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## Article

# Public-private partnerships in new EU member countries of Central and Eastern Europe: An economic analysis with case studies from the highway sector

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## ABSTRACT

*This paper analyses the role of public-private partnerships (PPPs) for infrastructure development in the new EU member states and candidate countries in Central and Eastern Europe. We survey projects in transport, water, energy, and telecommunications sectors and then focus on the highway sector. Based on theoretical considerations and extensive fieldwork in Hungary, Poland, Croatia, and the Czech Republic, we find that PPPs have not been very successful in the region to date. This is mainly due to the unfavourable institutional environment during the transition period, suboptimal project design, and unrealistic demand projections. However, the conditions for successful PPPs have considerably improved, partly due to EU membership, so that PPPs remain an important option for the second generation of infrastructure projects.*

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# Public-private partnerships in new EU member countries of Central and Eastern Europe:

An economic analysis with case studies from the highway sector

## 1. Introduction

In the quest to upgrade their infrastructure in the early and mid 1990s, many countries in Central and Eastern Europe (CEE) placed considerable hopes on public-private partnerships (PPPs).<sup>1</sup> Initial conditions indeed seemed to lend themselves for PPPs, which includes non-governmental capital provision: a lack of domestic public resources, relatively favourable lending conditions from international financial institutions, and the desire of international project developers to prove that “PPP could work in Central and Eastern Europe” led to many PPP projects, conceived in the second half of the 1990s. Official statistics list 217 projects in the region by 2003. However, looking back at 15 years of transition in CEE countries, attempts to institutionalise PPPs as a key instrument for infrastructure financing have not been successful. For example, in the water sector, some projects have taken off (e.g., in Budapest, Sofia, and Tallinn) but the overall impact has been lower than expected. In the highway sector, some ambitious plans to join private co-financing and to introduce user-tolls have been postponed or cancelled. Therefore, the question arises, why PPPs have not played a more important role in the region’s infrastructure development and what should be the way forward for PPPs in the new EU member states of Central and Eastern Europe.

EBRD (2004) and Guasch (2004) provide extensive surveys of PPPs and forms of ‘private participation in infrastructure’ (PPI) in transition countries. They conclude that PPI in CEE countries is on the rise, but that it remains largely underdeveloped relative to comparable regions of the world, such as Latin America or Asia. Additional sectoral surveys and selected case studies are provided by Simpson (2004) and Clement-Davies (2001). Comparative international analysis of the experiences with PPPs in Eastern Europe is provided by Estache and Serebrisky (2004). They conclude that PPPs only work for a limited period of time, but often result in complex renegotiation after some time, either due to macroeconomic shocks (such as in Argentina) or because individual projects run into problems. Estache and Serebrisky also emphasise the need for strong political commitments to make the PPP reform path sustainable in regions such as Latin America and Central and Eastern Europe. In addition, a high technical competence is required on both sides (public and private) to make PPPs work.

This study analyses the approach and results of PPP infrastructure financing in CEE countries, mainly between 1993 and 2005. We carry out a quantitative analysis of projects in different sectors and then focus on the highway sector in detail. In line with Bentz *et al.* (2003), De Bettignies and Ross (2004), and others, we define a PPP as a contractual structure where the public sector buys a service from the private sector through a long-term contract, and where more than one element of the infrastructure value-added chain is passed on to the private sector. PPPs also include sophisticated rules on risk allocation between the public and the private sector. It is important to make a distinction between a PPP and ‘simply’ raising private capital. Private financing can be part of a PPP deal, but does not have to be. Likewise, a PPP does not necessarily require tolls or user charges; these are characteristics for a commercial concession scheme that can be a PPP, but does not need to be one. In the highway sector, the value-added chain generally consists of design, construction, capital maintenance, routine maintenance, and financing. An essential characteristic of a PPP in the highway sector is that, at least, the tasks of construction and capital maintenance are passed on to the private sector.



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<sup>1</sup> In this study we focus on the Central and Eastern European countries that have joined the EU in May 2004 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) and on Croatia, Bulgaria, and Romania.

Our working hypothesis is that a PPP generally entails complex contract structures, which may to some extent have exceeded the institutional capabilities of the former socialist countries of Central and Eastern Europe. That said, given substantial institutional progress over the last few years, in particular EU accession in May 2004, a more fertile ground is provided for future PPPs. Our study is based on an extensive survey of the literature on the topic. For the empirical analysis of PPPs in the highway sector we carried out field research in four countries (Hungary, Poland, Croatia, and the Czech Republic) and expert interviews with banks, international financial institutions, project developers, and construction companies. The study was carried out between August 2004 and March 2005.

The study is structured in the following way. Section 2 provides a survey of PPPs in Central and Eastern Europe over the last decade. We examine the 'macro' perspective of infrastructure investment in the region, which is still characterised by a lack of basic infrastructure. But we also take a 'micro' perspective, which suggests a wide variety of institutional settings for PPPs. From the variety of sectors in which PPPs have been initiated, we focus in Section 3 on highways as a particularly strategic sector. From a state of underdevelopment, the region has been able to expand its highway system significantly. However, as Section 4 shows, this development has only been partly spurred by PPPs. As in the EU-15, traditional state financing and contracting have remained the dominant methods. We sketch the overall tendencies of highway development in Central and Eastern Europe and summarise case study evidence and country experiences from Hungary, Poland, Croatia, and the Czech Republic. Section 5 derives lessons from the case studies, and Section 6 gives general conclusions.

## **2. A survey of PPPs in Central and Eastern Europe**

### **2.1 The 'macro' perspective: infrastructure requirements**

***PPPs in Central and Eastern Europe have to be seen in the context of transition, including the goal of CEE countries to catch up with living standards in Western Europe.***

To comprehend the situation in the mid 1990s correctly, one has to place PPPs and the financing of infrastructure in a broader context. The collapse of the socialist infrastructure in the early 1990s had led to large investment requirements in CEE countries, including the extension and/or reconstruction of entire networks (such as telecommunications, highways, railways, airports, air traffic security, and water). Investment requirements were determined by changes in the demand for infrastructure services, but also by political constraints: governments of CEE countries were eager to reduce the infrastructure gaps with Western Europe. The integration into the European and world economy also called for urgent investments to attain international quality and security standards (for example in water, energy, and telecommunications).<sup>2</sup>

Quantifying the investment needs of the region is rather difficult. Table 1 summarises different estimates for several CEE countries. If one were to set a political objective that these countries should attain an average EU-15 infrastructure level by 2010, the investment needs for the sectors of material infrastructure alone would have amounted to more than EUR 500 billion by the mid 1990s. This corresponds to about 5 percent of annual GDP in these countries, for a period of 15 years.

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<sup>2</sup> This section is based on Hirschhausen (2002).

**Table 1: Estimated infrastructure investment needs of new EU member countries, 1995-2010**

Sector	Reference	Investment needs	
		in EUR billion	in percent of annual GDP
Roads	Modernisation/construction to EU-15 average density	44	0.5
Railways	Modernisation/construction to EU-15 average density	37	0.4
Telecoms	Teledensity: 35 mainlines per 100 citizens	63	0.9
Water/ Sewage	European standards for collection and treatment	180	1.5
Energy	Network development, oil-, gas- and coal sector reform	110	1.4
Environment	EU-Directive Air Pollution and Waste	71	0.3
<b>Sum</b>		<b>505</b>	<b>5.0</b>

Source: European Commission, TINA, EBRD, and own calculations.

EUR 500 billion does not appear to be much and indeed it is a modest sum compared to the infrastructure investments in large EU countries, in particular those carried out in Eastern Germany over a similar period (around EUR 1,500 billion). However, only a small fraction of the necessary investments has materialised in CEE countries. During the transition period, access to infrastructure financing was limited in the public and in the private sector. Public infrastructure financing was constrained by the need to consolidate state budgets in an environment of falling tax revenues. Between 1989 and 1995, the share of public investments in GDP therefore fell from 5-10 percent to 2-3 percent (EBRD 1996 and Vällilä *et al.*, this volume). At the same time, private infrastructure financing was constrained by underdeveloped capital markets and high uncertainty and risk. International financial organisations therefore played an important role as a catalyst for infrastructure financing in the early years of transition, but they too were unable to meet the substantial requirements (EBRD 1996).

The following figures indicate the investment carried out: between 1992 and 2003, private financing for infrastructure (transport, energy, telecommunications, and water) in CEE countries amounted to USD 53 billion (EBRD 2004). During that time, the large international financial institutions, the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), and the World Bank, invested roughly EUR 35 billion in these eight countries (own calculations on the basis of published information). Assuming that each Euro of this 'seed money' came together with about EUR 1.5 from the government, the value of public investment amounted to some EUR 80 billion. Thus, total investment in modernising CEE infrastructure until 2003 was about EUR 140 billion.<sup>3</sup>

<sup>3</sup> In this paper, we use USD 1 for one euro. The euro exchange rate has oscillated in the period under observation between 0.8 USD and 1.25 USD; investment figures are also distorted by imprecise information by project participants on the real values of investment (e.g., in constant 2000-terms). This is not to mention the problem that investments disbursed are much lower than investments announced. Therefore, the investment figures used in this study should be regarded as estimates.

***During the transition from plan to market in Central and Eastern Europe, access to infrastructure financing was limited.***

When looking at the sectoral distribution of private investment, we observe significant differences. Using data (EBRD 2004) on private investment in infrastructure in all transition countries (rather than those that have become members of the EU), the following picture emerges: energy and telecommunications have by far attracted the largest share of financing with roughly 45 percent each; the transport sector is seriously lagging behind, with only 9 percent of total private investment, and the share of water is negligible (below 1 percent).

## 2.2 The 'micro' perspective: a survey of projects

We now examine PPPs in CEE countries from a 'micro' perspective, i.e., we look at individual projects. To give an overview, we use the World Bank's database on Private Participation in Infrastructure (PPI). The PPI database details projects that are owned or managed by private companies as long as these companies or investors share the project's operating risk. Thus, as a first approximation, one can equate PPI and PPP. The PPI database focuses on infrastructure sectors: water (potable water and sewage), energy (electricity and natural gas), transport (railways, airports, toll roads, and seaports), and telecommunications.<sup>4</sup>

The PPI database classifies private infrastructure projects into four categories.<sup>5</sup> First, 'greenfield' projects: a private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract; build, operate, and transfer or own (BOT or BOO) are the most common contractual forms. Second, 'divestitures': a private company buys an equity stake in a state-owned enterprise through an asset sale, public offering, or mass privatisation programme; the contracts can entail a full transfer of the equity (100 percent) or a partial transfer. Third 'concessions': a private operator takes over the operation and maintenance for the contract period during which he also assumes significant investment and commercial risks; the long-term contracts include a detailed list of investments and service obligations. Fourth, 'management and lease contracts': a private company takes over the management for a fixed period, while ownership and investment decisions remain with the public sector; the operational risk is only transferred to the private operator by lease contract.

