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BEST PRACTICES IN FUNDING AND FINANCING OF ROAD INFRASTRUCTURE

A PIARC COLLECTION OF CASE STUDIES

TECHNICAL COMMITTEE 1.3 - *FINANCE AND PROCUREMENT*

PIARC

STATEMENTS

The World Road Association (PIARC) is a nonprofit organisation established in 1909 to improve international co-operation and to foster progress in the field of roads and road transport.

The study that is the subject of this report was defined in the PIARC Strategic Plan 2020– 2023 and approved by the Council of the World Road Association, whose members are representatives of the member national governments. The members of the Technical Committee responsible for this report were nominated by the member national governments for their special competences.

Any opinions, findings, conclusions and recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of their parent organisations or agencies.

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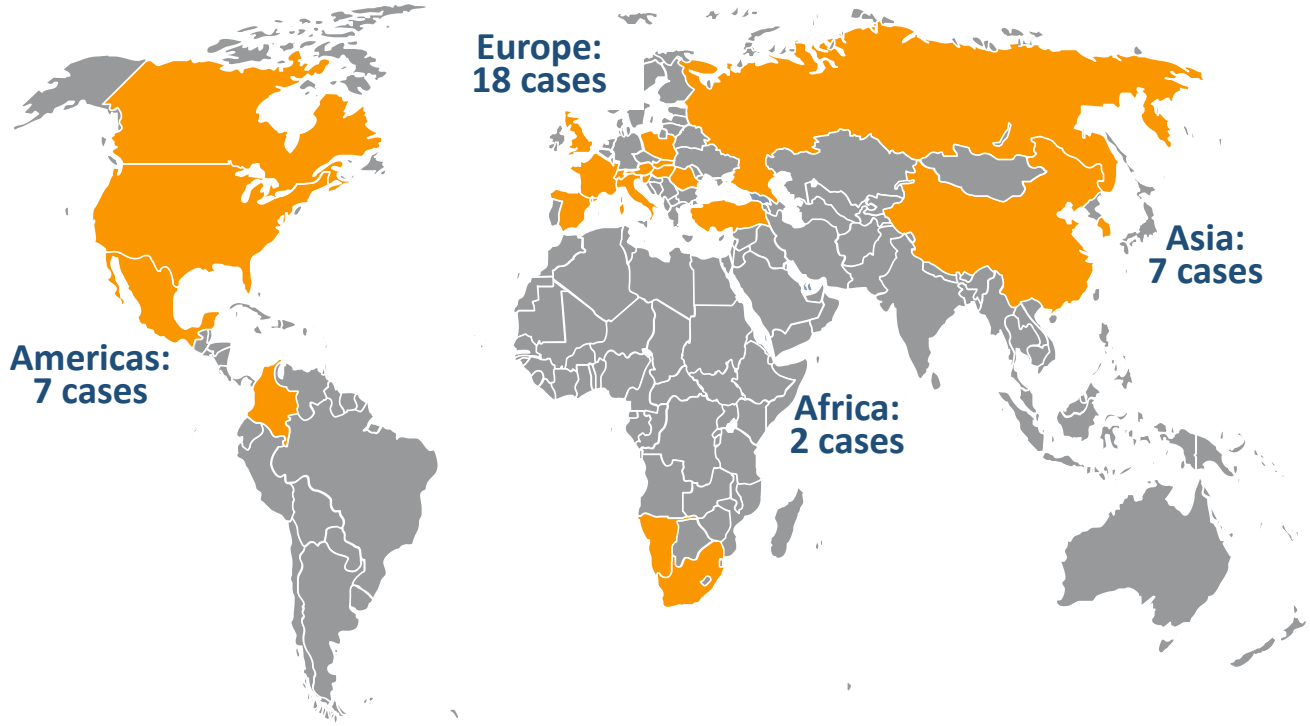

Figure 1: Map of case studies contributed to this paper

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EXECUTIVE SUMMARY

2022R13EN

BEST PRACTICES IN FUNDING AND FINANCING OF ROAD INFRASTRUCTURE

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In the past programs, national and international technical committees focused on financing topics related to the design, build, operation and maintenance of road infrastructure, with emphasis placed on relevant elements that could be implemented across the infrastructure management process. Despite this recent international research, many central themes remain to be improved in order to provide discipline to the different interests of public authorities, lenders, private companies and customers.

Taking into consideration past research and proposed solutions, the main objective of this new work cycle 2020-2023 is to define and analyse the main elements that are currently preventing alternative procurement models such as PPP from being more widely adopted. Such elements generate uncertainties that keep investors and lenders away from the road infrastructure business, with unfavourable effects on authorities, communities and companies.

To reach this goal, Technical Committee 1.3 includes experts from public authorities, public and private banks, road concessionaires and associations, universities, financial and legal advisors.

The team is collecting international successful and unsuccessful practices, to then select the key elements to be analysed and improved, with particular reference to the contracting and monitoring process. It is important to benefit from the coexistence of “Finance” and “Procurement” experts within the same technical committee.

In particular, this paper collects the case studies analysed by experts of the PIARC International Technical Committee 1.3 and two experts of its homologue Committee in Italy, according to the first Strategic Plan objective: *1.3.1. Best practices in funding and financing of road infrastructure*, with the aim of investigating innovative approaches on infrastructure funding and financing with special focus on the main elements that determine the good performance of each instrument.

Each expert had the possibility to analyse any case or approach, even if not strictly related to roads, that has financial elements that can be used to finance road infrastructure.

This paper collects 34 case studies from 22 countries.

CONTENTS

1. ABBREVIATIONS USED IN THE DOCUMENT

- BOT: build, operate and transfer
- CAD: Canadian dollar
- CAPEX: capital expenditure
- CHF: Swiss franc
- DBFMO: design, build, finance, maintenance and operation
- D&C: design and construction
- EIB: European Investment Bank
- EPC: engineering, procurement and construction
- EUR: euros
- GBP: British pound
- HUF: Hungarian forint
- HGV: heavy good vehicles
- NAD: Namibian dollar
- O&M: operation and maintenance
- OMR: operation, maintenance and replacement
- OPEX: operating expenses
- PNL: Polish zloty
- PPC: public private comparator
- PPP: public-private partnership
- PSC: public sector comparator
- R: South African rand
- RFP: request for proposal
- RMB: Chinese Renminbi
- RON: Romanian leu
- RUB: Russian ruble
- SOE: State-Owned Enterprise
- SPV: special purpose vehicle
- TRY: Turkish lira
- USD: United States dollar
- VAT: value added tax

2. AUSTRIA

2.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Austrian road system is divided into three categories:

- Federal roads: 2,233 km
- Regional roads: 34,175 km
- Local roads: 100,632 km
- Total length: 137,040 km

Regional and local roads are constructed, maintained, and operated by the Austrian provincial or local communities. The main source of funding are taxes and payments from the federal budget to the regional governments. However, there are no earmarked taxes in use for the funding of the Austrian road network, although they were provided for in the past until 1987.

On a federal level, the government set up the Autobahnen-und Schnellstraßen-Finanzierungs-AG (ASFINAG) to build, operate, and maintain the federal road network, which consists of motorways and expressways only. Back in 1982, ASFINAG was founded with the purpose of financing new motorway sections via the capital market. In 1997, however, ASFINAG's role changed to a motorway operator and it was granted the right to collect tolls on federal roads. Therefore, the funding source for all federal roads are tolls, collected by a toll sticker or based on the distance travelled. There are no direct payments or contributions from the federal budget. The toll sticker applies for all light vehicles and is valid for almost the whole motorway network. Only on certain stretches, which were mainly built in the 1970s, a distance-based toll is still in use also for light vehicles. For heavy vehicles, i.e. vehicles with a maximum permissible weight exceeding 3.5 tons, a free flow electronic toll collection system is in use on the whole motorway network. As of 31 December 2018, ASFINAGS toll income amounts to around EUR 2,156 million, with EUR 1,465 million stemming from heavy vehicles.

In addition, a certain percentage of traffic fines imposed on federal roads also contribute to funding the federal road system. Furthermore, ASFINAG also receives payments from rest area operators, usually based on their turnover, in restaurants, hotels or fuel stations located on the motorway network.

2.2. CASE: AUSTRIAN MOTORWAY NETWORK

The federal road network is governed by the federal road act. This law establishes legal and technical regulations for federal roads and defines which Austrian roads are federal roads and, thus, motorways. Currently, the federal road network consists of 2,465 km of which 32 km are under construction, 210 km are at the planning stage and 2,233 km are in operation. Regarding artificial structures, the Austrian motorway network has 165 tunnels and 5,765 bridges.

Based on another federal law, ASFINAG is in charge of the whole motorway network in Austria. This means that ASFINAG has to finance, build, maintain, and operate the network. ASFINAG is set up as a public limited company with all shares being held by the Republic of Austria. The Republic of Austria also owns the road network itself, i.e. the assets. ASFINAG's allowance to collect tolls is based on a usufruct contract between the Republic of Austria and ASFINAG. In 2018, toll revenues amounted to around EUR 21 billion. This is the main funding source of ASFINAG.

Regarding project development and any construction activities, ASFINAG is required to submit and to coordinate a six-year construction program with the Ministry of Transport and the Ministry of Finance. This program includes detailed information for the following year and information on a more aggregated level for the following five years. This program also shows new stretches, the refurbishment or renewal / enlargement of existing stretches but also investment in other infrastructures such as data lines or traffic information systems. In 2017, around EUR 900 million were equally spent on new constructions and structural maintenance; and additional EUR 100 million for investments into data lines and traffic information systems. Up to 2024, ASFINAG plans to invest EUR 8.4 billion in the road network.

ASFINAG carries out the routine operation by means of ASFINAG employees and subsidiaries. In case of need of heavy maintenance and / or construction of new motorway sections, ASFINAG is in charge for preparing the projects. This means ASFINAG seeks for any necessary public approval – such as environmental impact assessment, water rights, etc. – and prepares the planning and the tender documents. The construction/maintenance works are then carried out by third parties and supervised by ASFINAG.

For financing its activities, ASFINAG issues bonds on the capital market. These bonds are guaranteed by the Republic of Austria. Due to this guarantee, ASFINAG benefits from highly favourable financing terms and the bonds are rated Aa1/AA+ by rating agencies. The EIB also provides funds for specific construction projects.

