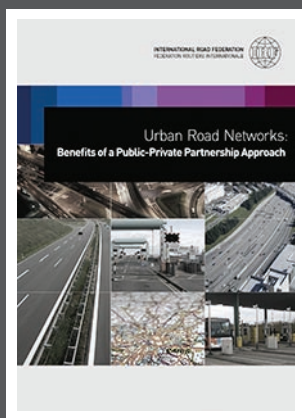




Urban Road Networks: Benefits of a Public-Private Partnership Approach





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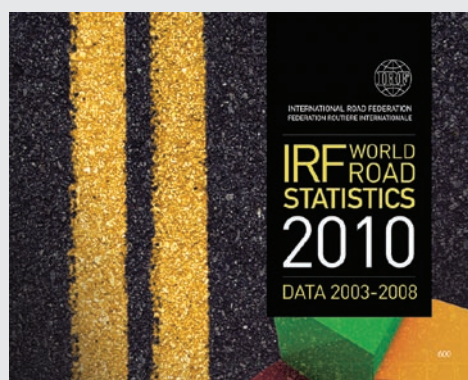
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Foreword



Following publication of the IRF Working Group's discussion paper, *Public-Private Partnerships - Beyond the Financing Aspects*, in 2008, some members suggested that the Group's next task should be to address the issue of partnerships for Urban Roads. I must admit that I initially questioned the relevance of this suggestion, and the need to focus specifically on urban issues when dealing with Public-Private Partnerships (PPPs). I was wrong.

The members of the Working Group have identified a number of "modern" case studies that naturally fit into our definition of PPPs, and also highlight the specifics of urban PPPs in today's context; as well as their interaction not only with broader transportation issues but also with social, economic, environmental and political parameters. These case studies are briefly presented, classified and discussed in this paper.

To complement them, the Working Group has further investigated the topic from a historical perspective. This research has led to interesting and sometimes surprising findings, to which this paper also devotes a chapter.



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1. Introduction

1.1 Growing pressures on urban road networks

In 2005, almost 5 out of 10 people across the globe lived in an urban area of 1 million inhabitants or more. World urbanisation prospects compiled by the United Nations suggest that this number is likely to increase to almost 6 out of 10 people in 2030. This would mean that upwards of 4.97 billion people would be living in cities and urban agglomerations by that time. Looking at Western Europe, the numbers could be significantly higher. In 2005, some 141 million people, or 76.1% of the region's total population, lived in urban areas. By 2030, it is projected that this figure will have increased to 156 million, or 81.7%.¹

Urbanisation undeniably places growing pressures on urban transportation networks. It notably confronts the responsible authorities with the dilemma of how to reconcile the imperatives of maintaining the networks in good condition and with sufficient capacity to meet ever-increasing urban transport demands, with the fundamental desire to keep our cities 'liveable'. This publication looks into what benefits a PPP approach might be able to offer in terms of helping the authorities overcome the traditional constraints they face in dealing with this constant quandary.

Clearly, one of the main problems associated with rapid urbanisation is the increasing congestion occurring on urban road networks. This is coupled with proportionately decreased access to economic destinations in urban areas, which constitutes an important factor in determining economic competitiveness.

1.2 Rationale and aims of this publication

Urban road projects are without doubt a complex endeavour. An urban environment poses more challenges in terms of space, functionality, management of expectations and stakeholder involvement. Through this publication, IRF aims to assist both (local) authorities and private partners in setting up successful projects in this challenging setting.

1.3 Reader's guide

Chapter 2 provides a historical context for urban partnerships conceived to implement infrastructure projects; a concept that surprisingly dates back to as early as the 13th century. Chapter 3 looks into what distinguishes urban road projects from inter-urban projects, and addresses issues such as physical constraints, the specific needs of urban road users and the economic impacts of projects to relieve congestion in urban areas. An overview of IRF case studies of urban PPP projects is given in chapter 4. Chapter 5 explores how a partnership approach has benefited the specific urban road projects under review, while chapter 6 reports on a number of more or less common issues encountered in the case studies that are relevant to urban PPP projects in general. Finally, a number of conclusions are drawn in Chapter 7.

Summaries of the case studies into Urban PPP road projects that IRF has performed are featured throughout this paper as illustrations. The full case studies can be downloaded from the IRF website at www.irfnet.ch.

1) Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2008), *World urbanization prospects: the 2007 revision population database*, available from <http://esa.un.org/unup/> (accessed on 9 June 2010).

2. Historical Context

All over the world today, the role of public authorities in the process of planning and, in most cases, designing, financing and procuring urban roads is paramount. Even for modifications of existing roads, decisions are made by these public authorities - usually after due consultation with the population - and the private sector is left with the limited role of implementing such decisions.

While for interurban roads the private sector may be left with some leeway to propose alternative layouts in PPP-type schemes, this would hardly be acceptable for ring roads around major cities, and probably even less acceptable inside the cities themselves. The maximum extension of the private sector's role may be found in so-called *greenfield* urban development areas, after they have been authorised by public authorities.

This has, however, not always been the case, and history is rich in examples of where the private sector has played a much larger role; if not in the planning of urban roads, at least in the ensuing phases.

Special tribute should be made in this respect to the work of the French historian Xavier Bezançon, who has investigated numerous public works contracts spanning back over almost two Millennia. His landmark research has highlighted the significant contribution made by the private sector throughout the ages towards procuring public services in general, and transport infrastructure in particular - including roads and bridges, even in urban areas. Much of the following is drawn from his inspirational books.²

2.1 Creation of the *Bastides*



Photo 1: Monflanquin Bastide (France)

On numerous occasions throughout history, the successful creation of towns or cities has involved a high degree of private participation. Perhaps the most striking example can be derived from those towns in southwestern France known as *bastides*. The establishment of more than 300 such *bastides* in the 13th century was essentially based on a partnership system between, on the one hand, populations prepared to move in order to improve their status and, on the other, real estate owners. These latter would typically include local Lords, and even possibly the Kings of France or England, who would have ownership of undeveloped lands.