***The number of infrastructure projects in CEE countries with private participation is impressive.***

The number of PPI projects in CEE countries is impressive. Table A1 in the Annex shows 217 projects, which have reached financial close since 1990, with Hungary, the Czech Republic, and Poland accounting for 157 projects. The distribution between the four categories shows an emphasis on 'greenfield' projects and 'divestitures' with 67 and 107 projects, respectively. As to a breakdown by sector, telecommunications and energy dominate, accounting for 136 projects, i.e., more than 50 percent of all projects. Management and lease contracts are mostly used in the potable water and sewage sector. Among the 20 concessions listed in the PPI database, there are six toll road projects; all structured as build-rehabilitate-operate-transfer (BROT) contracts.

We now look at the volume of investment. The PPI database lists expenditure for some of the projects but not for all. Investment in infrastructure projects is recorded on the basis of expenditure on expanding and modernising facilities and on acquiring government assets or rights to

<sup>4</sup> Cp.: <http://ppi.worldbank.org/methodology.asp>.

<sup>5</sup> For the definitions, see <http://ppi.worldbank.org/glossary.asp#201> and Estache and Serebrisky (2004). Most infrastructure projects fit in one of these four categories. However, as boundaries between categories are not always clear and some projects have features of more than one category, such projects have been classified in the category that best reflects the risk borne by the private sector.

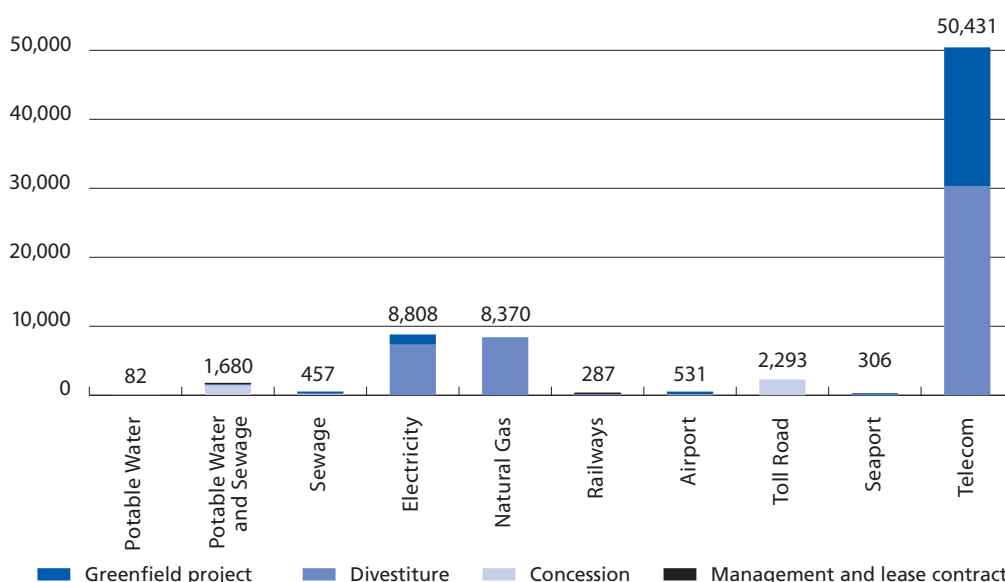
provide services. It is worth noting, however, that expenditure have generally been recorded on a commitment basis in the year of financial close and not on a disbursement basis, implying a considerable overestimation of actual investment.

Among the 217 projects listed in the World Bank’s PPI database, investment figures are available for 188 projects. The investment commitments amount to EUR 73 billion, of which more than two-thirds represent investments in Hungary (42 projects, EUR 17.4 billion), the Czech Republic (46 projects, EUR 16.4 billion), and Poland (35 projects, EUR 18.0 billion). Regarding the sectoral distribution, telecommunications dominate by far, with a total of 69 projects and an investment value of EUR 50.4 billion. Figure 1 shows the distribution of investments by sector and PPI category.<sup>6</sup> Within the energy sector, electricity (57 projects, EUR 8.8 billion) and natural gas (17 projects, EUR 8.4 billion) have been equally important. The other sectors, such as toll roads or water, are far behind.

**The telecommunications sector accounts for the bulk of infrastructure investment with private participation.**

Figure 1 also shows the dominance of ‘divestiture’ in infrastructure investments. More than 50 percent of the PPI investments in telecommunications and almost all investments in the energy sector have been generated through divestiture (total of 94 projects, EUR 46.4 billion). 64 ‘greenfield’ projects have been realised, amounting to an investment of EUR 22.6 billion. Figure 2 provides a more detailed analysis of investments in the two other categories, i.e., ‘concessions’ and ‘management and lease contracts’. These are the types of private participation that are closest to the typical PPP model. Toll roads and potable water and sewerage are the leading sectors. The six toll road projects alone account for about EUR 2.3 billion, more than the potable water and sewerage sector with 20 projects (EUR 1.4 billion.).

**Figure 1. PPI investments, by sector and PPI category (in millions of USD)**



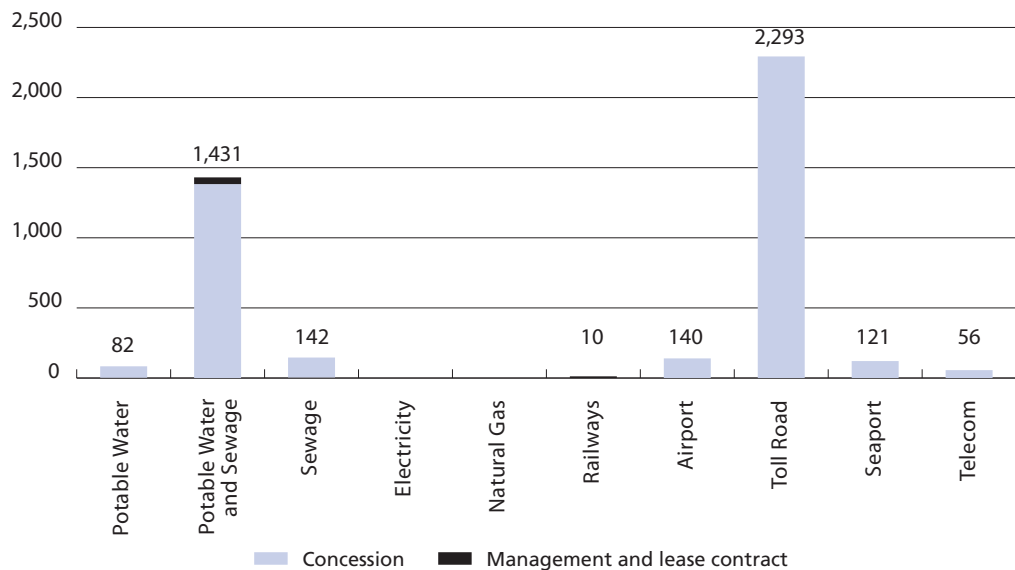
Source: World Bank PPI database

As discussed by Riess (this volume), private participation works differently across sectors, and we can confirm this hypothesis from the experience of CEE countries. To begin with telecommunications,

<sup>6</sup> See Heinrich (2005) for a more detailed presentation of the case studies. Note that the dominance of telecoms in PPI does not imply the dominance of this sector in public-private partnerships. In fact, most of the telecoms projects are outright privatisations.

there have been many PPI projects (71) in this sector, simply reflecting the high profit prospects of this sector and the minor role of the public sector.

**Figure 2. Investments in PPIs, by sector and the PPI categories 'concession' and 'management lease contract' (in millions of USD)**



Source: World Bank PPI database

***The water and sewage sector has been a prime target for concessions and management and lease contracts.***

By contrast, the water sector has proven to be a difficult sector for PPIs, mainly due to the low commercial value of the projects. However, water and sewage have been prime targets for PPPs, mainly due to the backwardness of the water sector in the region and the urgent need for financing, but also because project developers in the water sector rode on a wave of successful international projects, which they hoped to transfer to Central and Eastern Europe. Some large PPPs, often in combination with the award of concessions, were initiated. Whereas some of them are considered a success (e.g., Sofia, Budapest, and Tallinn), in particular small projects often suffer from non-commercial contract structures, facing difficulties right from the start.

Within the transport sector, railways are in the most difficult position. None of the CEE national railway systems is profitable and the ongoing fall in market shares suggest little hope for a significant change. Thus, contrary to roads, most projects in the rail sector have never been seen as profitable without extensive public support. Exceptions may be individual connections (such as the Prague airport link). Thus, PPP in the railway sector are unlikely to become an easy solution to the sector's problem. The situation is different with airports, which are 'easy' targets as increasing traffic to the capitals of CEE countries ensures the commercial viability of these ventures. Lastly, seaports had a much more difficult time as most of the ports in the region were over-dimensioned and experienced declining turnovers.

In the following sections, we will focus on the highway sector. The highway sector lends itself particularly well to an analysis of the experience with PPPs in Central and Eastern Europe because investment needs in this sector were considered to be exceptionally large and urgent. International experience – especially from the United Kingdom – seemed to indicate substantial efficiency gains of PPPs in the highway sector. Last but not least, highway sector PPPs are generally perceived to be technically simple: the technology is well known, fairly straightforward, and not prone to rapid change (in contrast to telecommunications, for instance), therefore posing low technical risks.



### 3. Highway sector PPPs: key theoretical considerations

The economics of PPPs is a relatively new but rapidly growing research area. Building on other research areas – such as property rights, transactions costs, and asymmetric information – there are many ways to explore the economic pros and cons of PPPs. Moreover, the debate of the 1960s on differences between public and private financing of projects has re-emerged recently. In what follows, we will not review the state of the art (this is done by De Bettignies and Ross 2004 for instance) but focus on key aspects that are of particular importance for our case. Besides, the theoretical literature has focused on narrowly defined problems thereby ignoring institutional aspects. While this is necessary to expose the economics of PPPs as clearly as possible, case studies of PPPs must also take into account institutional and organisational issues that affect the implementation of PPPs. In this section we will, first, briefly review efficiency aspects relevant for the assessment of highway sector PPPs and, second, account for the fact that highway investments cannot be considered in isolation but must be examined as components of road networks.

#### 3.1 Efficiency aspects

In assessing the efficiency of PPPs in the highway sector, it is helpful to distinguish three different though interdependent stages. More specifically, one needs to examine, first, the economic efficiency of PPPs relative to other forms of public procurement, second the institutional framework for PPPs in the country considered and, third, the highway sector policy of that country.