PPP models in the road sector are not common in Austria. In the early 2000s, an intensive discussion took place whether PPP could be helpful for infrastructure investments in Austria, or not. Besides the Ministry of Finance and the Ministry of Transport, major infrastructure providers (ASFINAG, federal railways), construction companies and institutional bodies formed a task force on PPPs. At the end of the process, it was decided that ASFINAG would perform a pilot PPP project. The idea was that projects with a volume of up to EUR 3 billion should be procured as PPPs. At the beginning, a project called “Ostregion – package 1”, consisting of 50 km and representing an investment value of around EUR 800 million was carved out of this investment program. Both the signing of the contract and the financial closing took place in December 2006. Since January 2010, the PPP road is open to the public. The contract is a DBFMO agreement with a mixture of availability payment and shadow toll. Taking into account the Austrian situation, i.e., ASFINAG is owned by the Republic of Austria and is in charge for the whole motorway network by law, it is the only motorway PPP so far. As of today, bearing these facts in mind and considering the higher financing costs of a private partner, it will remain the only motorway PPP.

2.3. PRO-CONS ANALYSIS

Pros

The way the Austrian government sets up its responsibilities for the federal road network has certain advantages. First, this translates into a one-stop-shop strategy. The government has to deal with only one partner that is in charge for every aspect in the life of a motorway, i.e., planning, construction, maintenance, operation, and, above all, financing. Second, this structure guarantees well-known procedures and a common standard that applies not only for the whole network but also for each single project. Furthermore, ASFINAG’s obligation to coordinate its construction and maintenance program enables the federal government to check whether the financial situation is

sound and the mid- to long-term plan provides good governance of the road network or the company. Finally, funding ASFINAG via tolls and having the opportunity to issue bonds for financing the activities at the same time makes road management more flexible and leads to a sound financial base.

Cons

Although ASFINAG has the right to collect tolls, it is not free to set its toll tariffs independently. ASFINAG may propose changes in the toll tariff based upon infrastructure costs and in accordance with European legislation. However, the Ministry of Transport together with the Ministry of Finance must approve such proposals, therefore there is no guarantee that toll increases are accepted. Furthermore, toll tariffs are provided for by regulations and such regulations are subject to a public proceeding. During this proceeding, many organisations and interested bodies may comment and suggest changes to the regulation.

3. CANADA

3.1. BACKGROUND ON FUNDING IN THE COUNTRY

With the second largest landmass in the world, Canada has almost 900,000 km of roads. While many of these roads are small and serve rural areas, national and regional roads account for 38,000 km and represent nearly 40% of road travel in Canada.

Canada is a federation of 10 provinces and 3 territories. Most of the road network is managed on a decentralized basis by the provinces and territories, each having control over their respective policies. The federal government also participates in funding multi-provincial roads (notably the Trans-Canada Highway system), international road crossings with the United States and to other projects on a program basis.

There is very little dedicated road funding in Canada. While there are few toll roads in Canada, the federal and provincial governments collect driving-related revenue from multiple sources such as gasoline taxes, fees for vehicle registration and fees for drivers' licences. However, this revenue is almost entirely recorded in government general funds from which it is allocated to spending based on government priorities. There is no correlation between revenue generated by driving activities and road spending and investment. In fact, fuel and other driving-related taxes are seen more as a source of funding for programs, which are not related to roads.

In the province of Québec, the Ministère des Transports du Québec (MTQ) is responsible for the maintenance of the upper road network, which in 2019 consisted of 31,023 km of roads and 5,454 structures (bridges, tunnels, walls, pumping stations and culverts with a diameter greater than 4.5 m). In addition, the MTQ is also responsible for the management of 4,265 bridges on the municipal network.

In Québec, funding for road infrastructure and public transit financial assistance programs is mainly provided by the Fonds des réseaux de transport terrestre (FORT) established in 2010. This fund is financed from various sources, the largest share of which comes from the Québec fuel tax.

For fiscal year ended 31 March 2019, the sources of revenues of the FORT were:

- Québec Fuel Tax: CAD 2.23 billion / EUR 1.42 billion (55%)
- Rights and permits, including vehicle registration and licensing fees: CAD 1.10 billion / EUR 700 million (27%)
- Other revenues, including revenues from rest areas (concessionaire fees), PPP revenues (government share of A25 and A30 tolls), Transfers from the Government of Canada, Contributions from partners (excluding P3s), Contributions from the Green Fund, and other revenues, notably from the sale of goods and services: CAD 727 million / EUR 465 million (18%)

The Québec Government has launched in January 2019 a major initiative on the funding of mobility in Québec. The proposed initiative will mainly seek to propose funding options to enable sustainable mobility stakeholders to assume their responsibilities fully in a sustainable perspective, with adequate tools.

3.2. CASE: CHAMPLAIN BRIDGE

- Project name: Samuel de Champlain Bridge
- Jurisdiction and country: Canada, Government of Canada
- Brief project description

The Champlain Bridge over the St. Lawrence River links Montreal to its South Shore. It is one of the busiest crossings in Canada, used annually by over 40 million vehicles. An important component of the Continental Gateway corridor, the bridge also facilitates the transit of close to CAD 20 billion / EUR 13 billion of trade every year.

Due to the bad condition of the original Champlain Bridge, that opened in 1962, the Government of Canada decided in 2012 to replace it. The entire project comprises:

- Samuel de Champlain Bridge: 6 lanes + 2 lanes for transit built on 3 separate decks, 3.4 km long bridge linking Nuns' Island to the South Shore, with a design life of 125 years;
- Nuns' Island Bridge: 6 lanes, 468 m long bridge linking the Island of Montréal to Nuns' Island; and
- Highway 15: 6 lanes, 3 km long highway linking the Nuns' Island Bridge to the Quebec Ministry of Transport's Turcot Interchange.

The project was built as a PPP. Under the PPP contract, the private partner has responsibility to design and build the entire project, finance all construction costs and then operate and maintain all infrastructure for 30 years. There are no tolls.

- Public sector project sponsors: Government of Canada
- Private partners: SSL Group, comprising SNC-Lavalin (50%), ACS (25%) and Hochtief (25%)
- Cost of infrastructure construction: Approximately CAD 2.5 billion /EUR 1.6 billion
- Period of construction: Start (financial close): July 2015 End: June 2019 (main bridge)
- Annual O&M costs/km (or miles): Not available
- Duration of the contract: Construction period (approximately 4 years) + 30 years O&M period
- Source of project funding: No tolls. The private partner is paid through three milestone payments during construction (totaling CAD 1.7 billion / EUR 1.1 billion) and availability payments during the 30-year O&M period.
- Structure of the project: SPV created by the three private partner shareholders
- Sources of financing:
    - Private Canadian bank debt construction loan repaid with the three milestone payments, in the form of a revolving loan, maximum draw of CAD 1.1 billion (EUR 700 million), interest rate of approximately 2.4%
    - CAD 577 million (EUR 380 million) long-term amortizing bond, private placement raised in Canada, 4.1% interest
    - CAD111 million (EUR 73 million) long-term bullet bond, private placement raised in Canada, 4.2% interest
    - Equity (approximately 10% of long-term financing)
- The private partner assumes almost all project risks relating to design, construction and O&M. The public sponsor kept most risks relating to existing contamination and limited risks typical for

PPP (relief events, etc.). The public sponsor obtained and assembled all required land and obtained key environmental permits before financial close.

- The project had some technical challenges for the private partner, including a long span over the St. Lawrence Seaway that could only be built during limited periods when no ships were in the channel, a short construction period and very harsh weather conditions during winter, including ice on the river.

3.2.1. Pro-Cons analysis

Pros

- Although the project was very large and had many technical challenges, it was easy to finance since all revenue was coming from a credit-worthy counterparty (Government of Canada, AAA-rated) in the form of milestone payments and availability payments, no demand risk taken by the private partner.
- The project was delivered a few months later than scheduled but still met the Government of Canada's need for a fast replacement of the old bridge.
- The project was delivered very quickly. The decision to build a new bridge was taken in 2012, financial close for the PPP was reached in July 2015 and the bridge opened in June 2019.

Cons

- The private partner made a few construction claims. It was difficult for the Government to assess the amounts being claimed since it didn't have much detail on the original construction cost budget. In hindsight, it would have been preferable to require more detailed construction budget in the proposals at the RFP stage.

3.3. CASE: HIGHWAY A25 CANADA-QUÉBEC

A first project for the design, construction, operation, maintenance and rehabilitation of road infrastructure in a public-private partnership has been concluded between Concession A25, S.E.C. (CA25) and the MTQ with respect to the completion of Highway 25. The project consists of a 7.2 km four-lane highway section between Henri-Bourassa Boulevard in Montréal and Highway 440 in Laval and includes a six-lane bridge spanning the Rivière des Prairies for a length of 1.2 km. This project also includes a fully electronic toll infrastructure on the bridge. The project was designed so that the electronic toll system can detect vehicles without slowing down or stopping.

The contract, which launched the start of the work, was signed on 13 September2007. The new infrastructure was commissioned on 21 May 2011, four years later. The agreement spans a period of 35 years, ending in 2042. Construction costs add up to $ 80 million, or EUR 66 million, whilst operation, maintenance and rehabilitation (OMR) costs amount to $142 million or EUR 94 million (CAD 2007). Construction costs consist of payments made to the private partner and therefore do not reflect the actual costs incurred by the private partner for the design and construction of the infrastructure. During the OMR period, the private partner's revenues consist primarily of availability payments and the toll revenue remittance. The availability payment is based on a fixed annual amount of CAD 13.4 million (in 2007 CAD / EUR 8 million). The toll revenue remittance varies according to the actual toll revenues collected. All revenues collected up to sharing certain threshold go to the private partner whilst revenues exceeding this threshold are shared equally between the private partner and the MTQ.

All payments and revenues related to this P3 are transacted through the FORT (see point 1 above).

