderstandings.
- Upfront consideration of significant construction and financial risks through the establishment of a contingency fund enabled a satisfactory outcome after the risks materialised during the construction period.
- There are some risks, which although allocated to the Project Company under the PPP contract, will still need to be closely managed by the Procuring Authority to avoid reputational damage.
- Both parties may need some time for adjustment between the construction and operations phases to settle into managing the operations phase obligations.
- Frequent (even weekly) meetings with all relevant stakeholders can assist the Procuring Authority to keep a close watch on the construction activities and manage any potential challenges.
- Dispute Resolution Boards may be costly to set up, however, they can also be an effective way of settling disputes and have the advantage of reducing the risk of litigation.

## PROJECT INCEPTION

### Goals and Objectives of the Partnership

The Port of Miami is located on an island in Biscayne Bay between the cities of Miami and Miami Beach. Before the construction of the Port of Miami Tunnel, the only access to the port was via a single bridge between the island and the city's central business district (shown on the bottom left of Figure 1). Over 16,000 vehicles were using the roads surrounding the port every day, with cargo trucks making up a quarter of that number.

With the expansion of the Panama Canal due to be completed in 2015, as well as the Port of Miami acting as the “cruise capital of the world”, it was clear that better access was required. Congestion was inhibiting the operations of the port, and the commercial growth of the city. This was exacerbated by the traffic patterns of Miami, where congestion is an issue not just during weekday rush hour, but also in the evenings and on the weekends during peak nightlife hours. By connecting the port directly to the interstate network, a tunnel would help remove up to 1.5 million trucks per year from the roads in the downtown region of the city. It was partly for this reason that it was decided not to toll the tunnel; applying user fees would have introduced the risk that some drivers would avoid the tunnel and continue to use the existing bridge.

A tunnel had been considered by the region's planners as early as 1982, however, it entailed substantial risks. It would have to be built 40 metres below sea level, under a busy shipping channel and in an environmentally sensitive area with uncertain geotechnical conditions.

The project would in fact include two tunnels (one for each direction of traffic), as well as improvements to the connecting causeway and port roads. A PPP model was decided to be the most appropriate procurement model to ensure value for money for the state, as it would best allow the transfer of construction risk to the private sector. Additionally, given the economic uncertainties and hardship due to the Global Financial Crisis, the state was reluctant to take on a large amount of debt to finance the construction of the tunnel.