At the first stage, the merits of PPPs relative to other forms of procurement must be assessed. Vällilä, Dewatripont and Legros, and Riess (all in this volume) discuss various aspects of this assessment. Suffice it to note here that the decision for or against a PPP typically involves trading off productive efficiency gains of a PPP (such as whole-life cycle cost savings) against possible allocative efficiency losses of a PPP (such as a decline in the quality of infrastructure services). In the case of highway sector investments, it seems fair to say that the cost-benefit trade-off is typically in favour of PPPs. But whether the net benefits of PPPs materialise in practice depends very much on the institutional framework for PPPs and highway sector policies.

The institutional framework for PPPs has many dimensions, but design, evaluation, and award procedures as well as renegotiation rules are especially important. Design, evaluation, and award procedures are without doubt more demanding for PPPs than for traditional procurement. It is crucial to have institutions in place that possess the know-how and incentives to assess and enforce project requirements, especially since a PPP usually calls for output (or performance) specifications rather than input specifications as in the case of traditional procurement. There is a need for a tender regime that enables the proper evaluation of bids (domestic and foreign) that possibly differ significantly in terms of construction methods, schedules, costs, tolls, and financing plans. What is more, the PPP framework must be clear about issues such as real tolls vs. public payments, regulation of tolls, payment rules, public warranties, and the allocation of risks between public and private sector partners.

Renegotiations are a central characteristic of highway PPPs in many countries, particularly in emerging economies, and they have often been the moment for rent shifts from the users and/or the public sector to the private operators (Guasch 2004). In principle, renegotiations need not to be efficiency reducing. Aghion *et al.* (1994) have shown that simple rules, such as appropriate default options in the event of renegotiation failure and allocation of bargaining power to one party, can result in optimal investment decisions. In practice, however, these results require an institutional setting with a regulator directed by straight and binding rules and controlled by independent agencies or courts. In many countries, independent agencies have not been created and rules have often been unclear.

*The performance of highway PPPs has been driven by their underlying economics, the institutional framework for PPPs, and highway sector policies.*

This takes us to the third stage of assessing the efficiency of highway PPPs: the underlying highway sector policy. An important issue here is whether the policy framework supports the raising of funds necessary for developing an adequate highway network. There are strong arguments in favour of a system that relies on the earmarking of traffic-related taxes and an independent agency, the latter implementing a general investment or, even better, network development plan (Heggie and Vickers 1998 and Heggie 2003). In this system, PPPs represent just one of several instruments. In fact, a coherent framework for raising funds to develop the highway infrastructure could weaken one of the major reasons for establishing highway PPPs in the first place, that is the use of private capital with a view to containing governmental budget deficits.

Another important policy issue is the prioritisation of projects and how they fit into an overall road network development plan. We address this topic next.

### 3.2 Network effects

*Integrating a highway PPP into a road network poses various challenges.*

We use the term 'network' simply to characterise strong complementary and substitutable relationships on both the supply and demand side. Highway systems generally embody such relationships since for the same origin-destination pair one can often use different routes, the quality of a route can depend strongly on the number of users in case of congestion, and even for a single route the overall quality of a journey depends on the quality of different sections of that route. Cognisant of these relationships, the integration of a PPP project into a network poses several problems. We will illustrate them by distinguishing between profitability effects and welfare effects.

For the profitability of a PPP highway project, users' willingness to pay plays a crucial role, and this willingness, in turn, can depend strongly on complementary investments. For example, the attractiveness of a highway, or a stretch of it, depends on the availability and quality of access roads and of upstream and downstream segments of the highway. Complementarities can be fairly extreme: in the case of international freight transport, for instance, waiting times at borders can be a decisive factor in the decision of whether to use roads or other modes of transport. Against this background, it is clear that the profitability of a particular PPP highway project also depends on the government's commitment, or lack thereof, to invest in other parts of the road network. Another decisive factor for the profitability of a highway PPP is the availability of alternative routes and the cost of using them. From the perspective of profitability, it may be necessary to restrain availability or to include alternative routes in the tolling system.

Turning, more generally, to welfare effects, economic theory and empirical evidence suggest that when users' route choice is taken into account, a first-best solution requires tolls on all segments of the road network (Yang and Meng 2000 and 2002). What is more, without general network pricing, profit-oriented PPP projects – even projects that just aim at cost recovery – might be welfare reducing if alternative public roads are not priced at all or if the pricing system does not depend on actual usage (such as a vignette system). The argument in favour of pricing the entire road network, rather than only certain segments such as those carried out as PPPs, becomes stronger when the possibility of a rise in congestion, accident risks, and environmental damages on alternative routes is taken into account. A corollary is that without network pricing, negative welfare effects on alternative routes must be considered when setting the tolls for PPP highways. Obviously, in practice, pricing the entire road network is rather difficult, and second-best pricing must be employed, leading to quite complex pricing schemes.

To conclude, network aspects seriously question the wisdom of real tolls – as opposed to shadow tolls – for PPP highways, in particular when these highways constitute isolated stretches of the road network. Empirical studies for the projects discussed in this paper have not been carried out and, as a result, the empirical evidence for negative welfare effects of tolling isolated highway segments cannot be assessed. However, anecdotal evidence indicates that bypassing of tolled highways resulted in a rise in congestion, accidents, and environmental damages on alternative routes. Bearing this in mind, we move on to the case studies on PPPs in the highway sectors of CEE countries.

#### 4. Case studies on PPPs in the highway sectors of Central and Eastern Europe

At the beginning of transition, CEE countries started with a very underdeveloped highway network and practically no cross-country highway connections. The shift of the modal split, away from collective railway transport towards individual motorised transport, created new demand for roads of better quality. In this section, we analyse the approach and results of PPP in four countries, which have either adopted the most ambitious initial approach (Hungary), have embarked on significant modifications of the programme (Poland), have awarded concessions slowly but surely (Croatia), or are about to implement a PPP programme (Czech Republic). The map shown in Figure 3 shows the location of the projects examined in this paper.<sup>7</sup>

*At the beginning of transition, the highway systems of CEE countries were underdeveloped, and there were practically no cross-country highway links.*

Figure 3. Map of initiated highway PPP/concession projects in Central and Eastern Europe



<sup>7</sup> Heinrich (2005) includes details of the case studies that we omit for the sake of simplicity.

## 4. Hungary<sup>8</sup>

### 4.1 The policy framework

Hungary is a particularly interesting case of PPP and concession models for highways, although not a very successful one. In fact, Hungary was the first CEE country that decided, in 1991, to rely almost entirely on private concessions for its highway development. The required investments for highway construction alone were estimated at around EUR 3 billion, to be raised through concessions to domestic and foreign private investors. Initially, concessions were planned for Hungarian's major motorway stretches M1, M15, M3, M5, M7, and two bridges over the river Danube. The introduction of cost-covering tolls was a necessary condition for the success of this type of PPP.

***A major obstacle to a coherent PPP policy in Hungary was the frequent change in political attitudes towards PPPs and user tolls.***

A major obstacle to a coherent PPP policy in Hungary was the frequent change in political attitudes towards PPPs and user tolls. In fact, since 1990 each change in government has resulted in a different attitude and a different institutional framework for PPPs. A glance at the major events of the past 15 years highlights the Hungarian stop-and-go policy regarding PPPs.

From 1990 to 1994, the right-oriented government considered PPPs the main way of financing investments in the highway network; in this period, the first two projects were tendered. From 1994 to 1998, the left-oriented government stopped promoting BOT concessions in light of substantial problems; moreover, it renegotiated existing concession contracts. In 1998, the government changed again, resulting once more in considerable policy changes. The National Motorway Company (*Nemzeti Autópálya Rt.*) was established, with responsibility for preparing and managing individual projects through traditional public procurement. A vignette system was introduced, while all revenues were earmarked for the newly founded State Motorway Management Company (*Állami Autópálya Kezelő Rt.*), which became responsible for operation and maintenance. Earmarking of revenues for expenditures on operation and maintenance follows the recommendations of Gwilliam and Shalazi (1999, p.180) who argue that "road fund's expenditure should be limited to maintenance in order to correct a systematic bias against maintenance despite the link between investment and maintenance". This bias is quite common because "maintenance spending can always be deferred with little visible short-term impact" (Heggie 1999, p. 88). In 2002, the left-oriented government returned to power and immediately began revitalising the PPP approach in the highway sector. However, PPPs are now considered a way of financing projects outside the government's balance sheet with private money. The remuneration of the operators in all PPPs is now based on availability payments, which are financed from the central budget.

In the light of accession to the EU, tendering of construction work contracts has become more transparent in recent years. EU procurement rules were applied, for example, for the tendering of the M10, for which significant co-financing from EIB was received – a sign of an improving institutional environment. The current investment policy aims at maximising receipts of EU grants. The policy rests on the Motorway Development Act, which has identified projects for implementation over the short-to medium term. But these projects have been chosen without thoroughly evaluating their economic effects – let alone their network consequences. There is thus a risk that Hungary is putting too much burden on future generations given that availability payments, which will reflect the cost of private finance, will have to be made eventually. Looking ahead, it is clear that network enhancements should be planned more carefully. In this respect, co-financing through EU grants and loans from international financial institutions has potential to help rationalise project appraisals and prioritisation.

<sup>8</sup> This case study is based on Szabo (1999), Léderer (1999), Hirschhausen (2002), Rubin and Leece (2004), and expert interviews with Atkins, EBRD, EIB, Kreditanstalt Austria, National Motorway Company, *Strabag*, and *Swietelsky*, and homepages of EBRD, Hungarian Ministry of Economy and Transport, and *Alföldi Koncessziós Autópálya Rt.* (AKA).

#### 4.1.2 Analysis of PPP projects

The history of Hungarian highway sector PPPs tendered in the 1990s is littered with problems and disappointments, partly related to the challenges of transition, but also caused by professional mistakes such as unrealistic traffic forecasts. Let us take a look at a three telling examples.

*The history of Hungarian highway PPPs is littered with problems.*

The conversion of the M1 from 'finance project of the year 1995' to its re-nationalisation is the most striking example for an inappropriate concession scheme. Hungary proceeded very quickly: a procurement notice for the M1 was issued in September 1991 and the concession was granted in April 1993 to a French-Austrian-Hungarian consortium. The consortium obtained the right to receive toll revenues and committed itself to build, rehabilitate, operate, and maintain the M1 for 30 years. The estimated costs of the project were USD 370 million. The government's contribution comprised the provision of land, archaeological exploration, and the clearing of sites (Szabo, 1999).