2) Bezançon, Xavier, *2000 ans de partenariat public-privé*, Presses de l'Ecole Nationale des Ponts et Chaussées, France, March 2004, is particularly recommended by way of first introduction, and includes a more extensive bibliography.

Case Study 01



91 Express Lanes California United States

Category:

Urban congestion charging

- The 16 km lanes contained in the median of State Route 91 opened in 1995 and were built – fully privately funded – to relieve the heavily congested State Route.
- 20 different toll levels have been preset to ensure free flow on the lanes. The tolls are collected electronically.
- Planning the lanes in the median of the existing highway enabled speedy and relatively cheap implementation of the project.
- In 2003, the Orange County Transportation Authority purchased the lanes from the private concessionaire because of plans to widen the Riverside Expressway; the latter being in conflict with a non-compete clause in the contract.

Such owners would enter into contracts³ to join their respective plots of neighbouring land into one large connected area, to be developed as a resettlement colony – or *bastide*. They would then attract people to live there by jointly setting up a community, with its own law and fiscal regime to ensure clearly established and stable rules.

Inhabitants would be allocated a plot of land on which to establish a house, a garden and an area to be ploughed. In exchange, they would commit to timely construction and to paying real estate taxes to the Lords. Besides greater opportunities – for working, studying and trading – these new towns also offered a more democratic system of administration.

Although the connection with road construction may not at first seem apparent, one only has to glance at the typical layouts of these *bastides* – with their central square (see Photo 1) – to agree that this type of contract produced original urban designs; including, of course, the corresponding infrastructure.

2.2 The Haussmann era in Paris

Perhaps the most striking example of private participation in the field of urban road infrastructure is the profound reshaping of Paris that occurred from 1852 to 1869, at the instigation of Napoleon III and Baron Georges-Eugène Haussmann, the Prefect of the Seine administrative department. During this period, 42 “road concession treaties”⁴ were signed. As a result, extensive roads, avenues and squares were built in about 50 different sites.

Road works typically included not only the construction of new carriageways, but also the installation of water pipes, sewage pipes, street lighting, tree plantations and public benches.

Private concessionaires recouped part of their investment from direct payments made by the City of Paris - usually to cover the cost of right-of-way acquisition. The rest was recovered from the sale of pieces of land along the road infrastructure. These were made available after the works had been completed, and were subject to a strict contractual stipulation, imposed on the concessionaire, that buildings should be immediately constructed on the plots concerned.

3) Referred to as “contrat de paréage”, i.e. co-regency contract.

4) Although so called, only part of these contracts truly corresponded to “concessions” in the modern understanding of the term.

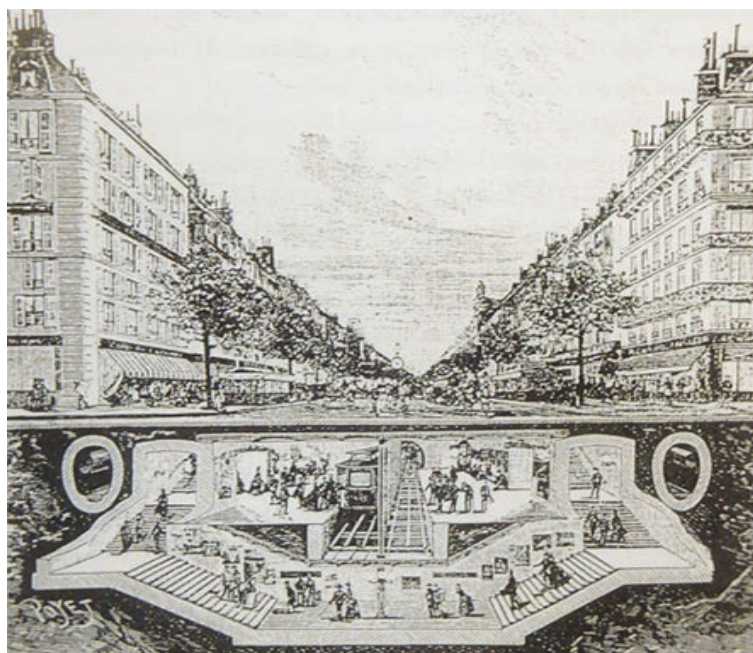


Figure 1: Cross section of a typical Haussmann period boulevard in Paris (19th century engraving by Louis Poyet). Source: RATP, Paris.

Such contractual clauses were progressively fine-tuned over time, as both the City of Paris and potential investors became more familiar with this type of contract and the risks associated with it. Many features present in today's PPP contracts were already prevalent in these 19th century forerunners – including, to cite just a few examples, mechanisms enabling the assignment of receivables to a financial company and profit-sharing between the City and the concessionaire, or land swaps.

It is often alleged that Baron Haussmann's motivations in renovating Paris were of a strategic nature – notably to facilitate a crackdown on possible insurgents and the erection of barricades. Even if this may, or may not, be partially true, however, the full extent and nature of the work undertaken suggests that his ambitions clearly extended far beyond this sole purpose. For instance, tens of thousands of Parisians had died in the first half of the 19th century from cholera epidemics, so improving health conditions as well as architecture and landscaping were also strong objectives.

Even prominent political rivals eventually admitted that the operations were both worthwhile and successful in this respect. In 1882, despite being a fierce opponent of the Second Empire, the French newspaper *Le Gaulois* paid tribute to Baron Haussmann's achievement in these terms:

Case Study 02



A14 Paris

France

Category:

Urban toll road

- The A14 links the western suburbs of Paris with the business district of La Défense and runs underground for 86% of its total length to minimise visual impact.
- Toll rates vary during the day to deal with peak hours; two different toll levels, peak and off-peak, are applied. Tolls are collected through different means, manually and electronically, leaving the choice to users.
- The A14 provides services addressing specific urban commuter needs, like free access for high occupancy vehicles (thus stimulating carpooling), discounts for frequent users of transponders, and a Bus Rapid Transit service (Express 14), which is currently used by some 15% of people on the A14.