The private partner carries out all operations, maintenance and rehabilitation activities required to keep the infrastructure in good condition. The MTQ conducts audits to ensure the quality of execution of the delegated functions to the private partner. Any deviations from best practices as defined in the partnership agreement are noted and scored based on the severity and repetitiveness of the shortcomings. Upon reaching a certain score, penalties for availability payments may apply. In addition, any interventions that require partial or complete closure of lanes may result in unavailability penalties. This is intended to encourage non-urgent interventions to be carried out outside peak traffic hours. The private partner is responsible for fixing toll rates and other charges. However, he must do so by respecting the maximums and minimums imposed by the partnership agreement and by the regulations in force. The private partner is also fully responsible for the collection and recovery of toll rates. To ensure that all revenues are accounted for, the Department conducts monthly audits. It may also conduct financial audits from time to time on specific issues that require a higher level of assurance.

It should be noted that the partnership agreements each consist of approximately 1,000 pages, to which must be added various ancillary contracts and the private partner's proposal, submitted during the call for proposals. Partnership agreements are what are known as "imperfect fixed-price contracts" since, although the contracts provide for the cost of construction, maintenance, etc. for a period of 35 years from the time they are signed, they can be amended either at the initiative of the Minister or the private partner. In the case of A25 there are currently 12 ministerial amendments (2 are in process) and 7 private partner amendments (3 are in process). The Minister's amendments are essentially intended to improve the project. For example, the Minister has required the partner to replace certain elements such as: the addition of new equipment to insure interoperability of the electronic toll system; new reports to be produced by the private partner; changes in the configuration of a multifunctional lane or a ramp; etc.

3.3.1. Pro-Cons analysis

Pros

- Allows for a closer monitoring of the deadlines associated with design and construction.
- Transfer of risk associated with construction costs, since construction payments made to the private partner are associated with the achievement of certain predetermined milestones.
- Alternative financing for the construction of new infrastructure, which has a positive impact on Quebec's debt.
- The revenue-sharing mechanism provides additional revenue to finance other infrastructures.

Cons

- The initial ridership estimates and corresponding revenue scenarios were significantly underestimated.
- Several class actions have been submitted, in relation to rates posting or collection fees.

Food for thought

In the context of the sale of the private partner’s share, it might have been interesting to include a priority clause if the government wishes to take over all activities. In addition, it would have been

desirable to provide for consequences for delays and defaults related to the private partner's financial activities in the same way as for OMR activities.

4. CHINA

4.1. BACKGROUND ON FUNDING IN THE COUNTRY

The total length of highways in China is 5,012.500 km, the density of highways is 52.21 km/100 km^2.

- Expressways (toll highways): 149,600 km
- National Highways (a small part of them are toll highways): 366,100 km
- Provincial Highways (a small part of them are toll highways): 374,800 km
- Rural Highways: 4,200,500 km

After decades of development, the highway investment and financing system in China has been formed by giving full play to the market mechanism and continuously innovating the supply models of highway public assets.

From the point of view of the different levels of government funding sources, the central government funds include vehicle purchase tax and fuel tax, and local governments' funds include general fiscal revenues, project revenues (toll revenue etc.), bank loans, general obligation bonds and revenue bonds.

As a whole, the central government actively plays an advantageous and positive role in making development strategies, comprehensive planning, macro policies, standard formulations and an overall plan for fund utilization, in order to balance regional development of urban and rural areas. Local governments are proactive and enthusiastic to undertake more responsibilities in highways financing, construction, operation and maintenance activities as well as to acquire policy-making and fund-raising rights.

There are two kinds of toll highways in China. One consists of government toll highways, which uses funds from fiscal revenues (including vehicle purchase tax from the central government and general fiscal revenues from local governments) and local governments revenue bonds. Local governments collect toll revenue to cover construction, operation & maintenance costs and repay revenue bonds. Another one consists of commercial toll highways, which uses the PPP model. Other non-toll highways (national highways, provincial highways and rural highways) also have several supply models, including tax paid by PPPs and government direct investment.

By the end of 2019, there were about 2,700 transport PPP projects at their identification and implementation stages in China, which involved highways, railways, rail transits hub stations, urban traffic, waterways, airports and ports. The total value of transport PPP projects investment is about RMB 10,000 billion / EUR 1,250 billion, and highway PPP projects account for more than half of the investment.

4.2. CASE: YONGDING-SHANGHANG EXPRESSWAY – FUJIAN PROVINCE

In the Fujian Province, there were 5,535 kilometers of expressways in operation at the end of 2019. According to the practices in recent years, funding sources of Fujian expressway project constructions include as follows:

- Vehicle registration and licensing taxes from Central Government: 9%
- Provincial capital fund via Fujian Expressway Group Co. Ltd.: 15%
- Municipal capital fund via specific company representing the municipal government: 13%
- Funding such as special bonds and bank loans: 63%

For social investment project, the typical funding sources include as follows:

- Social funding such as PPP investors: 35%-37% (in this case, the government subsidy might be up to 10%)
- Funding such as special bonds and bank loans: 63%-65%

In general, the budget from the central and/or provincial authorities is relatively fixed. However, whether to use available authority funds and how to fund road activities is decided by the municipal government. Accordingly, whether the social financing mode is adopted will vary for different projects depending on municipal fiscal capacity. In Fujian, about 8% expressways were funded by social funds, i.e. state-owned groups or private companies with national financial support.

Yongding-Shanghang project in Fujian Province of China is a four-lane expressway, which links Yongding county and Shanghang county, and connects to existing key expressways in Longyan City. The expressway is 56.28 kilometers long, including 7 interchanges and 2 service areas, and the design speed is 80 km/h. The project is sponsored by the Longyan City and approved by the Direction of Trade (DOT) of Fujian Province with an investment estimation of RMB 5.61 billion / EUR 703 million).

It is a BOT project covering construction, operation and maintenance activities. In December 2015, through public bid, a joint venture including Longyan Transport Investment Group (LTIG) and Road-Bridge Group of China Building Group (RBG-CBG) was awarded the entire project, including the financing, construction, 25-year operation and maintenance activities. The Longyan Highway Management Division (LHMD) which represents Longyan municipal authority has collaborated with this joint venture, and these two parties constitute the project cooperative company.

For the structure of the project funding, the registered capital funds (30% of the whole estimated cost) are provided by local municipal government (allocated by the Central Government from Vehicle registration and licensing taxes), the LTIG and the RBG-CBG. The three partners (LHMD, LTIG and RBG-CBG) have shared equity stakes of 30%, 36.4%and 33.6% respectively. Besides the project registered capital funds, the rest is raised by the project cooperative company from commercial banks.

The project started in October 2016 and opened in January 2020. The BOT contract is valid from construction until the project is concluded.

In term of the risk sharing, local government ensures that:

- No competitive road infrastructure will be built nearby.
- Subsidy policy such as land compensation will be guaranteed to the social stakeholder if the returns do not reach the expected rate in the early stage of operation.
- The social investors can do the construction if they have the highway construction qualification according to national specification.

4.2.1. Pro-Cons analysis

Pro

- The project funding by BOT alleviates the pressure of government budget.
- The investment confidence will be strengthened due to the municipal capital.

- The contract condition is competitive because it allows the social investors to carry out the construction.

Cons

- Lack of clarity in the provisions of the construction contract.

4.3. CASE: YELLOW RIVER GRAND BRIDGE PPP PROJECT OF PUYANG-YANGXIN EXPRESSWAY - HENAN PROVINCE

- Project name. Yellow River Grand Bridge PPP Project of Puyang—Yangxin Expressway
- Project operation mode. "BOT + EPC + No Government Subsidy" operation mode under PPP mode of cooperation between government and private sector. The cooperation period of the project is 33.5 years, including 3.5 years of construction and 30 years of operation.
- Project introduction. The project budget is RMB 2.845 billion / EUR 360 million. A new Yellow River Grand Bridge with a length of 8,127m is built, including about 4,864m in the Henan Province and 3,263m in the Shandong Province. The design standard is the twin six-lane highways expressway, the design speed is 120 km/h, and the design width is 33.12m. The project started at the end of January 2020 and is expected to be operational at the end of June 2023, with a construction period of 3.5 years.
- Project implementing agency. The people's government of Puyang authorized Puyang transportation bureaus as the implementing agencies of the project responsible for the preparation, supervision and handover of the project.
- Private sector. The private sector of the project is represented by a joint venture between Henan Expressway Development Co., Ltd. (HAED), Henan Province Highway Engineering Bureau Group Co., Ltd. (HAHEB),Henan Expressway Industrial Development Co., Ltd(HAEID), Henan Zhongtian High-tech and Smart Science & Technology Co., Ltd. (HAZHST), Henan First Highway Engineering Co., Ltd (HAFHE).
- PPP project company. As a PPP project company, Henan Puze Expressway Co., Ltd. is wholly owned by the private sector and is responsible for the construction and operation management of the project. As the leader of the consortium, the proportion of contribution (or share) of HAED in the project company is 97%, and 1.5% for HAHEB.
- Source of project funds. The total investment of the project is RMB 2.845 billion / EUR 360 million, and the project capital accounts for 20% of the total investment, which is invested by the private sector; the rest consists of debt financing, which accounts for 80% of the total investment, which is financed by the project company through bank loans. The project company is solely invested by private sector, and the government does not hold shares. User payment (vehicle toll revenue) is adopted in the project return mechanism. The planned FIRR of the project is 7.23%.
- Risk sharing. The risk of financing, construction, operation and maintenance of the project, such as the increase of interest rates or financing costs, over-expenditure of construction or operation costs, extension of the construction period and other risk shall be borne by private sector. Losses and cost increases caused by the change of government regulations and policies under the control of the government shall be borne by the government; the risk of change in policies and government regulations beyond the control of the government (such as laws, regulations and policy risks issued by the state or superior government) shall be borne by both parties. The risk of force majeure shall be borne by both parties.

4.3.1. Pro-Cons analysis

Pro

- EPC activities are able to provide time-saving solutions when the PPP method is used, which not only attracts social capital to solve their financing problems and reduces the government debt, but also introduces a strong construction and management team to make up for the lack of government management power, and improves the progress and efficiency of project.
- Reduces the pressure of government investment in the current period, relieves the financial pressure expenditure, and lowers the construction and operation costs of the project.
- The professional construction and operation tasks of the project are transferred to the social capital side, which can make the government get away from the heavy affairs, change the role of the traditional provider of infrastructure public service into the supervisor, and enable the government to have supervisory functions.