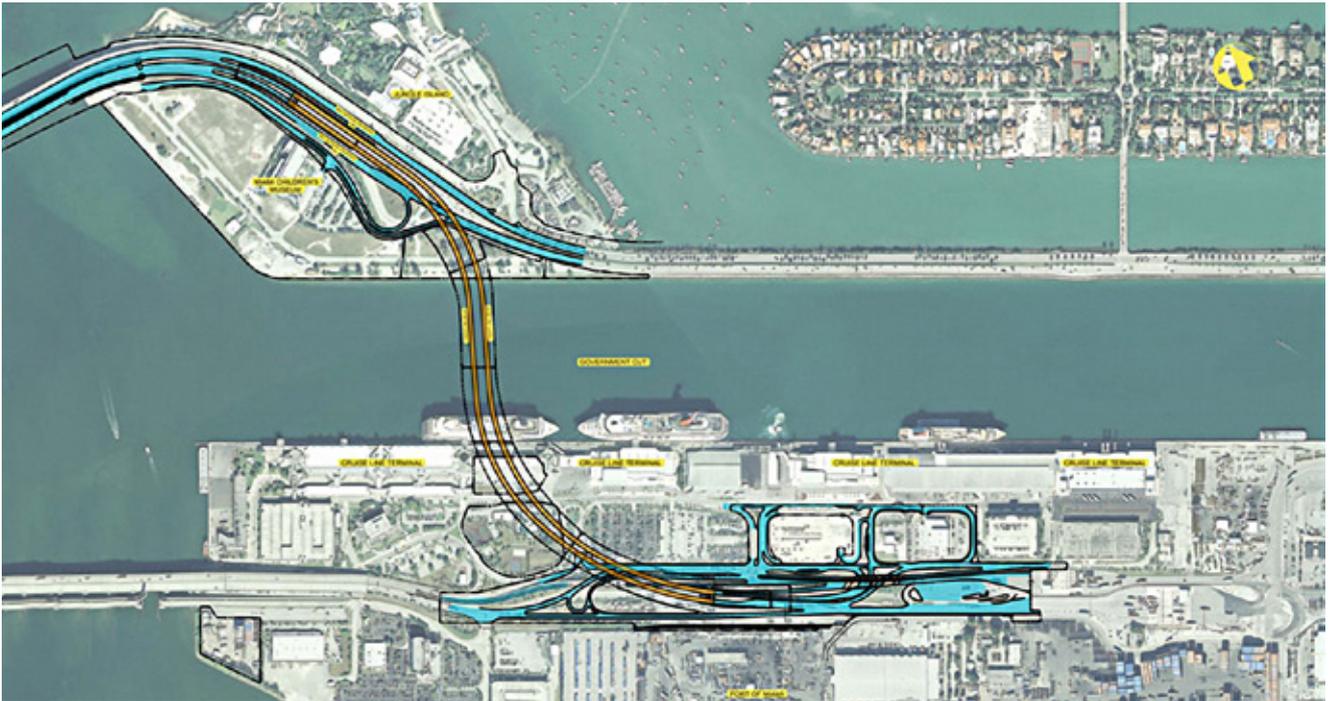


Figure 1: Port of Miami Tunnel "Yellow" (<http://www.portofmiamitunnel.com>)

### The Economic and Political Environment during Inception

In the years leading up to financial close of the Port of Miami Tunnel project, the local county had agreed to spend USD \$347 million on a new baseball stadium with significant scepticism from the public. The agreement was and is still controversial, with the real costs, including cost of borrowing, being argued to be higher than published. As a result, government expenditure on construction was expected to be scrutinised more closely, especially on a high-profile project such as a new tunnel. This reinforced the need to prioritise community engagement and inclusion, particularly during the high-risk construction phase. There was a great emphasis on the need to include the local community in the benefits of the project.

This project was tendered in the heat of the Global Financial Crisis, with the Florida Department of Transport selecting a consortium, Miami Access Tunnel, as the preferred bidder in 2008. The majority equity investor at that stage was Babcock and Brown, who went bankrupt before financial close. Meridiam subsequently joined the consortium as the majority equity investor to replace Babcock and Brown and financial close was reached with the Project Company, MAT Concessionaire, LLC, in 2009.

### MANAGEMENT OF THE PPP CONTRACT

#### Construction Phase

The construction process for the Port of Miami Tunnel was always going to be challenging, as the MacArthur Causeway

Bridge (to which the tunnel was due to connect) could not be shut down, and the port itself also needed to remain in full operation. The tunnels were the first tunnels in Florida to be completed using a tunnel boring machine (TBM), which has substantial upfront costs.

The first tunnel took eight months to complete, which was longer than originally planned, due to unforeseen geotechnical challenges. A large amount of coral stone, a hard material similar to granite, slowed down the boring from the start. However, more significantly, 30 metres below sea level the construction contractor encountered voids filled with a semi-liquid slurry which, in some locations, were the size of a city block. It was not possible to bypass the voids, nor leave them filled with the slurry. The solution to this challenge was to pump approximately 200,000 cubic metres of concrete into the voids, allowing the TBM to tunnel through a stable material. A contingency fund had been put aside by the Procuring Authority and the Project Company to cover additional costs due to geotechnical issues, and this was used to pay for this extra work. However, agreeing to reimburse the Project Company in recognition of the additional costs led to a dispute. This is described in further detail under the heading "Key Events" below. There were multiple work-fronts open at the same time, so the construction contractor was able to reschedule and optimise its work and mitigate the delays caused by the challenging ground conditions.

A final tunnelling challenge to be addressed was the existence of groundwater, which threatened to disrupt

the construction of cross passages between the two main tunnels. To avoid water pouring into the space that was being dug out, the construction contractor had to freeze the area to -30 degrees Celsius and keep it cold for 40 days to give the salty water time to harden.

Regardless of the challenges faced during construction, effective management of the construction phase and collaboration between the key parties resulted in completion of the project ahead of schedule and under budget.