Case Study 03



A2 Maastricht The Netherlands

Category:

Combined road and real estate development

- The project encompasses the replacement of the existing road with a 2 km, two-tiered, urban underground section of the A2 national motorway in the city of Maastricht. The freed area above ground will be redeveloped, including real estate and the provision of public spaces.
- The road infrastructure works and real estate development are carried out under two separate contracts, implemented by a single consortium, Avenue2.
- To speed decision-making, the implementation of various legal procedures – to determine the trajectory, local development plans (both including public consultation rounds) and tender procedures – has been interwoven.
- Revenues from the real estate development will be applied to pay off the debt incurred to finance some parts of the development of the infrastructure and public spaces.

“Narrow and filthy lanes were plentiful within the city. We lacked water, markets and light in those far-off times ... Only a few gas lamps were to be seen ...

He demolished whole areas; we could even say whole towns. We were yelling that he would bring the plague upon us. He would let us yell and bring us, on the contrary, air, health and life by virtue of his shrewd clearing works. Sometimes he would create a street; sometimes an avenue or a boulevard; sometimes a square, a public garden or a promenade.

He would establish hospitals and schools. He would bring us a whole river. He would dig magnificent sewers. He would erect barracks, theatres. From nothing, he would build the Champs-Élysées, the Bois de Boulogne, the Bois de Vincennes. He would set up a central food market, bring gas into widespread use, and add more bus lines ... He would introduce trees and flowers in his beautiful capital city. He would fill it with statues”⁵

From 1853 to 1870, more than 600 km of sidewalks, 840 km of water pipes and 16,000 street lights were installed in Paris. The development of PPPs had contributed significantly to the socio-economic development of the city.

2.3 Lessons for modern urban projects

Whilst focusing on French examples, this brief historical perspective could no doubt be complemented by numerous similar models drawn from other countries and regions. They all serve to bring home and demonstrate the longstanding relevance of “Urban PPPs” – as well as the complexity of the issues surrounding the application of this unique contractual mechanism that is often at the interface between the economic, social and political domains.

5) Free translation from: Moncan, Patrice de, *Le Paris d’Haussmann*, Les Editions du Mécène, Paris, 2009.

3. What are the specifics of urban road projects?

Complexity is the key element when looking into the specifics of urban road projects. This chapter briefly highlights the most distinguishing features of road projects situated in an urban, as opposed to inter-urban, context.

3.1 Physical constraints

The first obvious characteristic of urban road projects is that they have to be developed in a physically constrained environment. In general, space for extension of urban road networks is limited. Existing road networks are dense and often intertwined with other transportation networks, such as mass rapid transit. Scarcity of land in an urban setting implies high land acquisition costs. The physical constraints force private sector partners to devise innovative solutions for the design, construction and operation of a project.

3.2 A demanding audience

Public scrutiny

Because of their proximity to people's daily lives and habitat, urban road projects tend to be at the forefront of public attention. Urban road projects are more likely to precipitate protest actions than inter-urban projects – and are thus more likely to require thorough integration and mitigation measures to reconcile community needs.



Commuter needs

Commuters are special road operator clients in the sense that they make use of urban road networks on a daily basis. They are experienced, have a lot of expectations and demand high levels of service. Commuters place high value on the availability of the road and do not easily tolerate disruptions. These specific user needs must be taken into consideration when designing the project and forecasting operational needs. A customer-oriented approach is vital.

In the case of the Attica Tollway, built around Athens, Greece, a comprehensive mechanism was developed in order to provide a high level of service and safeguard the anticipated “value” derived from tolls. Over 6 years of full operation of the Attica Tollway (up to the time of writing), the average time saving perceived by users has been 30 minutes, and 60% of electronic toll collection has been recorded during peak hours. During the same period, the emergency response time has averaged 5 minutes – compared to the contractual obligation of 15 minutes.

Case Study 04



A86 Duplex, Paris

France

Category:

Urban toll road

- This 10 km stretch of motorway completes the second ring road of Paris. Construction costs amount to 2 billion Euros, and the project was awarded in a 70-year concession contract to Cofiroute.
- To safeguard forests, historical heritage and residential areas – and following active lobbying by local residents – the French state has opted for an underground route.
- The contractor came up with an innovative solution consisting of two superimposed, independent carriageways in a single tunnel tube, with each floor carrying one-way traffic. The tunnel is reserved for use by light vehicles with a maximum height of 2 metres.
- A modulated pricing system is used to encourage motorists to avoid travelling during peak hours.

3.3 Direct economic impact

In general, urban road capacity problems have a direct impact on the overall economic performance of the given area. The costs of urban congestion, notably in terms of travel time delays and increased fuel consumption, have risen sharply over the past three decades – as, for example, illustrated by data from the 2009 Urban Mobility Report of the Texas Transport Institute⁶ (Figure 1).

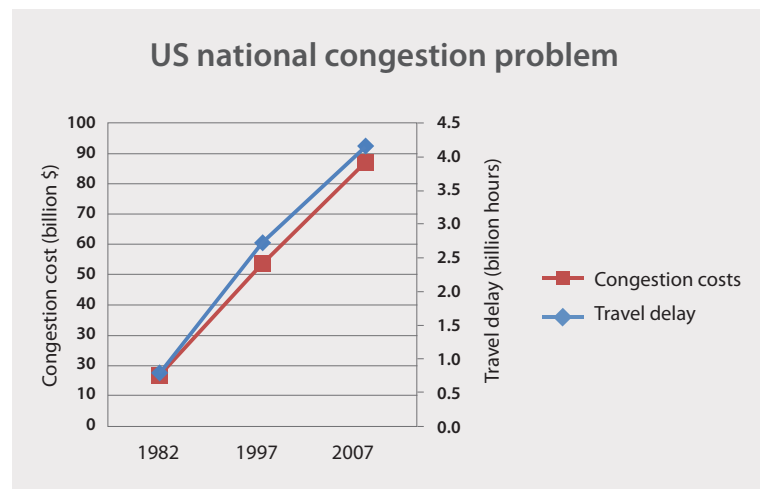


Figure 1: Congestion costs and travel delay due to urban congestion in the United States 1982-2007 (Source: Urban Mobility Report 2009, Texas Transport Institute).