Cons

- Lack of flexible income compensation mechanism. The project involves a long period from project approval, pre-approval, engineering approval, construction design to investment and construction. The cost of land acquisition and demolition and the price of engineering materials may fluctuate greatly. The final construction cost of the project may be much higher than the original design. After the project is completed and open to traffic, the traffic flow and charging standard may not meet expectations. If the government cannot establish the income compensation mechanism in time, the project may lose money and bring market risk, which may reduce incentive for social capital to be invested.
- Lack of special provisions on the cost overrun of PPP projects. In the current PPP-related policy documents, there are no special provisions on the cost overrun of PPP projects, in practice, the traditional management regulations on cost overrun of engineering projects are still adopted.

4.4. CASE: ZHOUKOU-NANYANG EXPRESSWAY PPP PROJECT – HENAN PROVINCE

- Project name. Zhoukou-Nanyang expressway PPP project
- Project operation mode “BOT + Government Subsidy” operation mode under PPP mode of cooperation between government and social capital. The cooperation period of the project is 37 years, including 3 years of construction and 34 years of operation.
- Project introduction. The project budget is RMB 15.148 billion / EUR 1.9 billion. The project is 195,588km, including 16,376 km in Zhoukou City, 88.018 km in Zhu-Madian City, 23,684 km in Ping-Dingshan City and 67,51 km in Nanyang City. The design standard is the twin four-lane highways expressway, the design speed is 120km / h, and the subgrade width is 27m. The project started at the end of December 2016 and started being operational at the end of December 2019, with a construction period of 3 years.
- Project implementing agency. The people's governments of Zhoukou, Zhu-Madian, Ping-Dingshan and Nanyang in compliance with the project respectively authorized by Zhoukou, Zhu-Madian, Ping-Dingshan and Nanyang transportation bureaus as the implementing agencies of the project responsible for the preparation, supervision and handover of the project.
- Social capital. The social capital of the project is a joint venture between Henan Expressway Development Co., Ltd. (HAED), Henan Province Highway Engineering Bureau Group Co., Ltd. (HAHEB), Henan Zhongtian High-tech and Smart Science & Technology Co.,Ltd. (HAZHST).

- PPP project company. As a PPP project company, Henan Wanlong Expressway Co., Ltd. is wholly owned by the social capital and is responsible for the construction and operation management of the project. As the leader of the consortium, the proportion of contribution (or share) of HAED in the project company is 97%, 2% for HAHEB and 1% for HAZHST.
- Source of project funds. The total investment of the project is RMB 15.148 billion / EUR 1.9 billion, and the project capital accounts for 20% of the total investment, which is composed of the land acquisition and demolition borne by the government and the debt free funds invested by the social capital, in which the cost of land acquisition and demolition is 12.6%, social capital investment is 7.4%; the rest consists of government subsidies and debt financing, which accounts for 80% of the total investment, in which government subsidies represents 17.5% ,the remaining 62.5% is financed by the project company through bank loans. The project company is solely invested by social capital, and the government does not hold shares. The return mechanism of the project adopts the feasible gap subsidy method, in other words, the income source of the project mainly stems from the user payment, and on this basis, the government gives the project company certain subsidies (land acquisition, demolition and construction subsidy fund). The planned FIRR of the project is 6.09%.
- Risk sharing. The construction, engineering, capital and market risks of the project shall be borne by the social capital, the risks such as laws, policies and regulations shall be borne by the government, and the risks such as force majeure shall be reasonably shared by the government and the social capital.

4.4.1. Pro-Cons analysis

Pros

- Reduce the government's financial pressure and increase the supply of public transport facilities. The capital investment in the early stage of the project is large. By introducing social capital, the short-term construction expenditure can be paid with instalments in the cooperation period, which is conducive to smoothing the financial payment pressure and accelerating the construction of public transport infrastructure.
- Balance risk sharing and improve public transport service efficiency. The professional requirements of construction and operation management of the project are higher; therefore it is more suitable to introduce professional social capital to be responsible for investment, financing, construction and operation maintenance. At the same time, under the incentive and constraint mechanism of optimal risk distribution, social capital is also driven to consider the construction quality, subsequent operation and maintenance cost of the project as a whole, and effectively reduce the whole life cycle cost of the project and improve its own income level on the premise of ensuring service quality.
- Introduce advanced technology and management experience to improve expressway management efficiency. Under the market competition mechanism, social capital with good reputation, outstanding performance and advanced technology is selected to invest, finance, construct, operate, maintain and manage the expressway.
- Combining the government's development planning, market supervision, public service functions with the management efficiency and technological innovation power of social capital, the respective advantages of government and social capital can be given full play to improve the

quality and efficiency of road service supply, which helps to reduce the government's excessive participation in micro affairs and pursue the maximization of public interests.

Cons

- Incomplete information which makes it difficult to guarantee the execution of the contract. In the contract execution period, government policies and market demands may change greatly, and it is difficult to predict all possible changes in advance, which may lead to moral hazard.

4.5. CASE: YULIN–ZHANJIANG EXPRESSWAY - GUANGXI PROVINCE

The project is known as Yulin–Zhanjiang expressway (expressway between Yulin City in Guangxi Zhuang Autonomous Region and Zhanjiang city in Guangdong Province, China). It fully respects the customs of national minorities located along the expressway and passes through several impoverished counties. As a major passage extending to developed cities and province, the expressway is expected to effectively fight transportation weaknesses in local economic development.

The project passes through the Luchuan and Bobai Counties, both of which have populations exceeding one million, population outflows are significant and the proportion of out-of-region employment is as high as 20%, due to the shortage of transport infrastructure. The project involves an important route to connect these two counties to regions beyond. During the construction, the two counties have attracted numerous industries, and as a result, migrant workers have returned, taking advantage of their newly improved transport infrastructure.

Due to the limited fiscal capacity of local governments, the project could not be promoted through direct government investment. In order to effectively alleviate current fiscal expenditure pressure of the governments and actively encourage private partners to participate, the public sector Yulin City Transportation Bureau, Guangxi Zhuang Autonomous Region of China, has introduced a PPP mode in the project, reserved enough space for the private partners to display their advantages, fixed the upper limit of fiscal funds supporting the project according to the government fiscal capacity assessment.

- Project name: Yulin-Zhanjiang expressway, which is between Yulin City in the Guangxi Zhuang Autonomous Region and Zhanjiang city in the Guangdong Province.
- Jurisdiction and country: China.
- Brief project description: the total investment scale of the project is 7.016 billion RMB / EUR 920 million. The main line is 74,674km, with the twin four-lane expressway. The design speed is 120 km/h, and the subgrade width is 26.5 m. There are 57 bridges in the entire line, including 45 big-size bridges, 12 middle-size bridges.
- Public sector project sponsors: Yulin City Transportation Bureau, Guangxi Zhuang Autonomous Region of China.
- Private partners: China Communications Construction Company First Harbor Engineering Co. Ltd. and CCCC Second Highway Survey and Design Institute Co., Ltd
- Cost of infrastructure construction: RMB 7.016 billion / EUR 920 million.
- Period of construction: 2016-2020.
- Duration of the contract: 2016-2050.

- Source of project funding: toll revenue; government subsidy for the construction period (RMB 500 million / EUR 63 million) and for the first five years of operation period (at most RMB 317 million / EUR 40 million).
- Structure of the project: The SPV company is Guangxi Zhongjiao Yuzhan Expressway Development co. LTD, which is organized by CCCC First Harbor Engineering Co. Ltd and CCCC Second Highway Survey and Design Institute Co., Ltd. The public sector holds no shares in the SPV.
- Sources of financing: Investors' equity capital is RMB 1.4 billion / EUR 175 million; Bank loans (25 years) amount to RMB 5.612 billion / EUR 703 million.
- Key elements of risk sharing: The public sector takes approval risk, land acquisition risk. The SPV/the Private partners take designing risk, over-expenditure risk and insufficient traffic flow risk.

4.6. PRO-CONS ANALYSIS

Pros

- Government subsidies of 500 million RMB / EUR 63 million for construction and at most 317 million RMB / EUR 40 million for operation of the project were increased by the SPV, covering other costs of financing, investment, design, construction, operation, and maintenance. The government does not set a lower limit to traffic flow, which greatly reduces fiscal pressure for the government. An earning-sharing mechanism was designed to avoid excess profits accruing to the benefit of the SPV.
- The government adheres to its position as a supervisor and co-operator and tries to reduce unnecessary interventions, allowing the SPV to make innovations and offers its professional advantages. The government and the SPV cooperated closely to overcome all kinds of difficulties such as the heat, rainy weather, seeking advice from residents, and carefully conducting preliminary survey and advanced exploration tasks. The preliminary design and construction drawings were completed within two and three months, respectively, land acquisition amounting to 8,000 m has been completed in three months. The government benefits from the economic growth from investments, which is a solution to the problem of employment, and from the increase in financial income. The government’s responsibilities are land acquisition and clearing, defining output & specifications, approving, planning, designing and governing the project, paying government subsidies.
- The SPV plays its role of partner, constructor, and operator, and benefits from the long-term earnings from the investment, and shares project benefits and governmental subsidies attributable to local economic growth. The SPV’s responsibilities are the planning and design, construction, operation and maintenance, collection of tolls, operation of service areas and advertisement, life cycle rehabilitation.

Cons

- The extra cost of land acquisition is about RMB 180 million /EUR 22.5 million, because the government could not include the same in the project investment budget and related government documents are not clear about it. The government is trying to settle the matter, but up to now the government still has not paid the extra cost to the SPV.

5. COLOMBIA

5.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Colombian road network has a length of about 200,000 km, of which 20,000 km of primary network. This is operated for about 60% by INVIAS (State network, tolled) and for about 40% (network under concession, tolled) by Colombian National Infrastructure Agency (ANI). The network managed by Invias is financed through public funds and toll revenues. The network managed by ANI, for the part of public contribution) is financed through public funds.

Law no. 1508/2012 regulates PPPs in the Republic of Colombia. The law takes into consideration two main points:

- Only projects larger than ~EUR 1.5 million will be eligible for a PPP scheme.
- Concessions can only last up to 30 years including extensions.

Furthermore, the bill divides regulations between public initiative projects and private initiative projects.