The construction contractor also faced some challenges in terms of having a full understanding of and compliance with federal laws and regulations, particularly labour laws. It is very important that the Procuring Authority ensures that the Project Company and its contractors are fully aware of the federal laws affecting the works. Regardless of the risk allocation, serious violations of labour or safety laws will have a negative impact on the project and all parties involved from a reputation point of view. The Procuring Authority was also liable for fines if any of its projects were not compliant with relevant laws and regulation. In this project, the construction contractor hired a labour union company to assist it in complying with the federal labour laws.

### **Operations Phase**

The tunnel began operations in August 2014, almost five years after financial close. Approximately 14,000 vehicles use the tunnel each day, and an estimated 80% of port-related truck traffic has been diverted away from the central business district.

A number of operational innovations were introduced to the project to improve traffic flow and user safety. An automatic incident detection system scans the roadway for atypical events, such as a stopped vehicle, and then alerts workers. The tunnel's internal surfaces are fireproofed, and a deluge sprinkler system was installed to suffocate any fires. A system of sensors and alerts exists to warn oversize trucks not to enter the tunnel, including infra-red scanners, ship horns and emergency messages. Additionally, there are floodgates at each entrance, which can completely seal the tunnel off from a storm surge. The operations have so far been free from fatalities, and in July 2015, the project received the 2015 Infrastructure Project Award from the National Council for Public-Private Partnerships.

### **Performance Monitoring and KPIs**

The KPIs for this project are around lane availability, incident detection and response time, maintenance, lighting, vents and safety features. The operations contractor was actively involved during the design development and construction phase, which allowed it to suggest improvements and ensured that it was satisfied that the proposed design would meet the availability and

performance standards. As part of this engagement, KPIs were also reviewed in terms of their practicality from a performance standards point of view. The engagement of the operations contractor in this process was quite important to ensure the practicality of the operations obligations.

Construction performance is monitored by two third party consultants, supporting the Procuring Authority's team: a Construction Engineering Inspection (CEI) consultant, and the owner's (i.e. the Procuring Authority) representative. These consultants submitted regular monthly progress reports and have attended regular progress meetings with the Project Company and the construction contractor.

The Procuring Authority did not have the relevant operations and maintenance expertise on tunnels and it therefore had in place an operations and maintenance oversight contract with relevant third parties to help with independent performance monitoring and contract management. The Procuring Authority's team conducts spot checks of performance standards, reported failures and the workings of the operations control room.

The Procuring Authority found the first three months of the operations phase to be the most challenging, as they presented a learning curve for both the Project Company team and the Procuring Authority team. During this period, many operational procedures and staffing requirements were adjusted to suit actual conditions.

### **Payment Mechanisms**

The payment mechanism for the Port of Miami Tunnel is split between milestone payments for the construction phase and ongoing availability payments during the operations phase, both paid by the Procuring Authority. The availability payments were set at USD \$32.5 million a year, not including inflation adjustments or deductions.

During construction, external consultants were hired by the Procuring Authority under an owner's representative contract and a CEI contract. In addition to verifying compliance with the design, quality of works and overall progress (which was independently done by the CEI team with on-site presence), the owner's representative was responsible for certifying milestone payments to the Project Company.

Availability payments for the operations phase were set at a maximum annual payment. The payments are broken down into monthly unitary availability payments. Deductions attached to certain KPIs are enforced through a performance-points calculation, which are also linked to the events of default and termination.

The availability payment largely consists of the operations and maintenance (O&M) fee, fixed for 30 years with inflation adjustments. The objective is to ensure the asset's

condition would meet the required specification throughout the duration of the contract and at handback. The parties agreed to share the risk of changes in O&M insurance costs, as these were seen to be dictated by global trends outside the control of either party. Savings made or additional expenses incurred on these premiums by the Project Company arranging the insurance cover are shared with the Procuring Authority.

### Community Engagement

One of the clear strengths which has led to the success of this project is the ongoing community engagement, which was carried out by the Project Company. This was particularly important given the public criticism over the recent construction projects, which were seen to disadvantage local residents, and also because this project had a high profile in the city and a wider region.