With the opening of the M1 (January 1996) it became clear that traffic forecasts had been too optimistic: actual traffic was some 50 percent below forecast.<sup>9</sup> There was a strong diversion of traffic to a toll-free, parallel running road. Moreover, several litigation procedures were initiated against the consortium, claiming that tolls were too high and in conflict with Hungarian law. Although tolls had been set according to the concession contract, the consortium lost the case. Before the issue was finally resolved in court, the lenders – in particular the EBRD – had suspended, at the end of 1996, disbursements for the completion of the M15 section and renegotiations commenced. But the idea of restructuring the whole project was refused by the new government, which was opposed to toll motorways and the provision of national capital assets by private finance. In the end, the project was renationalised thanks to diverging interests of various contractual private partners and the strong desire of the Hungarian government to finalise the project. Supposedly, equity holders were hit hard by the liquidation, but it should not be ignored that for some of the consortium's shareholders the remuneration of construction works might have been more than sufficient to compensate for the loss of equity. *Ex post*, a number of factors can explain the failure of the PPP project, such as a too optimistic traffic forecast, an overestimation of users' willingness to pay, the availability of a toll-free, parallel road, an inefficient allocation of risks, and political and institutional instability.

The M5, running from Budapest South to the Hungarian-Serbian border, is considered the 'younger brother' of the M1 and it also developed from a flagship PPP-BOT project to *de facto* re-nationalisation – although this process was less dramatic than in the case of the M1. In May 1994, only shortly before the elections, the 35-year BROT (build, rehabilitate, operate, transfer) concession agreement on the M5 was signed. By December 1995, the agreement was modified because the financial close was in danger due to investors' mistrust of traffic forecasts. The negotiation effectively led to a state-guaranteed return on the concessionaire's investment. Financing was provided by the EBRD and other subordinated commercial lenders; furthermore, the EBRD guaranteed the refinancing of the project in 2008.

In early 1997, only a few months after its opening, it became evident that traffic forecasts could not be met mainly because of a massive diversion of traffic to a parallel road. The outcome of subsequent negotiations was an agreement on subsidised (preferential) toll rates, accompanied by a transfer from the government budget to the concessionaire. In other words, risk allocation changed: the concessionaire no longer carries traffic risk and is certain to earn a rate of return of

<sup>9</sup> Anybody seriously interested in the forecasts would have noticed that these were largely exaggerated. In fact, the scenarios were based on observed traffic flows from 1992 without tolls; thus, it was assumed that demand would not respond at all to the introduction of tolls. Furthermore, the standard scenario (11,500 vehicles per day) unrealistically assumed high growth rates of GDP and tourism (Léderer 1999).

12 percent on his investment. The new contract, agreed on in 2004, also includes a change in the shareholders of the concessionaire, with the State Motorway Management Company acquiring 40 percent of the shares for an estimated EUR 82 million. Until 2009, the Hungarian state has a call option to buy the remaining 60 percent. If the call option is not exercised, the Hungarian state must provide the agreed availability payments until 2030.

After the failure of the first two flagship projects (i.e., M1 and M5), the government that came to power in 2002 attacked the PPP issue from a different angle. A special PPP department was founded in the Ministry of Economics and Transport, charged with proposing feasible projects. In this new setting, a concession was offered for the design, build, finance, operation, and maintenance of the M6 from Érd (which is in south of Budapest) to Dunaújváros. The concessionaire receives availability payments during the operation phase. The investment (EUR 470 million) is privately financed. The tendering process took seven months, and consortia participating in the process report that competition was very intense. The concession was signed in October 2004. While it is far too early to assess this PPP, it is fair to say the distribution of risks has been solved efficiently as the concessionaire only carries the risks he can control. That said, the investment cost are on the high side, probably reflecting a lack of competition for this PPP and the absence of a public sector comparator, which – had it been carried out – could have curbed investment costs.

#### 4.1.3 Assessment

***Hungary's experience suggests that tolling individual highway sections is inappropriate when toll-free alternative routes exist and consumers' willingness to pay is low.***

Hungary learned its PPP lesson the hard way. It is clear that tolling individual highway sections is inappropriate for financing investments in a road network where toll-free, parallel roads exist and users' willingness to pay is limited. The Hungarian experience can also be taken as evidence that concession companies in Central and Eastern Europe almost always entered into renegotiations, in which they succeeded in gaining additional financial support from the public sector. In an emerging country, which tries to attract foreign investors, the visible bankruptcy of a concession company adversely affects the country's reputation, and this is why the public sector is particularly weak in renegotiations.<sup>10</sup> Even without renegotiating 'failed' projects, PPPs and concessions enable construction companies that hold shares in the concession company to make profits by overpricing construction works.

Overall, Hungary's highway sector PPPs in the 1990s were an expensive way of procuring road services. The transaction costs associated with the renegotiation of contracts raised the overall costs. Anecdotal evidence from private sector participants indicates that institutional instability in the Hungarian public sector complicated renegotiations and raised transactions costs; responsibilities were often transferred from one government institution to another, and staff working on PPPs in the ministries changed frequently (especially when a new government came to power).

That said, Hungary has learned from its experience and, as a result, its policy governing PPPs in the highway sector has become more rational. The institutional environment is now more stable, encouraging the revival of PPPs. Nevertheless, shortcomings remain. For one thing, as in other countries, PPPs seem to be motivated by fiscal constraints while they should be pursued only if they offer value for money. For another, without properly appraising and prioritising projects and analysing solutions for the whole road network, Hungary may be embarking on a too ambitious road sector development programme, thereby burdening future government budgets with large contingent liabilities.

<sup>10</sup> A similar argumentation is presented in Engel *et al.* (2003).

## 4.2 Poland<sup>11</sup>

### 4.2.1 The policy framework

Poland embarked on the transition from plan to market with an exceptionally underdeveloped highway system. In the early 1990s, the total highway network comprised only 199 km and not a single 4-lane highway existed in the country. In addition, the quality of the existing intercity roads was deplorable due to a long period of negligence. Poland's inadequate road network was widely recognised as an impediment to its economic development and, consequently, the Polish government placed particular emphasis on the development of its highway system.

Three phases of the Polish highway development policy can be distinguished. In 1993, the government unveiled a plan to build 2,600 km of highways by 2005. It was assumed that private contractors would meet most of the estimated USD 8 billion of construction costs. The finance was expected to be generated exclusively through the introduction of tolls on the respective highway stretches. In 1994, a new legal framework was introduced with the Motorway Development Act. However, reality never met expectations. As late as 2000, only two concessions had been granted and not a single new kilometre had become available. Regarding traditional procurement, only a modest stretch (about 150 km) was built with loans from the EIB and the EBRD and EU grants (World Bank 2004). By the late 1990s, the government had recognised the slow progress and, subsequently, scaled down its highway expansion plan. The government also acknowledged that more public sector funding would be necessary to implement the PPP scheme successfully. The Motorway Development Act of 1994 was amended, allowing contractual payments (shadow tolls and co-financing of construction costs) to the concessionaire. The third phase saw a considerable reorganisation of institutional responsibilities: a National Motorways Fund was set up (active since the start of 2004), and the Agency for Motorway Construction and Operation and the General Directorate of Public Roads were merged into a new organisation, called General Directorate of Public Roads and Motorways (GDDKiA). Moreover, the responsibility for road network development and maintenance was decentralised. As a result, the network of national roads fell from 46,000 km to 18,000 km, with all remaining roads now under regional and local responsibility. Further institutional changes include the creation of the National Road Fund. The purpose of this fund is to channel the support of international financial institutions, including EU funds, to the national road network and to mobilise domestic resources for its extension and rehabilitation. Domestic resources mobilised by the fund comprise revenues from a fuel charge (which has been added on to existing fuel taxes) and transfers from the state budget. The GDDKiA and the National Road Fund also take a lead role in traditional public procurement, and their capacity to handle road network extension and rehabilitation will be decisive for the efficient use of funds.

*Three phases of the Polish highway sector development policy can be distinguished.*

Recent announcements by the Polish government indicate an increasing reliance on EU funds and loans from the EIB and the World Bank.<sup>12</sup> To illustrate, the EU has committed some EUR 1.5 billion for the period 2004-06. The highway network is planned to be extended by 2,063 km in 2005-13, with two east-west highways (A2 and A4) and one north-south highway (A1) among the priority investments. Within this development strategy, PPPs are supposed to play a more important role than in the past. To this end, a new PPP law is being drafted with a view to creating a stable institutional framework for PPPs.

11 This case study is based on Bak and Burniewicz (2004), Siwek (2003), World Bank (2004), and on expert interviews with EBRD, the Polish Ministry of Infrastructure, and on homepages of the institutions involved.

12 Since the beginning of the 1990s, the EU has been providing grants (EUR 510 million), mainly through PHARE and ISPA. The Polish road sector has mainly been supported by three international financial institutions: the EIB (with a total amount of EUR 1.7 billion), the EBRD (EUR 45 million), and the World Bank (USD 455 million).

#### 4.2.2 Analysis of PPP projects

*In the mid 1990s, Poland's highway sector development plan envisaged several PPPs, but most of them were either significantly delayed or not implemented at all.*

In the mid 1990s, several concession-type PPPs were envisioned, but most of them were either significantly delayed or were not implemented at all. For none of these projects was the PPP option compared to traditional public procurement. The experience with the PPPs that materialised reflects the changes in Poland's highway policy. We look at three cases.

The first highway PPP was the A4 between the two industrial centres in southern Poland: Krakow and Katowice (61 km). The first phase of the project consisted of an extensive rehabilitation of the existing highway and its operation and maintenance. The concession scheme was signed in September 1997 and put in operation in 2001. The financial viability of the project was envisaged to rest fully on toll revenues. The second stage of the project, which consisted of rehabilitating a major bridge, turned out to be more difficult, mainly because of lower-than-expected traffic and difficulties in raising the finance for this phase of the project. Overall, the commercial success of the A4 is still doubtful.

The other attempt to develop the Polish highway system through PPPs is the A2, linking Warsaw with Poznan and the German border at Slubice. With a total financing need of EUR 870 million, the A2 is the largest transport project in Poland with involvement of the private sector (Rubin and Leece 2004). A 150 km stretch of the A2, connecting Nowy Tomysl and Konin, was awarded as a BROT project in 2000. The concession is for 40 years and includes the right to levy tolls. Construction began in 2001 and the project is now on stream. The trouble is, however, that almost nobody is using it. Only transiting private users – for whom time is of high value – are willing to pay the toll. As to freight transport, more than 60-80 percent of the trucks are estimated to bypass the tolled stretch of the highway. At present, the government and the concessionaire are negotiating compensation payments. While the outcome of these negotiations is yet unclear, it is obvious that the commercial problems of this section of the A2 have diminished the chances for the westward extension of the A2, covering the remaining 100 km between Nowy Tomysl and the German border.