The need to implement urban road projects aimed at relieving congestion – whether they involve network extensions or more efficient operation of existing roads – is seen as an urgent priority.

3.4 Additional constraints faced by authorities

When public budgets are allocated, transport infrastructure is competing with other public service needs. Transport budgets are not generally sufficient to keep the infrastructure up to pre-defined service levels. When budgets *do* become available, they tend to be of a short/medium tenure that does not adequately meet the need for sustainable financing to cover the continuous investments required to keep urban road infrastructure up to standard.

Furthermore, tight links between project planning and other key disciplines, such as spatial planning and social policy, render urban road projects highly complex endeavours from a technical point of

⁶) Texas Transportation Institute, University Transportation Center for Mobility, *Urban Mobility Report 2009*, July 2009.



view. In terms of organisation, there are often several authorities having responsibilities in the urban jurisdiction, which again adds a layer of complexity.

Authorities need capability and competence in several disciplines in order to be able to deal with technically and organisationally complex projects. Such breadth of capacity is not always present, especially in local administrations. A recent KPMG study into success factors for urban transport infrastructure projects concluded that: “many elements need to be right to deliver a successful project, of which effective procurement and financing appeared to be the most important (...)”⁷ This underlines the importance of authorities having the prerequisite expertise and effectiveness in place when involving the private sector in a project.

⁷) KPMG International Cooperative, Global Infrastructure, *Success and failure in urban transport infrastructure projects*, Glaister, Allport, Brown and Travers, KPMG’s Infrastructure Spotlight Report, 2010, page 3.

Case Study 05



Attica Tollway, Athens Greece

Category:

Urban toll road

- The Attica Tollway is a 65 km motorway, which constitutes the ring road of Athens and connects with Greece’s two main National roads. The motorway forms part of the Trans European Network (TEN) of highways.
- Because of its funding structure, the Attica Tollway represents a so-called hybrid PPP; financing was provided by the Greek State (including funds obtained through the EU Cohesion and Structural Funds), private equity and loans.
- A flat toll rate is applied to discourage short trips. An open tolling system, with manual and electronic lanes, is currently being used.
- Active Traffic Management is used to offer high-level service to road users.
- Implementation of the Attica Tollway has led to significant travel time savings in the greater Athens area.

4. Case studies of urban PPP-projects

4.1 Key elements of Public-Private Partnerships

Before going into the benefits captured by a PPP approach, by reference to the urban projects studied, it is essential to outline what IRF considers to be the key elements constituting a PPP agreement. In essence, a PPP agreement between a (local) authority and a private sector partner is a means of shaping the contractual relationship for a road project in terms of risk allocation, financing & revenue schemes and performance. The key elements of PPPs are:

- **Combining several tasks in a single contract:** in PPP contracts the private sector partner is generally responsible for the design, construction, maintenance and operation of the given road.
- **Relative autonomy for the private sector partner:** in PPP contracts deliverables are specified in terms of functions and qualities. They are service level oriented. The “lack” of detailed work description leaves a substantial measure of freedom for the private sector partner in the planning and organisation of activities – in order to optimise the project and implement cost effective solutions as well as, more importantly, to maintain a high service level.
- **Specific risk sharing arrangements:** risks are made explicit in order to be able to allocate them between the client authority and the private entity in a PPP contract. The PPP partner can take up risks that are within his control to manage and/or mitigate. For other risks, which are not controllable, sharing mechanisms may be applied.
- **Specific cost recovery mechanisms:** in a PPP arrangement, the private entities can be reimbursed by tolls, shadow tolls or performance-related annuities paid by the client authority – or a mixture of these sources, generally geared towards ensuring incentives.
- **Joint or private financing:** the share of private finance in PPPs varies according to the type of contract and cost recovery mechanism. Projects with private pre-investment of construction works, availability payments or shadow toll arrangements can be described as jointly financed by the public and private sectors. A toll concession contract is an example of a fully privately-financed project.

Contract duration has not been included in the list of key characteristics as many factors determine the length of a PPP contract, which can be anywhere between 5 to 80 years.

4.2 IRF case studies of PPPs for urban roads

IRF has undertaken a number of case studies of different types of urban partnerships, with the aim of identifying the specific challenges and learning how these may be addressed through a partnership approach. A working classification of urban PPPs has been adopted in order to provide a broad distinction between cases, and to cover a wide diversity of possible schemes:

- **Urban congestion charging:** schemes that impose a fee on vehicles to enter a certain cordoned area within an urban zone – implemented through a partnership contract under which both public authority

and private partner bear financial risks. Variable pricing schemes that fulfil the partnership criteria are also considered to belong to this category.

- **Urban toll roads:** toll motorways in urban areas that have been allocated through concessions to private operators. The private operator generally designs, constructs, maintains and operates the road, in exchange for the right to levy tolls on the users. High Occupancy Toll (HOT) lanes would also fall within this category.
- **Combined road and real estate developments:** schemes under PPP in which functions/aspects like road development, housing development and/or business accommodation are combined to achieve optimum quality, and promote a viable business case by enabling cross-subsidising of project elements.
- **Urban road operation partnerships:** schemes under PPP that aim at making better use of existing urban road infrastructure capacity by mobilising Intelligent Transportation Systems (ITS). Projects based on partnerships for parking schemes and/or interfacing with other transport modes, like mass transit systems and rail, could also be included under this heading.
- **Long-term maintenance contracts for urban road networks:** schemes under PPP concerning long-term maintenance (sometimes including upgrading) of the urban road network, in which revenues are based on performance.

Table 1 gives an overview of the case studies. For each case, the Working Group has – among other aspects – looked into the rationale for a PPP approach, the urban context, the partnership structure, difficulties overcome and societal benefits.