The primary method in which local support was encouraged was through Operation 305 (referring to the local area code), which was a commitment to not just hire people from the local area, but also to source materials from local vendors. Approximately 83% of staff positions went to people from the county, and 400 locally-owned businesses were involved in the development of the tunnel.

The Project Company's team also put a lot of emphasis on community outreach, developing traffic management plans in association with local authorities to balance the demands of locals with those of the construction activities. Project Company representatives visited local schools to assist with Science, Technology, Engineering and Maths (STEM) activities, and have continued this into the operations phase. The TBM was even named Harriet by a local girl scouts group, after the 19th century abolitionist Harriet Tubman. Finally, the excavated material from the tunnel was deposited over landfill to create a recreational area on a nearby island. The ongoing focus on the community is seen by all parties as an important enabler of success.

### ROLE OF GOVERNMENT

The relationships between governments at different levels are vital to the ongoing success of this project. This began in the project structuring phase, where funds were provided by federal, state, county and city sources, with the City of Miami also granting land access. The USD \$150 million contingency fund set up by the Procuring Authority to mitigate the risk associated with unforeseen ground conditions was jointly funded by the Procuring Authority and the Miami-Dade County. The promise of ongoing funding to the Procuring Authority is particularly important given the decision not to impose tolls, as this increased the amount of money required from the

government. The Procuring Authority executed a funding agreement with the city and county, but these authorities had no direct oversight over the project.

### The Transportation Infrastructure Finance and Innovation Act (TIFIA)

The TIFIA programme was established to provide credit assistance to qualified infrastructure projects in the United States (US). According to the Florida Department of Transport:

*"The TIFIA credit program is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital."*

The programme's main goal is to assist in improving transportation infrastructure in the US and close the increasing gap by attracting and enabling private participation. The programme does not provide a grant to states and cities; it offers loans with favourable terms to assist in securing the required capital from the private sector. The programme's flexible loan repayment terms allow the delay of repayments for up to five years after substantial completion. The programme also provided credit guarantees to lenders and offers standby lines of credit to assist with project cash flows.

### RELATIONSHIP BETWEEN THE PROCURING AUTHORITY AND PROJECT COMPANY

#### Team Set-Up and Staffing

During the construction phase, the Procuring Authority's team reached 21 at the peak of the works, which was reduced to six as the construction phase came to an end. The Procuring Authority appointed one person to manage the PPP contract, with the authority and flexibility to recruit the internal and external Procuring Authority resources needed. As the Procuring Authority did not have substantial tunnelling experience, it relied on the expertise of the CEI consultant and the owner's representative.

At the start of operations, two full time staff members were appointed, and one was part time. Once the team became more familiar with the operations phase, the team was reduced to one full time employee and one part time employee. No structured PPP training was given to the Procuring Authority's contract management staff, however they gained relevant skills through "on the job" training.

#### Communications

The level of communication between the Procuring Authority and the Project Company stakeholders during construction was seen as beneficial to the project, particularly during periods of disagreement. Weekly meetings were held which included the Procuring Authority,

the Project Company and the construction contractor, as well as representatives from city and county governments. These meetings were focussed on day-to-day issues arising. This helped the Procuring Authority keep a close watch on the construction activities and helped mitigate the delays caused by disputes and challenging geotechnical conditions. In addition, there were monthly and quarterly meetings between the Project Company and Procuring Authority focussed on matters of strategic importance and any issues escalated from the weekly meetings. During the claim settlement period, quarterly meetings between the Procuring Authority and the Project Company were also joined by representatives from the city and county.

### Information Management

The Procuring Authority had an internal, department-wide document control system in place. The PPP contract did not prescribe any specific information management system. However, the owner's representative introduced software which facilitated document control and management during construction, which was considered an improvement on the system that the Procuring Authority had in place. All parties had access to this system to submit and upload documents for the contract management team to review and approve.