Last but not least, there have been attempts to develop PPPs along the A1, which is connecting Gdansk with Katowice (597 km). The section between Gdansk and Torun (152 km) was granted as a 35-year BROT concession in August 1997. However, the concession agreement was not signed until August 2004 and only for a 90 km stretch (Gdansk – Nowe Marzy). Estimated project costs are EUR 700 million, with the high costs per km attracting considerable criticism. Financial close has not been reached as the concessionaire is still negotiating the government's support for the project. That such support is now deemed necessary is partly due to worsening economic expectations. While originally planned as a self-financing toll road, the profitability of the project turned out to be questionable when expected traffic growth failed to materialise. To advance the project in an environment of less buoyant traffic, the project was split into two sections and radically restructured, replacing real tolls by availability and performance payments and shadow tolls. To make such payments possible, the Motorway Development Act had to be changed significantly because the 1994 Act forbade direct subsidies and restricted the granting of state guarantees. While this hurdle has now been removed, a new one seems to have emerged with the proposal to incorporate the A1 into the vignette system planned for Polish highways. Overall, the changing nature of the A1 confirms a tendency to step away from a full transfer of the demand risk to the private concessionaire towards a more traditional approach, including state financing.



### 4.2.3 Assessment

PPPs in the Polish highway sector are characterised by a piecemeal approach, lacking consistency for quite some time. Several PPP projects have been tried, but the overall strategy to make PPPs thrive on user charges has failed bitterly. As in Hungary, traffic forecasts have been far too optimistic and the diversion of traffic to parallel roads has been substantial. The investment plans underestimated Poland's financial constraints and its lack of public management capacity. The original policy to install self-financing BROT projects was not based on sound economic analyses. This is true for both the demand side (willingness to pay for highway use) and the supply side (evaluation of construction costs).

Curiously, although the overall Polish highway strategy has failed, the PPPs that saw the light of day generally score well with regard to completing construction on time and within budget. However, the time needed to prepare, negotiate, and finance PPPs turned out to be a major problem. A rigid legal framework stood in the way of solving problems that concessions had run into. Exaggerated traffic forecasts, combined with a lack of network pricing, legal inflexibility, and ongoing policy changes (e.g., the debate of the vignette system) resulted in complex renegotiations.

All PPPs have triggered a strong response by users, leading to congestions on smaller parallel roads. More fundamentally, the piecemeal approach to developing Poland's highway system did not sufficiently account for network effects, i.e., the interplay between highways and lower categorised and/or parallel roads. As a result, the highway and trunk road network resembles a patchwork, and the beneficial effects to the economy are negligible.

To summarise, following a period of trial and error, Poland's strategy for developing highway sector PPPs seems to be on the right track. The government has abandoned its initial approach of user tolls and now contemplates a country-wide vignette system and a unified highway management system. While expected changes in the road pricing policy may cause further distortions in the future, the decision to use performance-related payments is a step in the right direction. Furthermore, the government has also intensified its efforts to create a legal and institutional framework that facilitates PPP projects. In this context, capacities to appraise and manage projects and investment programmes are being strengthened – though attracting and retaining high-calibre staff remains a challenge. What is more, the establishment of the National Road Fund – bundling external and domestic funds – will facilitate the financing of expanding and maintaining the national road network. Having said this, several challenges remain: while changes to the legal and institutional framework have been initiated, they still need to be adopted and become effective; and then, even with an improved capacity to professionally appraise and manage road sector investments, political interference in the decision-making process remains a risk. Lastly, the combination of PPP and EU funds is still largely unexplored (although possible as Ireland's experience suggests) and may result in a bias in favour of traditional procurement.

## 4.3 Croatia<sup>13</sup>

### 4.3.1 The policy framework

Croatia stands out among transition countries as it has realised a large number of PPP projects despite the small size of its economy. The strategy was, however, mainly state-driven with few

***Although Poland's overall highway sector development strategy failed, the PPPs that were implemented delivered highways on time and within budget.***

13 This case study is based on Nicolopoulos and Herodotou (2004), Senft and Vilanek (2004), Rubin and Leece (2004), and expert interviews with Atkins, Croatian Ministry of Transport, EIB, HSH Nordbank, Kreditanstalt Austria and homepages of the Croatian Motorways Ltd., the concessionaires, the World Bank Group, and other institutions involved.

**When Croatia began considering PPPs in the second half of the 1990s, it had an extensive road network, though of poor quality due to insufficient maintenance.**

'true' commercial projects. After the violent break-up of the former Yugoslavia, Croatia began to ponder a coherent road development strategy only in the second half of the 1990s. At that time, the country had an extensive public road network, though of poor quality due to a long period of insufficient maintenance. In 2001, the government recognised the need to rapidly rehabilitate and extend Croatia's highway network, including major transport corridors within Croatia and with its neighbours, notably EU countries. To achieve this goal, the Croatian government passed the 'Programme of Construction and Maintenance of Public Roads' bill, which – among other things – put in place a new model for financing road transport infrastructure and a new structure for the management of this sector. Management of the existing road network was to be fully financed from public expenditures, whereas the management and construction of new highways was to rely primarily on foreign long-term loans and private participation. Specifically, two fully state-owned incorporated companies were founded: the Croatian Road Authority (*Hrvatske ceste d.o.o.*), responsible for the financing, construction, and maintenance of state roads which are not tolled; and Croatian Motorways Ltd. (*Hrvatske autoceste d.o.o.*), responsible for the operation, construction, and maintenance of highways, which are tolled but not under concession. In January 2005, the company also took over all operative responsibilities as grantor (e.g., technical efforts for preparing and granting the tender).

The two companies are largely independent in their financing, but they may also obtain additional state guarantees for highway development investments. This instrument has been used quite extensively, leading to a high level of debt of Croatian Motorways Ltd. Evidence suggests that the companies act quite independently in defining and evaluating their projects; the Ministry and Parliament seem to play a rather passive role in this process, and there is a lack of coordination between all concerned institutions and companies.<sup>14</sup>

The Croatia government considers PPPs important for raising private capital for the highway sector. The 2001 public road programme estimated investment requirements at EUR 2.1 billion, of which budgetary funding could cover only EUR 860 million. Several projects were earmarked for private concessions reflecting their advanced stage.<sup>15</sup> However, contrary to the initial objective, the bidding process was replaced by direct negotiations between the Ministry and the companies. Overall, bureaucratic procedures were a high burden on the bidding process, and perhaps too much discretion was left with public bodies (i.e., state-owned companies and/or the Ministry itself). This inevitably makes a meaningful comparison between PPP projects and traditionally procured ones difficult. It is also worth noting that under Article 42 of the Croatian 'Law on Public Roads' only the Croatian government may set up concessions. As the following section indicates, this is possibly the reason why the programme has become so expensive.

### **4.3.2 Analysis of PPP projects**

Of the five concession projects that have been considered, four have materialised, all evidencing Croatia's bold approach to toll-based PPP concessions, the difficulties in realising them, and the strong financial and managerial involvement of the government.

To start with the A4, this 97 km highway from Zagreb to Gorican (Hungarian border) is part of the Trans-European corridor. It serves as a link between Central and Eastern Europe and the seaports on

<sup>14</sup> In addition, the state-owned company *Autocesta Rijeka - Zagreb d.d.* (ARZ) was founded in December 1998. The purpose of ARZ is to plan, prepare, and manage the ongoing construction of the 147 km long toll road A6, which runs from the Croatian capital Zagreb to the largest seaport in Rijeka. The concession for the A6 was signed in July 2001.

<sup>15</sup> These projects are Rijeka-Zagreb, Zagreb-Gorican, Zagreb-Macelj, Dragonja-Pula-Rijeka (Istrian Motorway) and Rupa-Jusici.

the Adriatic coast. The 32-year BROT concession was signed in August 1998 and total project costs were estimated at USD 460 million. The ownership structure of the concessionaire was split, with the private sector holding 51 percent of the shares and the Croatian government the remainder. The concession agreement called for limited-recourse refinancing, but the concessionaire was unable to achieve financial close, the concession went to arbitration, and – eventually – was terminated when renegotiations of the project agreements failed. The construction of the highway was then taken over by Croatian Motorways Ltd. and fully completed in 2003. At present, Croatian Motorways Ltd. also operates the highway.

The A8 and A9 (Istrian Motorway) comprise 145 km, running from the south of the Istrian peninsula to central Croatia and then branching to the northeast and northwest, the latter branch continuing all the way to the Slovenian border. In September 1995, the concessionaire signed a 32-year BROT contract. Financing of the project (EUR 185 million) was assured through a combination of equity and commercial bank debt, toll revenues, and a significant element of government support. Project revenues are exclusively generated by tolls for the usage of the Ucka Tunnel, but the government has guaranteed a minimum level of revenues if traffic is below forecast.

The first phase of the project, consisting of 37 km of construction works between Rogovići and Vodnjan, was completed on time and within budget in December 1999. The A8/A9 has become a modern highway and further expansion plans are under way. Furthermore, in February 2003, the first phase of the project was also successfully refinanced, and in this context the Croatian government and the concessionaire raised the funds for the second phase of the project. Considering all these points, one could consider the project a success. However, from an economic perspective, it must be stated that the PPP has not worked out and the current setting, featuring considerable government guarantees, resembles more a traditional state-financed investment with some contracting out.

*The PPP for Croatia's A8/A9 highway resembles very much a traditional state-financed investment.*

This takes us, lastly, to the Zagreb-Macelj Motorway (A2). The A2 is part of the Pyhrn route (Nuremberg - Graz - Maribor - Zagreb) and the European corridor Xa and connects Slovenia with Croatia and thereby the CEE countries with south-eastern Europe. In March 2003, the Croatian government decided to upgrade and extend this route on a PPP basis. The 28-year DBFMO (develop-build-finance-maintain-operate) scheme was awarded to a consortium in which a group of construction companies holds 51 percent and the government of Croatia the remaining 49 percent of shares. The financing of this project (EUR 372 million) benefits substantially from commercial and political risk coverage granted by the Federal Republic of Germany. As in the case of the A8/A9, the government has assumed a significant part of the traffic risk, thereby guaranteeing the concessionaire a minimum level of revenues. The entire length of the highway will become a closed toll system, except for the Zagreb bypass (7.4 km). The project is on schedule, and daily traffic on the highway sections already commissioned amounts to an average of 8,600 vehicles (15,400 in summer). Moreover, the average yearly traffic increase has been above 8 percent, indicating that users accept the tolling scheme. Full operation is scheduled for end-April 2007. Similar to the A8/A9, this is a project that is moving forward smoothly in technical terms, but – contrary to the idea of a PPP – with a strong involvement of the Croatian state.