Category	Case Studies
Urban congestion charging	• 91 Express Lanes, California (United States)
Urban toll roads	• M6 Toll (United Kingdom) • Melbourne CityLink (Australia) • A14, Paris (France) • A86 West, Paris (France) • Attica Tollway, Athens (Greece)
Combined road and real estate developments	• A2 Maastricht (Netherlands)
Urban road operation partnerships	• M50 Dublin, rehabilitation and installation of electronic toll collection (Republic of Ireland)
Long-term maintenance contracts for urban road networks	• Birmingham Highways Management PFI (UK) • Portsmouth Highways Management PFI (UK) • St. Louis-de-France, Quebec (Canada)

Table 1: Overview of IRF Urban PPP case studies

5. Benefits captured for urban road projects through a PPP approach

In an earlier publication,⁸ IRF highlighted the economic advantages of PPPs for road works. In summary, these advantages were optimisation of work planning and organisation by the private partner, combined with enhanced service-level orientation and innovation – resulting in high-quality solutions and service for the road user. Moreover, there is a growing body of evidence to suggest that a PPP approach leads to projects that are implemented in more timely fashion and with less budget overruns, as illustrated by a study commissioned in 2007 by Infrastructure Partnerships Australia.⁹ According to this study, cost overruns amounted to only approximately 1.2 % of the total costs of contracted PPPs; whereas for traditional contracts the cost overruns were close to 15% of the total costs. The study further concluded that PPPs were more often completed on schedule compared to traditional contracts, and that project size did not affect this timeliness advantage of PPPs.

This chapter identifies the specific benefits captured through a PPP approach for the projects studied.

5.1 Efficient urban solutions and high level of service

A PPP approach very often enables the introduction of alternative, more efficient solutions for the particular road capacity problem faced by authorities.

Firstly, due to the lifecycle costing and high level of service requirements inherent in the very concept of a PPP, urban PPP partners are obliged to devote significant thought during the design and construction stages to ensuring quality projects. This qualitative element is, therefore, at the forefront from the very inception of a project, during the bidding stage – and is reinforced by the specifications laid down by the authorities in a typical tendering process for a PPP.

As alluded earlier, ready availability and access to the road infrastructure is even more important in an urban context than with inter-urban projects, due to specific commuter needs. A PPP approach – whether it involves a toll project or a scheme based on availability fees paid by the authorities – is particularly adapted to this reality as there is a clear incentive for providing increased availability of the road, given that level of service is made an integral part of the contractual obligations.

Secondly, clearly defined performance requirements, and penalty/incentive regimes provided for in the contract, effectively ensure continued quality and the maintenance of service levels throughout the full duration of the partnership. For example, in the case of the 91 Express Lanes in California, USA, a policy is applied to reimburse tolls if significant actual congestion occurs. In the case of the Portsmouth PFI, the private partners' remuneration is composed of a monthly lump sum fee and a shadow toll for heavy goods vehicles, minus deductions for failure to meet performance specifications.

8) International Road Federation, *Public-Private Partnerships: Beyond the financing aspects – An IRF discussion paper*, Geneva, 2008.

9) Allen Consulting Group & University of Melbourne, *Performance of PPPs and Traditional Procurement in Australia – Final Report*, Infrastructure Partnerships Australia, 2007.

Thirdly, the case studies reveal that most of the projects have included regular customer surveys and feedbacks – whether contractually required or simply deemed desirable by the private operator concerned. This aspect is of particular importance for urban projects, where a large proportion of users are regular commuters who have a good understanding of the service they expect, as well as its importance. It is very uncommon (if not virtually unseen) to come across such customer emphasis and feedback loops in traditional urban road projects.

For the Attica Tollway, a users' survey is carried out every year in order to measure customer satisfaction. Thus, for example, in 2010, 95% of users were found to be satisfied with safety on the Attica Tollway, and almost 98% declared themselves "very" or "rather" satisfied with the behaviour of personnel manning the toll stations.

On the A14 in Paris, detailed customer satisfaction studies are carried out on a regular basis. This allows for a better understanding of the customer base, as well as user needs and expectations regarding the infrastructure and services. It also enables the evolution of user needs to be monitored over time, thereby facilitating the identification of specific emerging needs that may not have been originally forecast or taken into account.

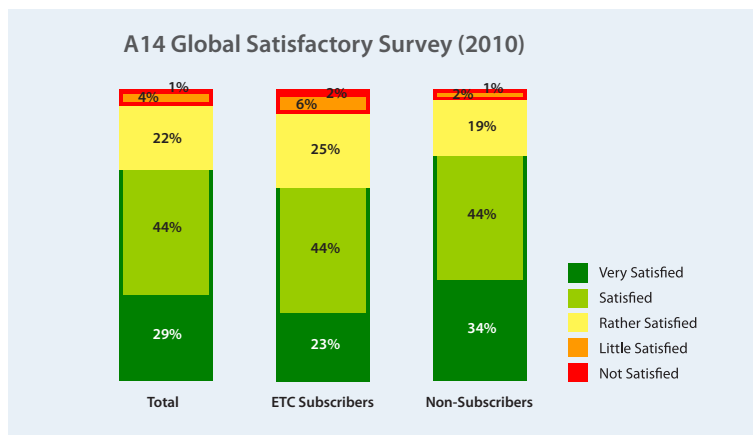


Figure 3: A14 Customer ratings 2010, distinguishing between subscribers and non-subscribers to the electronic toll collection programme in place (Source: SANEF).

Finally, in an urban PPP, the public entity can focus on monitoring and enforcing the service level and contractual requirements, rather than being necessarily involved in both implementation and control. The respective roles and responsibilities are clearer, and there is less risk of conflicting interests.

Case Study 06



Birmingham Highways Management PFI

United Kingdom

Category:

Long-term maintenance contracts for urban road networks

- The project encompasses the rehabilitation and operation of a 2,500 km road network, together with footways, 95,000 street lighting units, bridges, traffic signals and street fittings. It runs for a period of 25 years, with a core investment period of 5 years (2010-2015). The total value of the contract is £2.7 billion.
- The project overcame substantial delays in the planning and tendering stages, notably due to strong protests from labour unions; local government changes; altering UK Department for Transport requirements (leading to review of the business case); and competition for funding after selection of preferred bidders in a very stringent financial market.
- The project is the largest Public Finance Initiative (PFI) issued by a local authority in the UK. Birmingham City Council is receiving PFI credits worth £588 million from the UK Department for Transport.