- PPP projects that are proposed by the government: the government drafts the project and starts the tender procedure to select the successful bidder that will carry out the project.
- PPP projects that are proposed by private companies: before starting the tender procedure to award the project, the government must analyze whether the proposed project is technically and economically feasible and whether it is in the public interest and complies with public policies. If the project entails the disbursement of public resources (up to a maximum of 20% of the budget for the project), once the government has confirmed that the project is feasible, is in the public interest and complies with public policies, the project is put out to tender.

The Fourth Generation (4G) road infrastructure program has formed a central part of Colombian government's strategy to integrate the transport infrastructure and link industrial centers to major ports, updating major roads to international safety and speed standards. This project has been funded through both public and private capital, with a total worth of nearly USD 23 billion / EUR 19 billion, accounting to a yearly investment of 3% of national GDP, with the aim of improving or building over 8,000 km of roads and over 40 highway PPP projects. All PPP road structured projects have already been implemented.

To develop this program, launched by the government in 2012, international PPP expert groups have developed, on behalf of ANI, the technical, legal and financial structure of the new 4G motorway concessions.

In Colombia there is a specific institution at the ministerial level that oversees the process or establishes policies for the entire country or all sector, ANI, which is a key player in the structuring of PPPs. The Department of National Planning and the Ministry of Finance play a supervisory role.

To standardize the projects evaluations, the Colombian government has developed methodologies for technical and financial evaluation of the projects.

One of these methodologies, called the Public Private Comparator, is very interesting, because it has allowed the Colombian government to successfully carry out the most efficient projects and to discard those that would have brought fewer benefits, thus maximizing value for money.

5.2. CASE: 4G ROAD DEVELOPMENT PROGRAM

5.2.1. Scope

Deciding the best procurement or delivery method for a large project can be a challenging task. The consequences of the chosen method may be felt for decades during the project's lifetime. Therefore, it is important to have a transparent decision-making process in place to warrant that a sound decision is made. Whereas in many countries, PPP legislation is in place and, possibly, a PPP unit has been set up to guide this process, there is often no structured way of approaching the question of 'to PPP or not to PPP'. The decision for PPP as a procurement method is too often taken based on general policy reasons rather than project-specific ones, such as perceived private sector efficiency or financial constraints in governments' budgets. This leads to suboptimal decision-making with potentially severe consequences.

In Colombia, for example, there is a transparent decision-making process to ensure that a correct decision is made, based on the PPC method. Whereas in many countries, a PSC is prepared to determine the actual Value for Money if the project is procured as a PPP, in Colombia the PPC is used as an additional tool. The PSC is performed when the decision for PPP procurement has already been made, and may therefore be too late to have significant impact: if no Value for Money can be proven at the PSC stage, the procurement process is already in a very advanced stage. The PPC on the other hand is a tool that has been created to facilitate the decision-making process and is conducted in a very early phase of the project: after the market analysis, but before the contract preparation starts.

5.2.2. The structure of the PPC in Colombia

The methodology of the PPC defined in Colombia by *Ministerio de Hacienda y Crédito Público* and *Departamento Nacional de Planeación* allows to compare two project alternatives, or rather to implement the project as a public contract or as a PPP, appraising and comparing objectively the benefits of both. Such quantitative comparison constitutes a decision support tool for public entities in order to avoid discretion and it is realized before the publication of the public tender, establishing if PPPs can bring more value to the public service than the traditional public investment method.

The PPC is constituted by seven elements: four related to the net cost of Public Reference Project (PRP) and three related to the PPP cost. The elements of the PRP, calculated in present value, are:

- **Basic cost of the project (BC):** it is the value of the investment for the realization of the project, constituted by the costs of design, construction, maintenance and management, including the costs for the management of the contract;
- **Retained risk (RR)**: Retained Risks are those risks or parts of a risk that the government proposes to bear under a PPP arrangement. Governments retain any risks that are not transferred to the private sector. The cost of Retained Risk provides a comprehensive measure of the full cost to government;
- **Transferred risk (TR)**: are those that are likely to be transferred to the private sector under the PPP arrangement. The type and number of risks, which are classified as Transferred Risks needs to be assessed on a project-by-project basis. The value of Transferred Risk in a PPC measures the cost that the government would expect to pay for that risk over the term of the Reference Project;

- **Tool incomes or other sources (TI)**: monetary income generated by tolls, which may already exist or be potentially applicable in case the project is implemented;
- **Public Grants (PG):** Payment to the contractor in accordance with its request for public contributions;
- **Administration Costs (AC):** Administration cost of the contract for the public authority.

The mathematical formula for calculating the Value for Money through the PPC is the following:

$$VPD = \sum_{t=0}^{n} \frac{(BC_t - TI_t + RR_t + TR_t)}{(1+r)^t} - \sum_{t=0}^{n} \frac{(PG_t + RR_t + AC_t)}{(1+r)^t}$$

Where the discount rate (r) is equal to real WACC post-tax used by the PPP team in the financial modelling of the project and the number of years (n) of the project evaluation is equal to the duration of the concession contract. If VFM is positive the execution of the PPP project will generate greater efficiency and benefits.

5.2.3. Risk analysis in Colombia

Risk analysis it is the most interesting and innovative part of the methodology applied by Colombia in the evaluation of PPP projects. Risk analysis consists of four phases:

- **Risk identification**: Initially risks are identified through consideration of precedent projects and in consultation with the Experts PPP Team. The list of initial risks are refined by experts, typically through a workshop process attended by the relevant procuring entity staff, advisors and a representative of the Expert PPP Team. The output of the workshop is a risk list. The workshop process to identify risks requires careful management to ensure that all relevant risks are identified and described and typically the PPP team experts who conduct this phase apply the Delphi method at this stage;
- **Qualitative risk analysis:** the list of risks identified in the previous phase is characterized in terms of probability and impact by the team of PPP experts who have structured the project, assigning qualitative values to the same (low, medium low, medium high, high). A 4x4 risk matrix is thus built, where the list of risks identified in terms of probability and impact are positioned in the 16 quadrants;
- **Quantitative risk analysis:** the risks that in the previous phase are considered relevant by the PPP team and by the procuring entity staff will be assessed with quantitative methods, to determine the economic impact on the project. The relevant risks for the project are typically located in the four quadrants at the top right of the matrix. The quantification of the risks that have available time series is carried out with statistical models, such as Monte Carlo and Bootstrap. While risks that do not have time series are quantified by analyzing each risk with a public panel of experts, in order to determine the possible impact on the project. The output of this phase allows to determine, for each risk, the economic impact on the project for the entire life cycle of the project.
- **Risk mitigation:** the methodology foresees that the team of PPP experts who have structured the project assigns each risk to the public or private entity, following the indications of the procuring entity staff. The assignment of risks will be reflected in the concession contract. At this stage, the public entity may decide to avoid the risk by eliminating the source of risk, preventing the same by reducing the probability of the risk or its impact, retaining it because

the management costs would be greater or transferring it to the private entity that can manage the same in the best way and at a lower cost.

5.2.4. Pro-Cons analysis

Pros

- PPC allows to balance the risk sharing between public and private sectors;
- PPC allows to reject in advance the structuring of a specific project if it does not create value for the public;
- PPC makes the public institution aware of the economic value of the risks of the project which it must assume during the life of the project;
- PPC provides a structured approach to discuss the pros and cons of PPPs and traditional procurements with all the relevant stakeholders involved. In different sessions, both qualitative and quantitative aspects of PPP procurement are thoroughly discussed and compared to traditional procurement methods. The great benefit here is that the discussion is focused on the specific characteristics of the project at hand, rather than a general overview of the benefits of PPP;
- PPC allows for an ex-ante estimation of the Value for Money that PPP procurement may deliver. The outcome can be both positive and negative, based on the results of the discussion between the stakeholders. For quantification purposes, data from previously executed projects is fed back into the PPC toolkit;
- Apart from a more high-level discussion on the merits of PPP versus traditional procurement, the tool also allows to distinguish among different delivery methods in a PPP procurement. A more detailed discussion on the differences between for example BOT, D&C and DBFM can therefore take place;
- Executing a PPC in an early stage of a project is very worthwhile, because of the structure it provides to the procurement decision.

Cons

- An improvement of the actual method would be useful, which includes advanced technical studies, as well as a traffic study and an advanced financial model;
- Risk analysis requires particular attention and investment in terms of costs and time;
- No miracles should be expected from the PPC: it has significant drawbacks too, the main one probably being that the outcome is an estimate, and at this stage in the project, one can only guess, to the best of his knowledge, the Value for Money that can be achieved through PPP procurement. The quality of the outcome highly depends on assumptions: it is important to substantiate the assumptions thoroughly. This risk is partly mitigated by feeding data from projects in execution back into the PPC toolkit;
- Another drawback is that future market circumstances are not considered in the PPC, but this is not different from other ways of procurement method decision-making

5.3. CASE: GIRARDOT – HONDA – PUERTO SALGAR

5.3.1. Scope

Develop a primary route with high technical specifications to ensure the South - North connection of the Central Core, using a parallel road lying along the right bank of the Magdalena River. The road connects the southern central departments of the country in the "Flandes" sector, with northern departments at the north of Puerto Salgar, connecting also with the Ruta del Sol Concession.

The project includes the construction of new roads and double driveways; improvement and rehabilitation of existing roads; maintenance and operation of the entire concession.

The total length of the project comprises 214 km, 19 km of which correspond to the construction of new roads and dual carriageways (including the new Flandes´ Bridge), 33 km will be rehabilitated, 158 km include improvements and upgrades and 4 km embark the new Puerto Salgar Bridge on the Magdalena River with its specific access points.

5.3.2. Benefits

Connectivity between the cities of the area of influence of the road, enhanced trading activities, cultural exchange, economic and social development of populations.

Increased trading activities between the north and south to connect Ruta del Sol, thus improving access to the Atlantic Ports of Cartagena and Barranquilla.

Development of tourism where improved roads will allow users to enjoy the wonders of the Andean landscape.

Marks the beginning of a process aimed at facilitating freight and commercial transportation between the Putumayo (southwest of the country in the limits with Ecuador) and the northern part of the Country.

5.3.3. Travel time savings

Traveling time with the construction, rehabilitation and improvement of the road is 15% lower with regard to the current situation.