### **4.3.3 Assessment**

Croatia's approach to developing its highway sector, gaining momentum over the past five years, has two very distinct characteristics. On the one hand, a relatively large number of projects and highway kilometres have been carried out, involving either the modernisation of existing highways or the construction of new ones. Despite the challenging construction work, most of the awarded projects were built on time and within budget. The introduction of distance-linked and

user-specific tolls was successful. In contrast to Hungary and Poland, the Croatian highway network is predominantly tolled (in 2003, 676 km out of 731 km), a concept generally well accepted by the public.

On the other hand, the government has maintained a considerable involvement, as witnessed by joint ventures between public entities and private partners instead of typical PPP structures under which the public sector procures highway sector services. Some observers have noted that the lack of separation within the public sector (notably between the function of a PPP-manager and a shareholder in the concession) may have made negotiations with the private partners not as transparent as they should have been, possibly resulting in overpriced construction costs. In this context, shortcomings in the quality of project appraisals have been pointed out. What is more, because of the direct profit interests of the Croatian State and its state-owned companies, some have expressed concerns that the quality of construction works and management may have suffered.

Overall, the evaluation of the Croatian case depends on whether one considers the glass to be half full or half empty. Optimists emphasise the large number of highway kilometres built under PPP schemes in the last decade and that private investment has been forthcoming. Pessimists would argue, however, that none of the PPPs seem to have attained the expected results in terms of commercially viable highway projects. The reality most likely lies somewhere in between: Croatia has certainly advanced with high speed in the area of PPP ventures, which have driven motorway densities to record levels. Yet, it is uncertain whether this strategy is sustainable given its large medium- to long-run fiscal burden. In fact, public debt is not negligible, and international financial institutions have argued strongly in favour of more fiscal discipline, including a cut in expenditure on highways.

*It is yet uncertain whether Croatia's highway sector development strategy is sustainable given its large long-term fiscal burden.*

#### **4.4 Czech Republic**

Compared to the other three countries reviewed in this paper, the experience of the Czech Republic is more limited. This section will therefore only broadly review the Czech experience without distinguishing explicitly, as before, between the policy framework, individual projects, and overall assessment.<sup>16</sup>

The network density of the Czech trunk road system averages 6.3 km/1,000 km<sup>2</sup> – less than half of the Western European average. An accelerated expansion of the road network has been ranking high on the list of political priorities. An early attempt to implement a toll-based PPP concession (D5, from Prague to the German border close to Nuremberg) was abandoned as it became evident during the tendering process in 1993 that demand for the toll road would be too low to ensure cost recovery. From then onwards, the Czech government pursued a conservative policy, with funding for highway expansions exclusively based on the state budget.

In 2000, a reorientation of the strategy took place, with the foundation of the State Fund for Transport Infrastructure (SFTI). SFTI is a legal entity, subordinated to the Czech Ministry of Transport, with the purpose of collecting financial means and of allocating them to transport infrastructure, i.e., building, maintenance and modernisation of highways, railway lines and inland waterways.

<sup>16</sup> This section is based on CRA (2004), expert interviews with the Czech Ministry of Transport, PPP Centre of the Czech Republic, the Czech Republican State Fund for Transport Infrastructure, and homepages of the institutions involved.

According to the Ministry of Transport, an important advantage of the SFTI is that it offers more financial flexibility, facilitating the transfer of means not spent in one year to the next year. The SFTI receives its revenue mainly in the form of transfers from the Fund of National Property (privatisation revenues, 45.4 percent of all SFTI revenues in 2004), road taxes (13.4 percent), a share in the earnings from the consumers' tax on fuels (29.8 percent), and all earnings from fees that trucks pay for the use of selected highways and speedways (5 percent). Additionally, the fund receives allocations from the state budget (6.4 percent). Grants from the EU and credits (especially from the EIB) allocated to specific projects are transferred to SFTI as well. Since 2000, payments by the Fund of National Property to SFTI have declined and may possibly end within the next two years. It is planned to displace the vignette system for trucks in 2006 or 2007 by a distance-related toll that could substitute for a great part of the diminishing payments by the Fund of National Property.

The Czech government has guaranteed an annual budget of around EUR 1.5 billion for SFTI until 2007. SFTI is part of the public sector and, therefore, its borrowing is on the government's balance sheet and, thus, relevant under the Maastricht treaty. Almost two-thirds of the funds of SFTI are allocated to highways (62 percent capital expenses, 38 percent current expenses), with the remainder earmarked for railways (34 percent) and waterways (2.1 percent). The SFTI has the obligation for the future repayment of the credits raised for transport infrastructure investments. The Fund's strategy follows an investment plan set up by the government in 2001, which encompasses mainly highway projects of European importance. The newly established institutional framework is also a major improvement: responsibilities are clearly assigned, financial flows are transparent, and revenues are at least partly earmarked for the transport sector. It is therefore possible that the Czech Republic may become an example for how a sustainable financing without strictly separating highway financing from the budgetary process can work.

***Recent improvements to the financing of transport investment point the way to a sustainable financing of transport projects.***

In 2001, the Czech government began a second attempt to realise a PPP, but failed again. It directly awarded a BOT concession for the construction of a stretch of the D 47. The project should provide a new 80 km long stretch of the four- and six-lane highway between the city of Lipník nad Bečvou and the Polish border, via the city of Ostrava. The concession contract was signed, but the project was cancelled in 2003 by the government due to criticism of the direct concession award and a probably overpriced remuneration. The government was forced to pay some EUR 20 million for breach of contract. The Minister of Transport announced that the project would be carried out by the public sector.

The Czech government has recently started its third attempt to launch PPP projects in the highway sector. A variety of projects are being considered, among them the D3 (Tábor-Sobeslav-Bosilec), a ring road at Brno, and the R52 (Pohorelice-Mikulov-Austrian border), which may even be structured as a bi-national PPP in combination with stretches of the A5 in Austria, and there are also plans to rehabilitate the R4 and the R10. The government has embarked on a PPP programme that aims at a systematic application of PPPs in all infrastructure sectors. To this end, a 'PPP Centre' has been founded. The Centre, a division of the Ministry of Finance, has three primary tasks: (i) to develop standardised procedures and methodologies for PPP evaluation and implementation, (ii) to accompany the PPP process and advise the different public actors, (iii) to support the Ministry of Finance, which must approve PPP projects as long as future public disbursements exceed a given limit.

According to the PPP Centre, the overall aim of PPPs in the Czech Republic is not to exploit short-term financing possibilities, but to focus the public sector on its core activities and to achieve cost efficiency. In contrast, the Ministry of Transport considers the widening of financial possibilities as one of the main advantages of PPPs. This indicates that the drivers of PPPs can differ between the Ministry of Finance and line ministries.

These substantial institutional and legal changes seem to meet the central requests of a professional preparation and management of PPPs. International experiences, particularly from the United Kingdom, concerning the design of projects and the remuneration schemes have also been taken into account. Moreover, institutional stability has increased, particularly since accession to the EU. However, it should be noted that several risks still remain: legal reforms are still not completed, a sound comparison of PPP and traditional procurement has yet to be developed, and the selection of projects strongly reflects the availability of EU funds. It remains to be seen, therefore, whether the Czech Republic will turn out to be the 'PPP-Tiger' of the next decade, or if it will remain on a slow track.

## **5. Lessons from PPPs in the highway sectors of Central and Eastern Europe**

Our survey of the highway sectors in Hungary, Poland, Croatia, and the Czech Republic has shown that 13 projects have been seriously considered as PPPs since the early 1990s. Of those, six have eventually been carried out as PPPs, of which two have been significantly restructured and another two have been renationalised in the meantime. This leaves two projects currently in the process of being implemented as PPPs. In quantitative terms, the outcome is therefore mitigated at best. Table A2 in the Annex summarises the chequered history of these projects.

While 13 is not a big number, our survey nonetheless allows us to draw some general lessons, covering the following aspects: (i) efficiency of the approach, (ii) sources of revenues and remuneration of concessionaires, (iii) transparency and appropriateness of institutional design, (iv) financing and investment appraisal, including the role of EU funds and international financial institutions. In drawing these lessons, we apply some of the theoretical checkpoints defined in Section 3 and refer implicitly, and sometimes explicitly, to two PPP benchmark cases in the highway sector – one in the United Kingdom, the other in Chile. We also offer some recommendations for future PPPs in the highway sectors of Central and Eastern Europe.

***Narrow design specifications seem to have hindered innovative solutions.***

To start with efficiency, the first point worth highlighting is that PPPs in the highway sector scored well in terms of delivering projects on time and within budget. One can thus argue that transferring construction risks to private partners has resulted in appropriate incentives. Concerning a possible trade-off between cost savings and quality shading, we have found only one case, the Polish A2, where this may have been an issue. The concessionaire proposed a type of road surface that was slightly thinner than specified in the contract. Checks performed with a test road proved, however, that output specifications could be met with this type of road surface and deviation from the original contract was thus approved. More generally, design specifications seem to have been too narrow for allowing concessionaires to realise major innovative solutions – a result known from the experience of EU-15 countries.

A comprehensive efficiency evaluation also calls for a comparison of a PPP with alternative forms of procurement. As pointed out in Section 3, highways are, in principle, suitable candidates for PPPs. That said, the contracting authorities of the countries considered here have not compared different procurement options. Anecdotal evidence and experts' judgement suggest, however, that traditionally procured highway projects outperformed PPPs on three counts: traditionally procured projects were often implemented faster than PPPs; they were less costly when all costs, notably transaction costs, were accounted for; and they resulted in lower distortions of modal and route choice, largely because toll-free, traditionally procured highways did not, by definition, divert traffic to other (toll-free) roads. All this does not mean that PPPs are inferior. Rather, their disappointing performance is the result of institutional shortcomings and mistakes in the design of PPPs. This takes us to lessons with regard to the remuneration of concessionaires.

The exclusive reliance on tolls has proven to be a failure. The evidence supports the theoretical prediction that tolling small stretches of highway networks causes inefficient traffic relocation and seriously affects the profitability of the concessionaires' investments. In the event, renegotiations of remuneration schemes, even the restructuring of entire projects, became necessary in many cases. Availability payments, already introduced in the United Kingdom, are now a salient feature of highway sector PPPs in Poland, Hungary, and the Czech Republic. This should substantially improve the viability of existing and future PPPs.