### KEY EVENTS

#### Dispute – Unforeseen Ground Conditions

The geotechnical challenges encountered, in particular the existence of soft voids in the rock, led to a dispute over the additional costs of pumping in extra concrete (i.e. grouting) to allow tunnelling to continue. A contingency fund had been created as part of the PPP contract as a way of sharing the risk of increased tunnelling costs. The risk was shared by structuring the overall contingency fund in a way so that the Project Company would be liable for the first USD \$10 million of additional costs, then the Procuring Authority would be liable for any costs above USD \$10 million up to a total of USD \$150 million. Where cost overruns exceeded USD \$160 million, the Project Company would be liable for another USD \$20 million. If USD \$180 million was exhausted, the parties would have the right to terminate the contract.

The PPP contract also specifically allowed for 8,000 cubic yards (6,116 m<sup>3</sup>) of concrete for grouting. However, due to the soft ground conditions (including the voids), an additional 250,000 cubic yards was required. As a result of a claim by the construction contractor, the Project Company submitted a claim to the Procuring Authority for the costs of pumping in additional concrete. This was, however, disputed by the Procuring Authority. As no agreement could be reached on the cause of the claim, nor its value, the claim was escalated to the project's Dispute Resolution Board (DRB), which decided in favour of the Project Company and

the construction contractor. However, the DRB's decision was only on entitlement for compensation and not the amount, which was later negotiated between the parties. The value of the settlement figure was well below what the overall contingency fund allowed for the project, and the Procuring Authority was satisfied with this outcome.

The contract did not provide for arbitration as a dispute resolution mechanism, and disagreements are generally escalated to the DRB if negotiations fail to resolve the dispute. The DRB is still used regularly on the project by the parties as a way to resolve disputes. It is costly to set up, however the parties have found it to be an effective way of settling disputes and it has the advantage of reducing the risk of litigation. The DRB also helps with dispute avoidance when used as a regular tool on this type of project. The parties meet with the DRB on a regular basis to discuss potential issues that could become disputes. These meetings are a forum for the Project Company and Procuring Authority to proactively resolve issues before they escalate into disputes.

### LESSONS LEARNED

#### Active community outreach and involvement is vital to the success of any major infrastructure project.

Support from the local community is vital to the success of any major infrastructure project, especially in an environment where PPPs may be subject to increased public scrutiny and possibly be perceived as controversial. In the Port of Miami tunnel project, both parties made it a priority to pro-actively involve the local communities in the project and use the project to address their needs. The parties agreed that in order for the project to succeed, it needs to have a notable impact that can be felt by the local community. As a result, the community engagement plan went beyond just media and public relations into delivering real economic, social and commercial benefits.

The community outreach plan involved three aspects: a) minimise nuisance to the local community caused by the construction works; b) identify opportunities to benefit the community through education and social activities; c) train and hire labour locally and use local contractors.

With the plan in place, the project managed to address the local community's social and economic concerns, and the challenges of their daily lives. A comprehensive traffic plan made in collaboration with the cities of Miami and Miami Beach ensured minimum effect on commuters. The inclusion of local programmes like the girl scouts and involvement in science, technology, engineering, and mathematics education mentorship helped the community with its social improvement initiatives. Finally, by upskilling local labour and the use of local contractors, the community was able to share in the economic benefits.

**Collaboration between different levels of government may be required to successfully deliver large infrastructure.**

The involvement of governments at four different levels (federal, state, county and city) was vital to the success of this project, from the structuring and signing through to implementation and operation. Joint funding and ongoing engagement and political support from different public bodies helped overcome challenges in construction, as well as improved community engagement.

**Sharing of risks beyond the control of either party can have a positive impact on the working relationship between the parties.**

It was recognised by both parties in this project that risks associated with O&M insurance cost changes are affected by global trends beyond their control. The risk was addressed proactively by both parties agreeing to share savings or cost increases in the premiums. This approach ensured a fair and optimised risk allocation and helped the relationship between the parties.

**Involving the operations contractor during design and construction can assist from an operational perspective to ensure operations KPIs are understood and achievable.**

The operations contractor should be involved during the design development and construction phase. As the party with the most expertise in operations, it will be able to suggest improvements which can reduce whole of life costs and help the service to be delivered to a high level. The structure of the PPP contract should incentivise the Project Company to do this regardless, however it is still important for the Procuring Authority to ensure it takes place. This may have more relevance if the operations contractor is not an equity investor in the Project Company. There may otherwise be a tendency for the considerations of the construction contractor to outweigh operational demands. In this project, the operations contractor was involved during the design and construction phase, which allowed it to highlight design deficiencies early enough for them to be rectified.