The present economic value of these savings (2013), at a social discount rate of 12%, amounts to EUR 400 million.

5.3.4. Data

- Structuring stage: 2012 – 2013
- Start of Concession: 2014
- Construction time: Four years (from 2014 to 2017)
- End of concession: 2038
- CAPEX: approximately EUR 500 million (totally financed by private, 30% Equity and 70% senior loan)

5.3.5. Pro-Cons analysis

Pros

- Only 18 months for integral structuring (design, cost-benefit analysis, financial model, value for money, government approvals, allocations provided by Ministry of Economics and Planning Department, tender);
- Option to confer a part of operating grants in USD, not only in local currency;
- Clear identification and assignment of risks and preventive allocation of public coverage;
- Clear identification of early termination value;
- Public guarantee for refinancing senior debt by a project bond to be issued at the operational stage;
- Expression of interest of multilateral banks;
- Strictly financial requirements for the contractor;
- Contractor return consistent with the cost of the capital;
- Prior socialization of the new tolls with the local communities.

Cons

- Basic level design and high influence of local communities.

6. FRANCE

6.1. BACKGROUND ON FUNDING IN THE COUNTRY

The French road network is divided into four categories and managed by different bodies:

- Toll free national roads: 12,000 km
- Toll national roads: 9,000 km
- Departmental roads: 377,000 km
- Communal roads (cities and villages): 673,000 km

France, compared to its surface, has a very long road network.

Toll free national roads are managed by the DGITM – Direction Générale des Infrastructures Terrestres et Maritimes – at the Ministry of the Energetical Transition.

Toll roads are managed by private companies: ASF-ESCOTA-Cofiroute are owned by Vinci; APRR-AREA are owned by Eiffage-Macquarie; SANEF-SAPN are owned by Abertis; A'lienor is owned by Eiffage/Sanef, small others such as ATMB, SFTRF are owned by the state. Some small other companies have been established to create new complementary itineraries such as ALIS, SMTPC, Atlandes, Alicore, Arcos.

Departmental roads are managed by the 101 French departments.

Communal roads are managed by either 12 big cities named "Metropole" or by one of the 30,000 existing cities or villages. The French government has been trying to reduce the number of cities for many years, pushing for the creation of local public bodies gathering many villages and small cities.

Except toll roads financed by tolls at a quite high level compared to Switzerland for instance, the main source of funding are taxes. They come either from local taxes but mainly from subsidies coming from the state.

Spending are classified into 2 different budgets: an investment budget (CAPEX) and a current budget (OPEX). For an exceptionally long period of time, VAT on OPEX was paid by the local authorities without any refund from the state. On the contrary, VAT paid on CAPEX was refunded by the state. That drove to irrational decisions in terms of road maintenance. It should also be noted that in certain regions certain types of road works were considered as CAPEX while in other regions they were considered as OPEX.

That has changed. Nevertheless and because of the French deficit, the state has put a lot of pressure on local authorities for them to reduce their spending and especially their OPEX. The reason is that OPEX comprises salaries paid to civil servants as well as invoices paid to a road company. The state wanted the local authorities to reduce their labor costs as well as the number of civil servants. OPEX is therefore still seen as a worse expense than CAPEX. In road maintenance, that drives to silly decisions and at the end to a higher cost or a lower quality service level.

6.2. CASE: PURCHASING ROAD MAINTENANCE

Spending on roads in France is mainly dedicated to existing road maintenance. New projects are rare and at the end they find the right or adapted financing solution.

Authorities do not know their assets very precisely, neither in quantity nor in quantity. As an example, most of them know the length of their network (with a precision of several %, 10%, 20%?)

but have no idea of the surfaces. And in case they had an idea, the precision would not be perfectly accurate. Most of them ignore the structure and have no history of the works done.

Every road owner or road maintenance manager, that means 100% of them, purchases what it needs to maintain its network through tenders. They often choose the less expensive quotation even if there is a balance between the price quotation and the technical offer from the candidate. A score is given to the price (the lowest price gets the highest score); a score is given to the technical memorandum. The candidate with a higher score is the winner.

The technical specifications demanded in the tender are not always accurate enough to purchase what is really needed, letting room to poor quality or interpretation whatever the reasons are.

The score on the price is fixed after a comparison between candidates.

The technical comparison is done between the technical specs and the proposal from the candidate plus a comparison between candidates.

No guarantee except the statutory minimum period of 1 year is given by the contractor for its works and no guarantee is demanded during the tender.

Infrastructure assets are not considered in the public accountancy. Their value is unknown, on the bookkeeping side. Their depreciation cannot be challenged by the expenses spent to maintain them. A debt engaged by a local authority to maintain or repair a bridge is seen as a debt and is accounted for; a grey debt for not maintaining the bridge and letting maintenance costs increase is not seen as a debt and is not accounted for anywhere.

As a consequence, everyone complains that the French road network quality is declining and that the situation is critical; the road managers complain they do not have enough budget to reach their goals; the road companies complain that prices are not high enough and/or that the public spending is too low. In reality, no one knows what the quality level of roads is and no one can tell how much money is needed to reach the required service level, since the same is not stated.

6.2.1. Pro-Cons analysis

Pros

- Road management decentralisation in the last 40 years has given more decision-making power to local politician with the objective to adapt the best solution locally.
- Through tenders and the notation system to select the candidate, local buyers stick to their compliances.

Cons

- Road management decentralisation has led to more clientelism, less technique and a short-term view
- Road management decentralisation has led to less expertise, to less know-how by the authorities
- Budgets are spent, works are done, works durability is not checked nor challenged
- No virtuous circle has started within the authorities to improve the decision-making process
- The political organisation and internal management rules have also led to very few exchanges between authorities

- As a conclusion, the French situation is far from being as efficient as it could and should be thanks to a more rational and shared approach.

7. HUNGARY

7.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Hungarian road system is divided into three categories:

- National trunk roads: 8,969 km (of which 1,509 km expressway)
- National secondary roads: 23,101 km
- Local roads: 181,230 km (of which 47.315 km paved)
- Total length: 213,300 km

National roads (both trunk and secondary roads) are maintained and operated by Hungarian Public Road Non Profit Co Ltd (apart from 359 km concession motorways and 96 km motorways interchange that is maintained and operated by the 4 concession companies). Construction and development of these roads are implemented by the National Infrastructure Development Co Ltd (NIF), which is also responsible for rail developments.

Apart from smaller sections, all expressways and all national trunk roads outside the settlements are tolled for freight transport above 3.5 tonnes, while cars and buses have to use vignettes for expressways. Toll and sticker revenues are collected by the National Toll Payment Services Plc and transferred to the government budget, which pays the costs of the collection to the company. The government also pays shadow tolls for the 4 concession companies (about EUR 300 million per year).

All these companies are financed by the government budget. However, there are no taxes earmarked for funding the road network, although they were applied in the past until 1998.

Local roads are maintained, operated and developed by the more than 3,000 local governments. They do not use earmarked tax either, although they receive 40% the annual vehicle ownership tax (which was only about EUR 100 million per year) up to 2019. Since 2020, state budget receives 100% of the annual vehicle ownership tax.

7.2. CASE: HUNGARIAN EXPRESSWAY NETWORK AND TOLL COLLECTION SYSTEM

Hungary has a vignette system for cars and buses since 1999, while there is a distance proportional electronic toll collection system introduced for freight transport above 3.5 tonnes since 1 July 2013.

Most of the expressways were built in the last 15 years; the total length of the expressways is 1,509 km, 1,197 km of which are motorways (359 km of which concession motorways with shadow toll) and 312 km are expressways (1 January 2019). The concessions proved to be too expensive, therefore there are no more concessions lasting for more than 10 years, as Hungary can also receive greater amounts from the EU's structural and cohesion funds to develop the road network.

The total length of the tolled network is 6,914 km (1,471 km of expressways, 5,434 km of trunk roads), while there are 38 km free expressways.

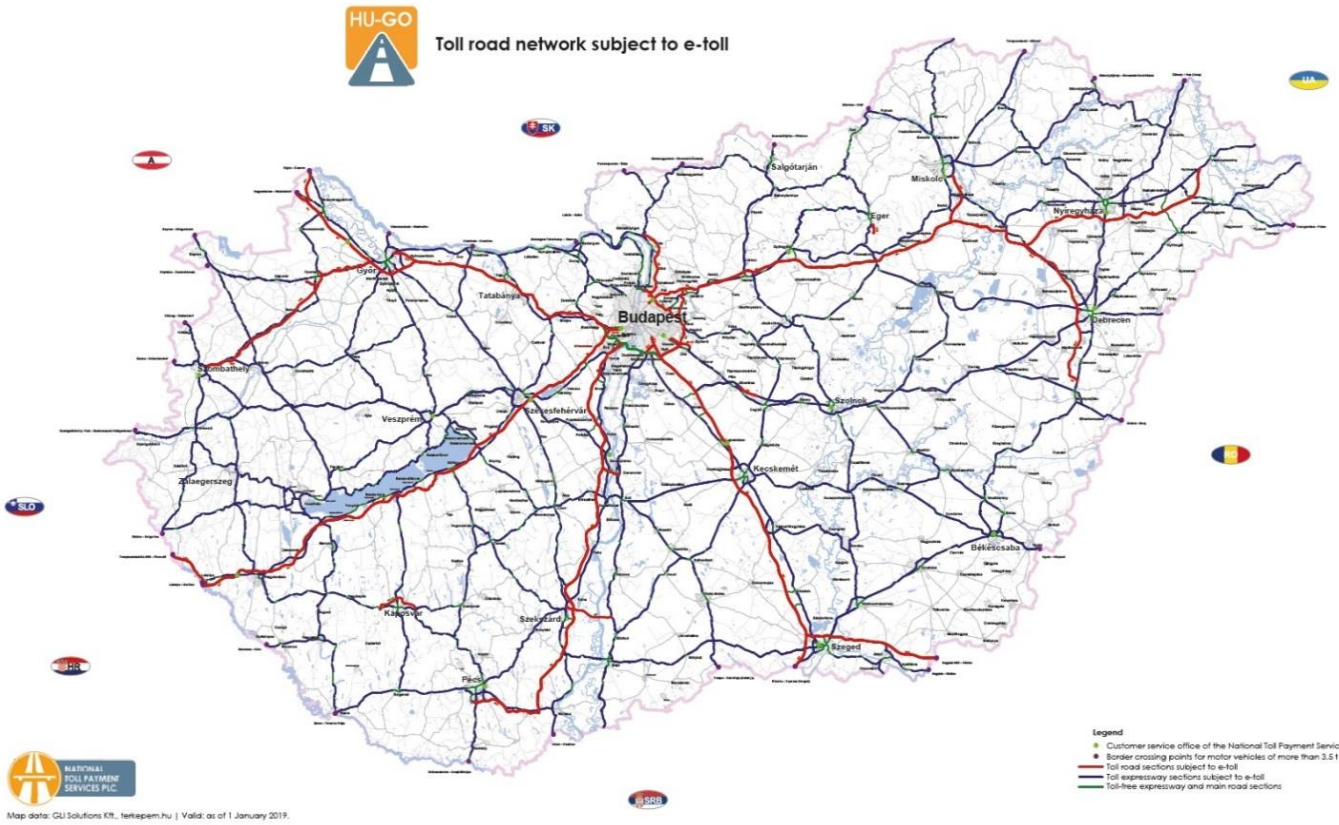

Figure 2: Tolled Hungarian road network for motor vehicles of more than 3.5 t (1 January 2019)

The former vignette system, which has been in place since 1999, has been very beneficial for heavy good vehicles, as the Eurovignette Directive allowed using stickers of a maximum of EUR 11 per day for heavy goods vehicles to cross the whole country since 2005.