**The exclusive reliance on tolls has proven to be a failure.**

Turning to the importance of having, or putting in place, an appropriate institutional framework, several conclusions can be drawn. First, a systematic assessment of procurement types has to be established. Although there is no perfect method to perform such an assessment, they foster not only a comparison of alternatives, but – perhaps more importantly – a thorough preparation of the PPP tendering stage.<sup>17</sup>

Second, the contract awarding processes have to be improved drastically. Lack of transparency and unclear awarding criteria curbed competition for PPPs, leading to relatively high construction costs. In part, this problem will be solved with the adoption of EU procurement rules. But even under these rules, there is a wide array of institutional solutions, leaving the challenge of choosing those that make the awarding of contracts efficient, transparent, and fair. In fact, experience from elsewhere in the world, Chile for instance, advocates auctions instead of negotiations to award contracts.

The third conclusion as to the institutional framework is that the process of renegotiating contracts needs to be rationalised. Renegotiations have led to serious delays in project implementation and additional transaction costs. Moreover, they turned intended fix-price contracts (allocating risk to the private sector) into some kind of cost-plus contracts, pushing back risk to the public sector.

There are several reasons why renegotiations often have become necessary in CEE highway PPPs. One is political interference, which has been particularly acute in transition countries – in part because they experienced more frequent changes in governments and political attitudes towards PPPs than more settled EU-15 countries. Hungary in the period 1994 to 2002 provides a vivid example: every change in government triggered a significant reorientation of transport sector policies. Another reason – related to the first – is that erratic policy changes adversely affect the administrative capacity of governments, making it difficult to establish trust and a fruitful working relationship between contractors, on the one hand, and contracting authorities on the other. And then, changes to the legal framework in preparation for EU membership caused severe disruptions and delays. Far too optimistic demand projections provide another explanation for the frequent need to renegotiate contracts. To some extent, overoptimistic demand projections may reflect strategic behaviour of both bidders and contracting authorities. Bidders have an incentive to overestimate demand and, thus, to promise low tolls if they count on renegotiations once the contract has been awarded to them. Contracting authorities may be willing to accept too optimistic demand projections, rather than abandoning projects for which there is not enough demand, as this allows them to avoid cancelling expensive and highly visible projects (Trujillo *et al.* 2000). Although all of this is true, Hensher and Goodwin (2004) – for instance – have pointed out that traditional estimation procedures and their application tend to result in an upward bias of demand projections. A last reason for renegotiations worth mentioning is straightforward: the public acceptance of tolls turned out to be much lower than expected, thus putting political pressure on governments to renegotiate remuneration schemes with a view to lowering or even abandoning tolls.

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<sup>17</sup> The methods used are called value-for-money tests. This topic is treated in detail by Grout (this volume).

An awareness of the reasons that may make renegotiations necessary helps to avoid them in the first place. Even then, however, they cannot be avoided completely. Against this background, a clear and efficient framework for renegotiations is essential. This framework should “specify the conditions that would allow renegotiation, the types of events that could trigger renegotiation and the frequency with which reviews can occur” (Estache *et al.* 2000, p. 273). In addition, the renegotiation process, dispute settlement mechanisms, and the inclusion of third parties should be governed. The Chilean use of a rule-based process appears to be best practice. With detailed contractual terms and an independent legal system, private sector investment should be protected adequately.

But even when all this is taken care of, problems are bound to emerge if PPPs are highly politicised and a matter of prestige for governments and administrations. Thus, some leniency towards concessionaires can be expected. A controversial question remains whether a separation of institutions that award concessions and institutions that manage them, a regular involvement of independent agencies (e.g., a central auditing authority and competition authorities), and control by the Ministry of Finance are sufficient to limit this leniency. As a minimum requirement, central PPP units should be placed in Ministries of Finance and an independent central auditing authority should be set up and regularly involved. While line ministries might assess PPPs not only on efficiency grounds but also on the availability of funds for investments in ‘their’ sectors, Ministries of Finance may be more interested in efficiency (reducing budget requests) and current and future fiscal implication. A central PPP unit fosters learning and scale economies, which are especially important for small countries. An independent central auditing authority – while usually not authorised to impede decisions by the government or a ministry – can have an important role in the public discourse.

***The institutional framework for PPPs in Central and Eastern Europe has been strengthened, improving the outlook for future PPPs.***

To conclude the discussion of improvements to the institutional framework, it is fair to say that institutions in CEE countries have become more stable. This bodes well for the future and promises that a new generation of PPPs, like those planned in the Czech Republic, will be more successful and result in higher efficiency. But a key condition for higher efficiency is that the PPP route is chosen because it offers value for money and not because governments perceive it as a way to circumvent budget constraints. This takes us to some lessons concerning the financing of PPPs.

A key driver of PPPs in several CEE countries is still the desire to finance infrastructure outside the government budget. There is thus a bias in favour of PPPs – even after Eurostat has ruled that a PPP can be considered to be outside the government budget only if the private partner bears the construction risk and either availability or demand risk. From an efficiency perspective, a network-wide solution for the financing of highways that avoids a systematic selection bias in favour of PPPs is called for. Several countries have taken such an approach. Austria is one of them, and its approach can serve as a model for CEE countries, not only because it avoids the bias in favour of PPPs, but – perhaps more importantly – because it entails a systematic approach to highway planning, the earmarking of revenues, and the charging of road users on a network-wide basis (see Box 1 and Beckers *et al.* 2005).

An increasingly important aspect of PPP financing could be support by the EU. EU structural and cohesion funds for the new EU member countries are expected to triple by 2007. At present, it is not entirely clear whether and how EU funds can support PPPs, although there are cases where EU funds have been used indirectly to meet availability and deferred payments in the context of a PPP (e.g., Ireland; see PricewaterhouseCoopers 2004). The problem lies in assuring that public funds are not used to raise private profits above normal returns. But incentive-oriented contracts, e.g., fixed-priced contracts, blur this distinction. A challenge in the period ahead is to remove the uncertainty about how EU funds could support PPPs, thereby eliminating the selection bias associated with EU funds in favour of traditional procurement.



### Box 1. The Austrian road network approach

The issue of appropriate highway financing is an urgent one for Western European countries as well. In this context, Austria has established an interesting model of financing the trunk road sector outside of the government balance sheet based on user payments. This box summarises the Austrian experience, which holds interesting lessons for Central and Eastern Europe as well.

The public enterprise ASFINAG (Austrian Trunk Road Financing cooperation) plays a key role within the system and works as a kind of road fund. On the one hand, ASFINAG receives up to the year 2047 all revenues from user charges (at present a network wide heavy-duty-vehicle toll, which is calculated according to EU Directive 1999/62, and a vignette system for private cars, which might be replaced by a toll within a few years). On the other hand, ASFINAG has to operate and maintain the network of approximately 2,000 km and undertake new investments. In 1997, when the current system was established, ASFINAG additionally had to take over 'old' debt of approximately EUR 5.7 billion.

According to a government-approved plan for future investments, ASFINAG will invest approximately EUR 7.5 billion in the extension of the network between 2002 and 2012. As revenues from user charges (EUR 1.2 billion in 2004) are lower than current expenditures (EUR 450 million for operation and maintenance, EUR 675 million for new investments, EUR 310 million for interest payments), ASFINAG has to raise new debt. At end-2004, ASFINAG debt stood at EUR 9.4 billion; in 2012, when the network extension will have been substantially advanced, ASFINAG will start to amortise the debt.

Currently, the price of the vignette is determined mainly by political considerations. But this does not jeopardise the financial viability of ASFINAG since the net present value of revenues from user charges is expected to be higher than the net present value of ASFINAG's future financial obligations. In any event, to secure long-term financial viability, ASFINAG is interested in obtaining the authority to determine user charges for private cars. In this case, a regulatory system should be set up.

The repayment of ASFINAG's debt is guaranteed by the Austrian state. Therefore, ASFINAG's cost of raising debt is just a few basis points higher than that of the Austrian state. ASFINAG's rating is AAA. The European Statistical Office (EUROSTAT) has decided that ASFINAG is not part of the public sector. Thus, ASFINAG borrowing and its debt do not affect the thresholds under the Maastricht treaty – despite the state guarantees for the repayment of ASFINAG's debt. This decision of EUROSTAT is based on regular and intensive analysis of the relationship between ASFINAG and the state.

To summarise, Austria has a trunk road financing system based on earmarked user charges, a network-wide charging system, and a decentralised management authority. As ASFINAG is 'outside' the Maastricht treaty, there is no reason for undertaking PPPs to circumvent short-term budgetary constraints. This should foster decisions on PPPs solely based on efficiency considerations.

A last observation concerns international financial institutions, which have provided more than finance. In particular in the early years of transition, they offered advice and played a catalytic role in the mobilisation of funds. While the process of transition has been successfully completed in those CEE countries that have joined the EU, international financial institutions will continue to play a role in further upgrading the infrastructure of Central and Eastern Europe.

## 6. Conclusions

**PPPs in CEE countries have underperformed due to the adverse institutional conditions, high transaction costs, and unrealistic demand projections.**

In this paper, we have analysed the approach to and the results of PPPs in the infrastructure development of new EU member states from Central and Eastern Europe. The investment requirements in the region are substantial. Great hope has been put in private participation in infrastructure (PPI) and especially PPPs to undertake these investments. Although the overall portion of PPI in general and specifically of PPPs has not fulfilled the high expectations, the World Bank PPI database lists 217 projects in the region. However, a closer look at individual projects suggests a rather critical assessment. Due to the adverse institutional conditions prevailing in the transition period, high transaction costs, and unrealistic demand expectations, PPPs in CEE countries have been less successful than in other countries, and certainly less successful than initially hoped for. In general, they seem to have been less successful than traditional procurement would have been.

With respect to the specific institutional conditions prevailing in CEE transition countries in the 1990s, it has been argued that PPPs were particularly suited for this period, or, alternatively, that they were particularly unsuited (see discussion in Hainz 2002, Hirschhausen 2002, and Hashi 2003). The former argument is based on the lack of traditional infrastructure financing in the transition period, where PPPs could have filled part of the financing gap through more private involvement. The latter argument is based on the institutional void of the first years of transition and the difficulty to establish contracts that should be binding for several decades. *Ex post*, the PPP sceptics have won the debate, as the expected potential for PPPs has not materialised by any means.

Although the overall picture of PPPs in Central and Eastern Europe does not match expectations, we have to acknowledge that the conditions for successful PPPs have considerably improved recently. This is confirmed by consequent development of the institutional infrastructure for PPPs; one also observes improvements of the EBRD infrastructure indicators (see EBRD 2004). Given substantial institutional progress over the last years, in particular in the context of EU accession, these countries have developed a more fertile ground for PPPs in the future. Institutions in most of the new member countries have become more stable, professional, and focused. Transparency and accountability have improved. Countries now have to show that they are able to make use of improved institutional capabilities to put in place efficient PPPs for the second generation of projects.