Case Study 07



M50, Dublin Republic of Ireland

Category:

Urban road operation partnership

- The two-lane orbital motorway forming a C-ring to the west of Dublin is being upgraded under a 35-year PPP contract. In parallel, a free-flow tolling system is being implemented to replace the existing manual toll plaza.
- The upgrade was designed to improve traffic flows and adapt to growing urbanisation (new housing developments) and new urban transportation modes.
- The revenues from the electronic tolling are used by the National Roads Authority to pay the availability fee to the contractor of the upgrade.
- Societal benefits include a reduction in CO2 emissions as traffic no longer has to 'stop and go' at the toll plaza.

5.2 Continuous attention and funding for urban roads

In a PPP, irrespective of whether it is for construction, operation or maintenance costs, funding has to be forecast and modelled over the entire duration of the partnership. The detailed financial plan has to undergo a thorough risk analysis, taking into account downside scenarios. It follows that the PPP partner has to fully secure the financing for the project and prove funding resilience. In some cases, this will include foreseeing financial reserves.

As funding is forecasted in advance, there is hardly any room for perceived arbitrary decisions to cut budgets, lower service level or reduce the quality of the infrastructure due to political decisions regarding public budget restrictions. The obvious benefit is that funding is secured for the duration of the contract, whereas with a conventional approach, funding is subject to annual public decision-making cycles, in which road infrastructure is in competition with other public services.

For example, before the PFI was concluded, the Portsmouth City Council (PCC) had only been able to carry out general reactive maintenance on its road network due to budget constraints. Under the PFI, the road network has been brought back to appropriate standards during a "core investment" period and will continue to be maintained to these standards throughout the duration of the contract till 2025.

5.3 Greater socio-economic benefits, materialising sooner

The most common, and generally most important, socio-economic benefit resulting from a PPP approach to urban road projects is the time saved on project implementation. Under a PPP approach, there is a clear capacity to deliver projects – which in some cases may have been delayed for decades – faster. This is due to the contractual structure and the secured funding; factors that are particularly relevant in the case of urban road projects given the specific challenges and inherent complexity. By way of example, the A14 near Paris (a 900 M€ investment) was built in less than five years, including design studies, public consultations, expropriation (compulsory purchase) and construction.

The 91 Express Lanes in California, United States, were constructed as the result of a call for proposals for demonstration projects of transportation PPPs issued by the Californian State Department of Transport (CalTrans) to the private sector. No state financial support was to be available for

the projects. Out of four proposals received, the 91 Express Lanes project was the only one that was implemented in a timely manner. The main component of the socio-economic benefits that have resulted from the project has been travel time savings. Well-publicised reports by Edward Sullivan, of the California Polytechnic State University (Cal Poly),¹⁰ refer, among other advantages, to savings of 12-13 minutes per trip on normal traffic days. Moreover, dramatic proportionate reductions in travel time delays affecting the existing free lanes were also recorded; from 30 to 40 minutes per trip before the opening of the express lanes, to around 12-13 minutes 18 months after they came into operation.

Enhanced mobility and accessibility generally facilitate overall economic development and improve people's quality of life. With urban PPP projects, these aspects are enhanced even further through better and more efficient utilisation of the infrastructure, accompanied by increased level of service.

The Melbourne CityLink provides a good example of an acceleration of much needed investment in road infrastructure. The estimated economic growth attributable to the project is AUS\$ 300 Million, representing a significant increase in GDP. The northwestern suburbs of Melbourne benefited from improved accessibility and a faster pace of development, while users enjoyed the advantages of reduced travel times and increased travel time certainty.

Similarly, the Attica Tollway in Greece played a critical role in the development of urban and land-use planning requirements for the metropolitan area of Athens. The undoubted success of the project is evidenced by the fact that the number of entries exceeds forecasts by 30%. Indeed, the Attica Tollway has not only given rise to significant improvements in traffic conditions in the metropolitan area of Athens, but has also produced tangible benefits for the economy and overall development.

5.4 Innovation and optimisation

It is widely recognised that PPPs - whether at bidding stage or later throughout the life of the project – foster innovations. This tends to

¹⁰ Sullivan, Edward, *Evaluating the Impacts of the SR91 Variable-Toll Express Lane Facility, Final Report*, May 1998, and *Continuation Study to Evaluate the Impacts of the SR 91 Value-Priced Express Lanes, Final Report*, December 2000, Cal Poly State University, San Luis Obispo.

Case Study 08



M6 Toll

United Kingdom

Category:

Urban toll road

- The M6 Toll runs as a 42 km bypass of a congested section of the M6 Motorway near Birmingham. It was the UK's first privately developed user-pays toll road, following the 1989 Government Green paper, *"New Roads by New Means – Bringing in Private Finance"*.
- Journey times using the M6 Toll between junctions 4 and 12 of the M6 are up to 37 minutes faster than on the existing M6 before the opening of the toll road.
- The M6 Toll has helped the regeneration of the West Midlands conurbation and created many local jobs. Refinancing benefits were partly reinvested in road improvements in the region.

be even more the case with urban PPPs, as the complexity and the need for integration within a more global transportation network, necessitate ever-greater emphasis on inventiveness and optimisation. Several examples provide vivid illustration.

In the case of the A86 West toll concession project near Paris, the French state opted for an underground route in order to safeguard forests, historical heritage and inhabited areas. Cofiroute, the private sector partner involved, came up with an unusual solution consisting of two superimposed independent carriageways in a single tunnel tube, with each “floor” carrying traffic in one direction. The tunnel is reserved for use by light vehicles with a maximum height of 2 metres.

The Attica Tollway was the first project in Greece to introduce electronic toll collection services and the initiative has succeeded to such an extent that, six years on, electronic collection now covers 50% of toll transactions. From the perspective of interoperability, electronic transactions carried out using the Attica Tollway tag (e-pass) currently represent 98% of total electronic transactions for the whole of Greece.