Following the introduction of a usage-proportional electronic toll in most neighbouring countries, Hungary followed their footsteps, as the proceeds from electronic toll was increasingly lacking from the budget, which was affected by the economic crisis coupled with the debt crisis. After several years of postponing, an electronic toll collection system was introduced as of July 1, 2013, covering 6,513 km national road sections (1,201 km expressways, 5,312 km trunk roads) of the Hungarian road network (approximately 31 thousand km), while there were a 125 km free expressway section (M0 ring road around and inside Budapest) that remained free.

The amount of toll that is proportional to the distance travelled depends on the category of the road in use, the category of vehicle (J2, J3, J4 by axle number) and its environmental classification. Hungarian distance-based toll rates are at the forefront of Europe and the world and they have increased lightly, on three occasions, since their introduction, by 5.0% on 1 January 2015, by 5.8% on 1 January 2019 and by 3.4% on 15 March 2020. 2019 prices are shown in the following table.

Type of road	J2	J3	J4
Expressway	0.0771	0.1082	0.1674
Trunk road	0.0328	0.0568	0.1044

Table 1: Rate of toll for heavy good vehicles (EURO-5) since 1 January 2019 (EUR per km[1], excl. VAT)

The introduction of the usage-based system multiplied the toll revenues 6 times compared to the freight revenue of the previous vignette system[2] (Table 2). Since then an additional 60% revenue increase (in EUR, current prices) was reported for the next six years as a result of an increase in vehicle traffic, new roads and other revenue-increasing measures.

Toll and vignette revenues	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Road tolls (above 3.5 tons)[3]	27	30	34	67	74	60	61	67	69	243	415	472	501	564	578	669
Vignette revenue (up to 3.5 tons)	52	65	74	90	98	86	87	98	113	113	117	142	155	169	179	192
Vignette revenue (buses)[4]										3	4	4	4	5	5	5
Toll and vignette revenues total	79	95	108	157	171	146	148	165	182	358	536	619	660	738	762	866

Table 2: Toll and vignette revenues from road network 2004-2019 (EUR million, current prices)

Due to the characteristics of road use of heavy vehicles, it can be said that the current fee is proportional to the use of the road, not the magnitude of the increase, but the proceeds previously registered were insufficient to maintain the road network.

The revenue from distance-based **road tolls** of HGV was EUR 669 million in 2019, while nearly EUR 200 million came from stickers. Nearly half of the HGV toll revenue (about 49%) comes from tolls paid for domestic vehicles, while the remaining approximately 51% are attributable to foreign vehicles. Nearly 40% of foreign users are Romanian, while more than 10% are Polish; in addition, Bulgarian, Slovak and Serbian traffic is significant. in terms of mileage, however, we can see the other side of the coin; domestic vehicles make up approximately 51% of the total the total mileage. The reason for this is that they use the road network is somewhat more suitable for domestic vehicles (but not necessarily to avoid high-speed expressways).

Increased toll revenue would be enough to maintain the tolled network for the long term, which has a much higher traffic burden than the average, but it will not be suitable for maintaining the entire 31 thousand-km-long national road network.

In the period since the introduction of a distance-based electronic toll, the length of the tolled network has increased to 6,914 km (1,480 km of expressways, 5,434 km of trunk roads) due to new

[1] EUR exchange rate of the MNB, the central bank of Hungary: 322.16 HUF/EUR (02.01.2019).
[2] National Toll Payment Services Plc. http://toll-charge.hu.
[3] Vignette system up to June 2013, electronic toll system since July 2013.
[4] Revenue figures of buses before July 2013 included as followings: buses < 7.5 tons with light vehicles, above 7.5 tons with heavy vehicles.

roads, although the number of free highway sections has decreased from 125 km to 38 km (due to M0 Budapest ring road and motorways therein).

Vignette revenues: the car (and bus) category is also increasing dynamically thanks to the extension of the toll road network on 1 January 2015, when (1) much of the previously free expressway sections became tolled and (2) the new county road stickers also enabled to use the expressway network for those who have not been able to afford it, and (3) new vehicle categories (cars above 7 people, trailers) have been introduced. All these measures raised more revenue. Total length of expressways subject to stickers is 1,373 km, while there are still 136 km expressways that are still free of charge for cars and buses.

The annual cost of a car sticker (incl. 27% VAT) is around EUR 125 (HUF 42,980), and around EUR 10 (HUF 3,500) for ten days and EUR 15 (HUF 5.000) for one year per county.

7.2.1. Pro-Cons analysis

Pros

- There is a good revenue-raising opportunity since 2013 for public roads that is used by government, which is more important than all the minor cons listed below. Perhaps the only significant con consists of the fact that it is hard to raise more toll and vignette revenues than the current one.
- Quite many trunk roads are subject to toll for HGVs (compared to other EU countries). However, km rates of a trunk road cannot be higher because of EU regulations, therefore sometimes it is still worth choosing them instead of parallel expressways. The Swiss model (same km rate for HGVs for all country roads) should be considered for the EU countries as well.
- There is a free-flow system, and there is a range of possibilities to buy a toll or vignette, both are electronic.
- The toll system is relatively cheap and there are relatively few users that do not pay tolled sections.

Cons

The cons are rather smaller deficiencies of the toll system that could be relatively easily adjusted to the current system that is still efficient and fundamentally does not need to be changed.

- The amounts spent on maintenance and operation of the expressways are rather low, although the latter are raising a lot of toll revenue. Although it should be proven to the EU that toll and vignette revenue are spent on roads, it is easy to infer the same, since there are a lot of shadow toll paid to concession companies by the state (almost 40% of toll and vignette revenues) and a lot of road developments and extensions, therefore there is no need to prove there have been maintenance activities. Most of the expressway network is relatively age, so they do not need much maintenance, but some older motorways (like M1) were in poor conditions for a longer period. So, there is no real earmarked revenue missing since 1998. On the other hand, there have been enough financial sources in the past recent years.
- Annual car stickers for the whole country are still a bit expensive compared to other countries in the region, so few (but rapidly growing) car owners can afford it, which is not efficient enough. On the other hand, there is a relatively cheap county sticker for an annual vignette.
- Direct financing of local roads is an unresolved issue.

- There are certain roads (2x2 carriageways with 110 km per hour speed limit), that are not expressways, so they are subject to vignette. Most of them are in poor regions. The Government wants to introduce in each county capital 2x2 carriageway roads, and the remaining counties do not really like to have an official expressway because of its vignette obligations. Revenues that most of these roads would raise are quiet low, therefore, therefore the Government would have no reason to involve them for social reasons.

8. ITALY

8.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Italian highway network (2018) extends for ca. 6,943 km in total (including highways, tunnels and bridges but not the highway links), of which 6,003 km are governed by 25 toll concession contracts. The Italian Ministry of Infrastructure and Transport is the contracting Authority for the national highway sector.

Tolls to be paid by the users, and tariff adjustments, are established through specific financial mechanisms by both the Ministry of Infrastructure and Transport and the Ministry of Economy and Finance. The basis are CIPE Resolutions (Inter-Ministerial Committee for Economic Planning), which take into account expenses and investments incurred or planned by the concessionaires for the maintenance and improvement/expansion of the sections of the highways they manage (which is a matter regulated under Law no. 296/2006). Some concession contracts include the construction, management and maintenance of the assets (public works and service), while others only include their management and maintenance (public service).

In Italy, the average cost of the tolls is EUR 0.0786 per km, substantially in line with the European average (e.g. France: EUR 0.0866 / Spain: EUR 0.1202). In particular, a concession fee equal to 2.4% of their annual tolls (net of VAT) is paid by the concessionaires to the Government, divided between the Ministry of Infrastructure and Transport (58%) and Anas (42%). In 2017, the whole sector generated a turnover of ca. EUR 7,200 million (of which approx. EUR 5,900 million in tolls). Investment and maintenance expenses in the highway network are critical factors, specifically contracted between the parties (public and private).

In addition to the motorways managed by the 25 concessionary companies, there are about a thousand km of motorways (939.6 km) managed directly by ANAS S.p.A. (national road company owned by Ferrovie dello Stato Italiane S.p.A.) which, considering also 355 km of highway links, is entitled to manage 1,295 km in total without tolls. ANAS manages 90% of the Italian public road network (30.000 km), while regions and other local municipalities manage the remaining roads.

In general, like in other countries, the Italian highway sector is affected by factors as, inter alia, the effective levels of traffic and aspects of legislative (e.g. litigation) and regulatory framework (e.g. tariffs) nature that could impact cash generation capacity and the sustainability of the projects.