Nevertheless, several further steps are required. This concerns especially the necessary institutional framework: efforts to avoid inefficient renegotiations and to include PPPs in a systematic, network-wide approach of financing and managing highways should be on top of the agenda. From an international perspective, a clarification of the relationship between EU funding and PPPs, further assistance on project selection and concession design, and assistance in developing efficient institutions and know-how are the most important future tasks.

## Annex

Table A1. PPI projects in Central and Eastern Europe, by country and category

	Water and sewage			Energy			Transport			Telecoms	Σ
	Potable water	Potable water and sewage	Sewage	Electricity	Natural gas	Railways	Airport	Toll road	Seaport		
<b>Czech Republic</b>	16 D:4; C:1, M:11	1 C:1		17 G:3, D:14	10 G:1, D:9	4 D:1, M:3	3 G:1, C:2			15 G:11, D:3, C:1	<b>66</b> G:16, D:31, C:5, M:14
<b>Estonia</b>	1 C:1			3 D:3	1 D:1	2 D:2				4 G:3, D:1	<b>11</b> G:3, D:7, C:1
<b>Hungary</b>	5 C:1	1 C:1		18 G:4, D:14	7 D:7	2 G:1, C:1	2 C:2			18 G:4, D:14	<b>54</b> G:9, D:35, C:5, M:5
<b>Latvia</b>					1 D:1			2 G:1, M:1		4 G:3, D:1	<b>7</b> G:4, D:2, M:1
<b>Lithuania</b>				3 D:3	1 D:1					6 G:5, D:1	<b>10</b> G:5, D:5
<b>Poland</b>	3 D:1, M:2	1 G:1		16 G:2, D:14	1 G:1	2 D:2	2 C:2	2 G:1, C:1		10 G:8, D:2	<b>37</b> G:13, D:19, C:3, M:2
<b>Slovak Republic</b>	1 M:1			3 D:3	1 D:1					3 G:2, D:1	<b>8</b> G:2, D:5, M:1
<b>Bulgaria</b>	1 C:1			1 D:1						3 G:3	<b>5</b> G:3, D:1, C:1
<b>Croatia</b>		1 G:1		3 G:3			2 C:2			2 G:1, D:1	<b>8</b> G:5, D:1, C:2
<b>Romania</b>	3 C:3			1 G:1				1 G:1		6 G:5, D:1	<b>11</b> G:7, D:1, C:3
<b>Σ</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>65</b>	<b>22</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>71</b>	<b>217</b>
<b>Σ</b>	<b>C:1</b>	<b>D:5, C:6, M:19</b>	<b>G:2, C:2</b>	<b>G:13, D:52</b>	<b>G:2, D:20</b>	<b>D:3, M:3</b>	<b>G:2, D:2, C:3</b>	<b>C:6</b>	<b>G:3, C:1, M:1</b>	<b>G:45, D:25, C:1</b>	<b>G:67, D:107, C:20, M:23</b>

Source: World Bank PPI database (G: greenfield, D: divestiture, C: concession, M: management and lease contract)

Table A2. Status of PPP projects in the highway sectors of Poland, Hungary, Croatia, and the Czech Republic

	Length (km)	Cost	Status				
			Planned	Realised	Realised, but substantially restructured	Renationalised	Under implementation
<b>Poland</b>							
A1 North-South connection (Gdansk-Katowice)	90	EUR 700 m	x				
A2 Frankfurt/Oder-Poznan-Warsaw	254	EUR 870 m			x		
A4 Kattowice-Crakow	61	USD 590 m		x			
<b>Hungary</b>							
M1/M15 Győr-Austrian Border/Slovakian Border	57	USD 370 m				x	
M3 Budapest-Polgar	59	EUR 295 m	x				
M5 Budapest-Kecskemét-Röszke	144	EUR 670 m			x		
M6 Erd-Dunaujvaros	59	EUR 470 m					x
M7 Budapest-Székesfehérvár	42	EUR 251 m	x				
<b>Croatia</b>							
A2 Zagreb-Macej	60	EUR 372 m					x
A4 Zagreb-Gorican	96	USD 460 m				x	
A8+A9 Istrian Motorway	145	EUR 185 m		x			
<b>Czech Republic</b>							
D5 Prague-Nuremberg	41	-	x				
D47 Ostrava-Lipnik Nad Bevcou	80	-	x				

## References

- Aghion, P., Dewatripont, M. and Rey, P. (1994). "Renegotiation design with unverifiable information". *Econometrica*, (62:2), pp. 257-282.
- Bak, M. and Burnewicz, J. (2004). "Country study - Poland. Polish programme of motorways constructions – Barriers of implementation". Bergamo workshop on highways: Cost and regulation in Europe.
- Beckers, T., Brenck, A., Hirschhausen, C.v., and Klatt, J.-P. (2005). "Die ASFINAG und das österreichische Modell der Fernstraßenfinanzierung: Vorstellung und Bewertung." Working Paper, Berlin University of Technology (Homepage <http://wip.tu-berlin.de>).
- Bentz, A., Grout, P. A. and Halonen, M. L. (2003). "What should governments buy from the private sector – Assets or services?". CMPO Working papers series No. 01/40.
- Clement-Davies, C. (2001). "Public/private partnerships on Central and Eastern Europe: Structuring the concession market". *Business Law International*, (1), pp. 18-37.
- CRA (2004). "State fund of infrastructure – Rating analysis; rating of the state fund of infrastructure". CRA Rating agency.
- De Bettignies, J.-E. and Ross, W. (2004). "The economics of public-private partnerships". *Canadian Public Policy – Analyse de Politiques*, (XXX:2), pp. 135-154.
- EBRD - European Bank for Reconstruction and Development (1996). *Transition Report: Infrastructure and Savings*, EBRD, London, UK.
- EBRD - European Bank for Reconstruction and Development (2004). *Transition Report 2004 Infrastructure*, EBRD, London, UK.
- Engel, E., Fischer, R. and Galetovic, A. (2003). "Privatizing highways in Latin America: Is it possible to fix what went wrong?". *Economia: The Journal of LACEA*, (4:1), pp. 129–158.
- Estache, A. and Serebrisky, T. (2004). "Where do we stand on transport infrastructure deregulation and PPP?". World Bank Policy Research Working Paper No. 3356.
- Estache, A., Romero, M. and Strong, J. (2000). "Toll roads". in Estache, A. and de Rus, G. (eds), *Privatization and regulation of transport infrastructure*. World Bank, Washington D. C., United States of America.
- Guasch, J. L. (2004). *Granting and renegotiating infrastructure concessions. Doing it right*, The World Bank, Washington D. C., USA.
- Gwilliam, K. and Shalizi, Z. (1999). "Road funds, user charges, and taxes". *The World Bank Research Observer*, (14:2), pp. 159-186.

- Hainz, C. (2002). "Project financing in transition economies". FOROST Working Paper No. 5.
- Hashi, I. (2003). "The legal framework for effective corporate governance: Comparative analysis of provision in selected transition economies". Center for Social and Economic Research Studies and Analyses No 268.
- Heggie, I. G. (1999). "Commercially managed road funds: managing roads like a business, not like a bureaucracy". *Transportation*, (26:1), pp. 87-111.
- Heggie, I. G. (2003). "Commercializing management and financing of roads in developing and transition countries". *Transport Review*, (23:2), pp. 139-160.
- Heggie, I. G. and Vickers, P. (1998). "Commercial management and financing of roads" World Bank Technical Paper No. 409.
- Heinrich, M. (2005). "Public-private partnerships in the highway sector of East European transition economies – An economic analysis with observations from Croatia, the Czech Republic, Hungary, and Poland." Berlin University of Technology, Workgroup for Infrastructure Policy (WIP), diploma thesis.
- Hensher, D. A. and Goodwin, P. (2004). "Using values of travel time savings for toll roads: avoiding some common errors". *Transport Policy*, (11:2), pp. 171-181.
- Hirschhausen, C. (2002). *Modernizing infrastructure in transformation economics*, Edward Elgar Publishing, Cheltenham, UK.
- Léderer, K. (1999). "After two years of operation of M1/M15 the first Hungarian concession motorway: Dilemmas of private motorway concession in the transition economies" in École Nationale des Ponts et Chaussées (ed.), *Road Financing*. Presses de l'École Nationale des Ponts et Chaussées, Paris, France.
- Mohring, H. and Harwitz, M. (1962). *Highway benefits: An analytical framework*, Northwestern University Press, Evanston, USA.
- Nicolopoulos, A. and Herodotou, C. (2004). "Driving the first project bond to success in Eastern Europe: Bina Istra Case Study". in *Inframation - developing Central & East European infrastructure*. The International Project Finance Association, London, UK.
- PriceWaterhouseCoopers (2004). "Developing public private partnerships in New Europe". London, United Kingdom.
- Rubin, B. and Leece, P. (2004). "Developing motorways in Central and Eastern Europe". in *Inframation - Developing Central & East European Infrastructure*. The International Project Finance Association, London, UK.
- Senft, W. and Vilanek, C. (2004). "Next year's model?" *Project Finance Magazine*, (March), pp. 12-14.
- Simpson, I. (2004). "Successfully negotiating road concessions in CEE". *Transportation Finance Review*, (2004/2005), pp. 52-55.

- Siwek, K. (2003). "Key incentives for PPP in Poland. Progress and questions". Berlin - 4th European symposium „European and German competence centres for public private partnership”.
- Spackman, M. (2002). "Public-private partnerships: lessons from the British approach". *Economic Systems*, (26:3), pp. 283-301.
- Szabó, F. (1999): "Public-private partnerships in Hungarian motorways' Construction". ECMT-Seminar on public-private partnerships (PPPs) in transport infrastructure financing.
- Trujillo, L., Quinet, E. and Estache, A. (2000): "Forecasting the demand for privatized transport - What economic regulators should know and why". World Bank Policy Research Working Paper No. 2446.
- World Bank (2004). "Proposed loan in the amount of Euro 100 Million to the Republic of Poland for a road maintenance and rehabilitation project". World Bank Project Appraisal Document.
- Yang, H. and Meng, Q. (2000). "Highway pricing and capacity choice in a road network under a build-operate-transfer scheme". *Transportation Research Part A*, (34), pp. 207-222.
- Yang, H. and Meng, Q. (2002). "A note on "highway pricing and capacity choice in a road network under a build-operate-transfer scheme"". *Transportation Research Part A*, (36), pp. 659-663.