The extended duration of PPP contracts, coupled with the partnership relationship, provides a key incentive for innovation and research & development. It enables the private partner to run the whole innovation cycle – from the conception of an idea, through concept development and product testing, right up to technical implementation when the benefits finally become apparent.

The tendering process and the competition this entails are also keys to innovation; not only with respect to the technical construction aspects (methodology, pricing, timeframe) but also the operation and integration of the infrastructure. Firms are stimulated to try and gain competitive advantage through innovative ideas and concepts.

In a number of cases, innovative cross-financing mechanisms have been implemented to enable the overall economic viability of the project. Two examples are highlighted here.



For the M50 Dublin project in the Republic of Ireland, two separate contracts have been issued – one for the rehabilitation of part of the M50 ring road around Dublin and the other for the installation of an Electronic Toll Collection (ETC) system to replace the toll plaza. The revenues from the electronic tolling will be partly used by the Irish National Roads Authority to pay the annual availability fee due to the private partner handling the rehabilitation component.

The A2 project in the city of Maastricht, the Netherlands, entails the reconstruction of an urban section of the current motorway into two underground tunnels, one above the other. The surface area thus freed will be used for the ‘green carpet’ development of real estate and public areas – with revenues from the real estate being applied towards paying off debts incurred to finance the infrastructure development and green spaces.

6. Issues highlighted by the urban PPP case studies

A number of issues, which seem to be more or less common to the projects under review, emerged from the urban PPP case studies. Some of these issues are specifically related to the use of tolls; others more to the complexity and long duration of PPP contracts. They are introduced briefly below.

6.1 Dealing with future developments

A common concern related to long-term contracts is how to cater for future developments. At the time of contract negotiations, a number of likely developments in the near future can be readily anticipated. Further into the life of the contract, however, such predictions become increasingly difficult. Overall, in PPP contracts there is:

- a. The necessity for the private operator to stay at the forefront of the expectations of the client authority and the road users;
- b. The willingness of, and incentives for, the private partner to “sweeten” the project with new developments (with direct or indirect compensation).

Mechanisms to cater for future developments should be anticipated in the original contract. For example, on the A14 project near Paris, an additional intermediate interchange (at a cost of approximately 40 M€, fully financed by the concessionaire, SAPN) was built ten years after the opening of the main motorway, thus further contributing to the accessibility of the Chambourcy/St Germain area. While French and European Union legislation both permit a certain flexibility with regard to additional investment and/or adaptation of the infrastructure, the key element remains the negotiation process that takes place between the partners – notably whether a need is expressed by one of the parties, and whether both derive value from the proposed adaptation.

As alluded earlier, the operator of the Attica Tollway undertakes extensive user surveys on an annual basis in order to measure performance and define ongoing client expectations. From these surveys, it is apparent that users of the Attica Tollway are highly supportive of expansions to the existing infrastructure; as well improvements that help alleviate traffic congestion at specific locations. A revision of the prevailing legal framework should be foreseen in the concession agreement concerned, in order to enable the implementation of such additional small-scale expansions and improvements.

Clauses that are too strict regarding future developments might lead to the demise of the project. This was the case with the original contract for the 91 Express Lanes in California, USA. In 1999, the California Department of Transport (CalTrans) initiated plans to widen the Riverside Expressway. This was, however, in violation of a non-compete clause in the concession agreement. The clause stipulated that, in order to ensure the profitability of the express lanes, no improvements (including widening the free lanes or building a mass transit transport link) could be implemented along 48 km of the Riverside Freeway during the contract period. The Orange County Transport Authority (OCTA), supported by CalTrans, eventually decided to buy out the private interest and purchased the express lanes in January 2003 for US\$ 207.5 million. This constituted a *de facto* return of the project to public ownership.

Case Study 09



Melbourne CityLink Australia

Category:

Urban toll road

- The Melbourne CityLink is a 22 km motorway connecting 3 major freeways in the Melbourne conurbation. It consists of two parts: the Southern Link and the Western Link.
- The project was built to bypass the central business district, which was suffering from severe congestion. Both parts of the CityLink run through densely urbanised areas. The Western link was built as an elevated road to save space.
- The CityLink project accelerated much needed road infrastructure development and contributed to an important increase in the level of GDP. Furthermore, it spurred development of the northwestern suburbs as well as reduced travel times and improved travel time certainty.

6.2 Toll acceptability and willingness to pay

The problem of social acceptability of toll systems must be examined with care whenever it is proposed to apply tolls on a road section. This applies especially in an urban context. There are, indeed, examples of projects that have ultimately failed due to lack of willingness on the part of users to pay such tolls.



A number of factors are said to determine social acceptability:¹¹

- **Level of toll charges:** toll levels vary widely and are generally set by reference to socio-economic conditions and project cost components (e.g. construction costs). Toll levels need to be reasonable in the sense that they are consistent with and proportionate to the usefulness gained by the road user. Price elasticity for short distance tolls is usually higher than for longer distance tolls.
- **Toll collection method:** Whatever technology is applied to collect the tolls, users should clearly recognise the service provided. This is especially important when introducing electronic toll collection. Progressive introduction of the tolling, rather than simultaneous introduction over a complete network, mitigates the risk of jeopardising public support.
- **Toll system:** a toll system will only be accepted insofar as it is associated with satisfactory benefits for the user.
- **Presence of toll-free itineraries:** the presence of a toll-free itinerary parallel to the tolled road section has a significant positive impact on social acceptability. People tend to value highly having a choice between distinct service levels.
- **Existence of taxes associated with the road sector**

11) E. Tyrogianni, D. Mandalozis, *Toll Acceptability in Attica Tollway*, Athens, 2010.

Sometimes the nature of the toll collecting concession company – state owned or private – can have an impact on toll system acceptability.