**Early discussions on the interpretation and practicality of operations KPIs with the operations contractor can make for a smoother transition between construction and operations and help to avoid misunderstandings.**

It is important that the parties reach agreement early on what each KPI means from an operational point of view, and how it will be measured. Agreement on the interpretation of the KPIs is key to minimising disputes relating to performance evaluations during the operations phase.

On this project, the operations contractor, in collaboration with the Project Company and the Procuring Authority, started reviewing the KPIs one year before the start of

the operations phase to assess their achievability and predict any challenges. The main issue that the operations contractor raised was regarding incident response times. The Procuring Authority had made this a priority, however, based on the final design there was a question over whether the KPIs were achievable. The Procuring Authority managed this by analysing the resources that the operations contractor had described in its operations manual and assessing whether its concerns were valid. The Procuring Authority concluded that the KPIs for dealing with a breakdown of a large truck were too onerous, given that it would be difficult to bring a certain size of tow truck into the tunnel. The timings for this were then adjusted, while all other KPIs remained as prescribed in the PPP contract.

**Upfront consideration of significant construction and financial risks through the establishment of a contingency fund enabled a satisfactory outcome after the risks materialised during the construction period.**

Although in many PPP projects involving construction works the majority of the construction risks are allocated to the construction contractor, tunnelling projects can present particularly high risks in terms of unforeseen ground conditions, delays and cost increases. In this project, although a dispute occurred with respect to unforeseen ground conditions, the availability of a contingency fund enabled a successful outcome that was acceptable to both parties and the delivery of the project.

**There are some risks, which although allocated to the Project Company under the PPP contract, will still need to be closely managed by the Procuring Authority to avoid reputational damage.**

The construction contractor faced some challenges in terms of its full understanding of and compliance with federal laws and regulations, in particular labour laws. It is very important that the Procuring Authority ensures that the Project Company and its contractor are fully aware of the federal laws affecting the works. Regardless of the risk allocation, serious violations of labour or safety laws will have a negative impact on the project and all parties involved from a reputation point of view. The Procuring Authority was also liable for fines if any of its projects were not compliant with relevant laws and regulation. In this project, the construction contractor hired a labour union company to assist it in complying with the federal labour laws.

**Both parties may need some time for adjustment between the construction and operations phases to settle into managing the operations phase obligations.**

The Procuring Authority found the first three months of the operations phase to be the most challenging, as they presented a learning curve for both the Project Company

team and the Procuring Authority team. During this period, many operational procedures and staffing requirements were adjusted to suit actual conditions.

At the start of operation, two full time staff members were appointed by the Procuring Authority and one was part time. Once the team became more familiar with the operations phase, the team was reduced to one full time employee and one part time employee.

**Frequent (even weekly) meetings with all relevant stakeholders can assist the Procuring Authority to keep a close watch on the construction activities and manage any potential challenges.**

The level of communication between the Procuring Authority and the Project Company stakeholders during construction was seen as beneficial to the project, in particular during periods of disagreement. Weekly meetings were held which included the Procuring Authority, the Project Company and the construction contractor, as well as representatives from city and county governments. These meetings were focussed on day-to-day issues arising. This helped the Procuring Authority to keep a close watch on the construction activities.

**Dispute Resolution Boards may be costly to set up, however they can also be an effective way of settling disputes and have the advantage of reducing the risk of litigation.**

A Dispute Resolution Board (DRB) was set up to resolve a dispute between the parties related to geotechnical challenges encountered by the construction contractor during tunnelling. The DRB is still used regularly on the project by the parties as a way to resolve disputes. It is costly to set up, however the parties have found it to be an effective way of settling disputes and it has the advantage of reducing the risk of litigation. The DRB also helps with dispute avoidance when used as a regular tool on this type of project. The parties meet with the DRB on a regular basis to discuss potential issues that could become disputes. These meetings are a forum for the Project Company and Procuring Authority to proactively resolve issues before they escalate into disputes.