6.3 Equity impacts

Urban PPPs applying some form of charging or tolling have a variety of equity impacts. They tend to increase horizontal equity by, on the one hand, charging users directly for the roadway costs they impose during peak hours and, on the other, by reducing cross subsidies from motorists who choose not to use the facilities at peak times. Some critics argue that road pricing is tantamount to “double taxation” in that motorists usually already pay other road-related levies such as fuel taxes and vehicle registration fees. In general, however, these levies do not cover the marginal cost of driving in peak urban conditions.

Although large-scale income equity effects are often feared, they have not to date materialised to the extent of discriminating between groups in society in terms of permitting affordable access to road infrastructure. A study by Cal Poly State University aimed at evaluating the impacts of the 91 Express Lanes in California, USA, concludes that: “(...) while toll lane use has continued to vary significantly with income, gender, age and other characteristics, people from all demographic backgrounds make use of the facility”.¹² Motorists from all income groups are generally willing to pay for travel time savings and reliability; their frequency of use is dependent on a wide range of factors besides income, including gender, education and the need or otherwise to commute to work.

There are also means available to subsidise lower income groups in order to overcome eventual affordability problems – for example by granting discounts or even free access to the toll facility.

6.4 Road asset information

In PPP contracts related to maintenance and operation, the responsibility for existing road assets is transferred from the owner to the operator for the duration of the contract. In order to estimate maintenance and operation costs with a view to preparing a bid, the private partner needs to have detailed, up-to-date information about the condition, location and dimensions of the road assets under consideration. This information is not always readily available, especially from local authorities.

¹²) Sullivan, E., *Continuation Study to Evaluate the Impacts of the SR 91 Value-Priced Express Lanes – Final Report*, Cal Poly State University, December 2000, page 223.

Case Study 10



Portsmouth Highways Management PFI United Kingdom

Category:

Long-term maintenance contracts for urban road networks

- The Portsmouth City Council was the first municipal authority in the UK to outsource its highway management through a PFI contract. The contractor, Ensign Highways Ltd., is responsible for the day-to-day, “fence-to-fence” management and maintenance of 480 km of roads, 19,000 street lighting points and 84 structures.
- The contract consists of an initial core investment period of 5 years, to bring the whole network up to standard, and a 20-year operation & maintenance period. The contractor is paid a monthly fee based on availability and performance.
- A number of personnel from the Portsmouth City Council dealing with highways management has been transferred to Ensign Highways.
- Initially, available information on conditions and the inventory of assets was insufficient for candidates to prepare a bid. Nor was the information centrally organised. Additional surveys had to be undertaken to obtain the necessary information to the required level of detail.

Case Study 11



St. Louis-de-France, Quebec Canada

Category:

Long-term maintenance contracts for urban road networks

- Given that the municipality of St. Louis-de-France lacked the manpower and resources to manage its arterial network after transfer from the provincial transport authorities, an analysis was performed to compare a conventional contracting approach with a 15-year design-build-maintain contract. The analysis showed substantial savings for the DBM-approach.
- The contractor, Page Construction (later acquired by Sintra Inc.), has responsibility for the design, construction and structural maintenance, within performance specifications related to roughness, rutting and cracking.
- Due to the characteristics of the contract, the contractor has been able to develop and experiment with innovative pavement and maintenance techniques.
- 3 years after the award of the contract, St. Louis-de-France was amalgamated with the city of Trois-Rivières. The simplicity of the contract enabled an easy transfer from the original parties to the new authority and a new contractor.

In the case of the Portsmouth PFI, the available road asset information was insufficient for bidders to come up with cost estimates accurate enough to make a proper proposal. Besides being in many respects outdated, the information was not centrally located. Rather it was spread over a number of departments within Portsmouth City Council. Several additional surveys and measurements had to be performed in order to fill in the missing data.

6.5 Sufficient competition and deal flow

In order to get competitive bids and value for money for their urban road projects, client authorities need a sufficient number of willing and capable private companies or consortia to compete in the bidding process. From a longer-term perspective, they also need to consider whether a competitive market is still likely to be present at the time of re-contracting, after the initial contract period has expired. This is especially valid for long-term maintenance contracts.

Conversely, for the private sector to get involved in these kinds of initiatives there must be continuity in the flow of potential deals. Clearly, there needs to be a prospect of stable revenue flows for companies, in order to enable them to recoup their investment in setting up the dedicated structures needed to handle such projects.



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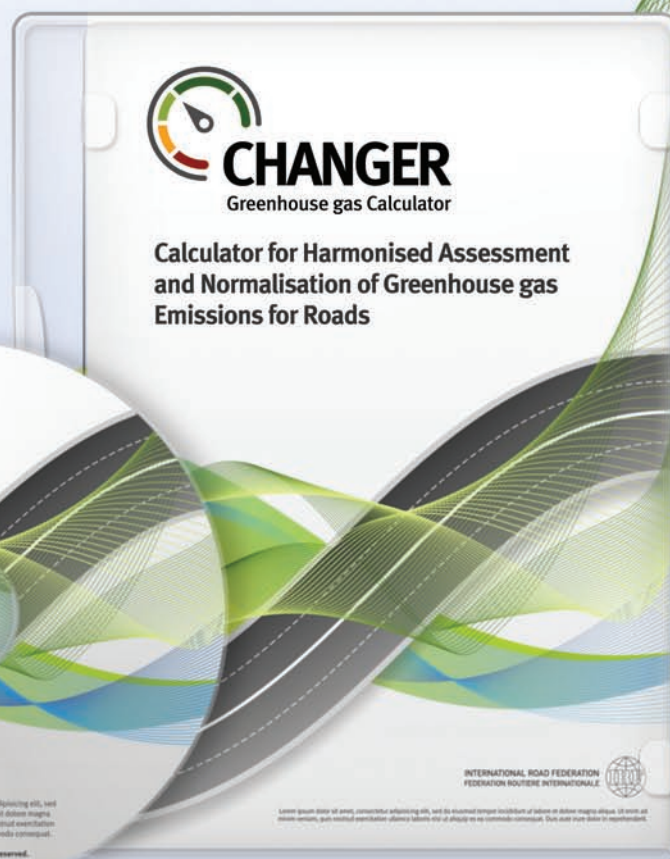
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