8.2. CASE: TANGENZIALE EST ESTERNA MILANO

The Tangenziale Est Esterna Milano (“TEEM” or “A58”) is 32 km long and links the highways A4 (near Agrate), Brebemi and A1 (exit Melegnano) and intercepts along its path the SPexSS11 Padana Superiore, the SP 103 Cassanese, the SP 14 Rivoltana and Provincial Road (SP) ex State Road (SS) 415 Paullese. This infrastructure was designed to reduce the traffic congestion on the existing Tangenziale Est due to the development of multiple industrial and logistics sites in the eastern area of Milan.

The traffic volume recorded in the Milan Metropolitan Area is of over one and a half million private and public vehicles, based on the information provided on TEEM’s website. The ring roads in operation (East, West and North) are used every day by 350,000 private vehicles.

In detail, TEEM includes 6 junctions (with toll collection) with ordinary roads and 3 interconnections with the existing highway network (A1, A4 and Brebemi). The highway is composed by two

carriageways with 3 lanes each (plus 1 emergency lane). The project has also included secondary works such as the construction of 38 km of new local road linked to the infrastructure, 10 km of cycling path and the refurbishment of 15 km of existing roads.

The concessionaire is “Tangenziale Esterna SpA”, which has obtained a 50-year concession from the Italian Ministry of Infrastructure for the design, build and management of the new ring road. Its aim is to be an effective response to the need for rapid, safe and low environmental impact movements. The entire infrastructure became operational on 16 May 2015, in line with the designed schedule.

The concessionaire (Tangenziale Esterna SpA) is made up of: - Tangenziale Esterne di Milano SpA (TEM) - Impregilo - Impresa Pizzarotti & C.- Coopsette - CMB- Unieco - CMC - CTE (Consortium of Designers) - Itinera - Pavimental - Autostrade per l'Italia - Banca Intesa Infrastrutture e Sviluppo - Turin Autostrada Alessandria Alessandria Piacenza Company - Milano Serravale-Milano Tangenziale Company.

The overall financial commitment for the construction works of the infrastructure was about EUR 2,200 million, of which EUR 580 million were equity from the concessionaire , EUR 1,200 million from banks (IMI, Intesa San Paolo, Unicredit, UBI, Mediobanca, BPM, Credito Bergamasco, Popolare Emilia Romagna e Santander) and EUR 330 million from public funds (EUR 70 million in 2013, EUR 70 million in 2014 and EUR 190 million in 2015). The secondary works were financed by public funds and local private investors.

The main source of revenue for the concessionaire are the tolls paid by the infrastructure users.

The creation of TEEM guaranteed important employment and growth prospects for the Italian and Lombard economy with an expected investment generation of EUR 5.6 billion. The impact on the national GDP was estimated to be at +0.3%, + 1.4% on the Lombard Region and + 2.8% in the province of Milan.

Most of the economic impact of this infrastructure is concentrated precisely on the directly affected territory. The benefit for indirectly related activities was expected to be EUR 2.3 billion, EUR 911 million for the service-related sector and EUR 770 million for other industries. Moreover, this infrastructure was estimated to create 18,000 jobs in the construction sector and 10,000 in other sectors. With the entry into operation of TEEM-A58, moreover, the average speed in travel will increase by 34% which will lead to save eight million hours of travel, which translates into a collective benefit of EUR 150 million.

In 2014, EUR 460 million were paid by the banks and EUR 70 million by the Ministry of Infrastructure on the accounts of Tangenziale Esterna SpA. These funds were added to the EUR 580 million (EUR 465 million in equity and EUR 115 million deriving from a subordinated loan) provided to the Concessionaire by the Shareholders (TEM 47.6%, Pizzarotti 10.1%, SIAS 7.4%, Itinera 6.4%, Coopsette 4.1%, Unieco 4%, CMB 4%, Impregilo 3.7%, CMC 3.2%, Autostrade Lombarde 3.1%, Intesa San Paolo 2.5%, SATAP 1%, Pavimental 1%, CTE 0.4%, Serravalle 0.3% and Autostrade per l'Italia 0.2%). This funding structure was planned from the beginning of the project. The public contribution was set to depend on the actual progress of the works. By agreeing on this capital increase, the shareholders had so far financed the costs of the works, guaranteeing their continuity ever since the opening of the construction sites dating back to 11 June 2012. Other public funds were EUR 330 million from Cassa Depositi Prestiti S.p.A..

The total investment was EURO 1,659 million (without VAT) and the infrastructure was full in operation on 16 May 2015.

8.2.1. Pro-Cons analysis

Pros

- High number of users for the "TEEM – Tangenziale Est Esterna di Milano", which significantly reduced heavy traffic on the existing Tangenziale Est.
- Many Italian and foreign companies, which operate not only in the logistics sector but also in the mechanical and food sectors, have opened factories in Brianza, Martesana, Sud Milano, Lodigiano and other territories crossed by the A58 motorway, connected to the A4 Turin-Trieste, A35-BreBeMi and A1 Milan-Naples.
- End of works in line with the time schedule.

Cons

- Higher tolls compared to the existing Tangenziale Est due to the need to amortize construction costs
- Construction costs have been slightly higher than planned but this was partially compensated with a variation
- The land acquisition has been considered unfair by residents as it was initially carried out based on fixed rates decided by the Concessionaire.

8.3. CASE: CONCESSIONI AUTOSTRADALI VENETE – CAV S.P.A.

Concessioni Autostradali Venete "C.A.V." S.p.A. (concessionaire) is an Italian publicly owned company (ANAS S.p.A. [50%] and Veneto Region [50%]) which operates, under a long-term concession agreement awarded by the Italian Ministry of Infrastructure and Transport (contracting Authority), a relevant motorway concession in the Veneto Region (Mestre/Venice area). In 2009, after the company's incorporation (2008), CAV was granted a concession (original concession agreement) by ANAS in its capacity as grantor. Currently, the concessionaire operates and maintains a motorway network of ca. 74 km (until 31 December 2032), and manages the traffic on the Mestre bypass (Passante di Mestre), A4 motorway (section Padova-Mestre), Marco Polo Airport link road (Raccordo Marco Polo) and, moreover, A57 Mestre west ring road (Tangenziale Ovest di Mestre).

This was envisaged in order to reimburse, through the stream of revenues coming from the collection of tolls, the financing from ANAS for the previous construction of the Mestre bypass (construction cost: > EUR 986 million plus VAT, partially borne by the State) and related road infrastructure investment costs (borne by Veneto Region). The motorway assets are fully operational with limited complementary works in the process of being completed. They are amongst the most strategically sections of the Italian motorway system, given their location in one of the most prosperous and industrialized regions of Italy and at one of Europe's major crossroads, well connected to various important international transport networks. In accordance with the concession agreement, the concessionaire has the right to collect the tolls paid by motorway users (user-pays scheme) and revenues from commercial sources (sub-concessions from service areas and others). In particular, the tariff applied for the toll is set on the basis of formulas defined by national legislation which, through periodic adjustments, aims to ensure economic and financial

sustainability of the concession in order to cover investments and operation costs, with a fair return on the capital invested in the project. The value of the entire concession accounted for ca. EUR 1.3 billion. The level of traffic is high and quite steady. Considering the last financial statements (2018), CAV shows direct net revenues from tolls of approximately EUR 139 million (plus other connected revenues of about EUR 7 million and other revenues of about EUR 1.5 million); regarding O&M costs, maintenance costs are ca. EUR 14 million considering the entire network managed. The economic and financial indexes are solid: EBITDA of EUR 98.5 million, EBIT of EUR 53.8, net income of EUR 23.3 million and positive financial ratios. Risk allocation is properly defined between the parties by the concession agreement, in line with the European/Italian legislation on public contracts and concessions as well as best practices for the concessions in the motorway sector. Particular attention is given to demand and operative risks related to the traffic (borne by the concessionaire), besides other private risks or shared and public risks.

In April 2016 (signing on 6 April and closing on 12 April), CAV issued a successful project bond of EUR 830 million to refinance its debt in order to repay the residual debt to ANAS (construction of the Mestre bypass) and previous financing from Cassa Depositi e Prestiti S.p.A. through European Investment Bank (EIB)'s inter-bank funding. This project bond issuance represented the first Italian project bond guaranteed by the EIB, in line with European Commission's Project Bond Initiative 2020 and exclusively reserved to institutional investors. More specifically, CAV issued two classes of fixed interest rate bonds (EUR 400 million class A1 and EUR 430 million class A2, at 2.115%) to refinance approximately EUR 332.15 million of existing third party debt granted by CDP, to repay approximately EUR 446.24 million of net exposure to ANAS, to fund the maintenance reserve account, the debt service reserve account and the capex reserve account up to their respective required balances and to pay fees and closing costs required in connection with the transaction. The bonds are fully amortizable, senior secured obligations of the issuer and have no recourse to the shareholders. EIB guaranteed the bond issuance through a project bond credit enhancement agreement in the form of an unfunded subordinated revolving letter of credit amounting to the lower of 20% of the outstanding amount of the bonds and EUR 166 million, which will be provided by the EIB. This guarantee allowed to reach a higher level of credit rating (Moody's: A3), compared to similar transport infrastructures, with a low level of fixed interest rate (2.115%). In accordance with the terms of the finance and security documents, the bonds benefit from the issuer security, which includes an assignment of the issuer's rights under the concession agreement as well as a pledge of certain of the issuer's accounts. The obligations of the issuer in respect of the class A1 bonds and the class A2 bonds will rank equally among themselves in respect of security and as to payment of interest and repayment and prepayment of capital. Interest payments are being made semi-annually (30 June and 31 December) until the final redemption date on 31 December 2030.

The Italian legislation has supported project bonds with fiscal incentives applied for professional investors involved, with a limited taxation for their interest income (12,5%) equal to government bonds. Tax incentives have not been problematic in terms of State Aid.

8.3.1. Pro-Cons analysis

Pros

Characteristics of the Project:

- Strategic location with strong catchment area

- Limited competition
- Fully operational assets in good condition
- Long operational history
- Stable regulatory framework
- Stable shareholders and experienced management team

The financial viability of the project and its success are based on a well-structured mix of relevant characteristics. First, an economic and social effectiveness of this road infrastructure (strategic location with strong catchment area) that presents consistent levels of traffic (limited competition) and a correct tolling system. The contractual risk management has been well developed in line with national and international legislation and best practices. The sponsors of the company are financially solid and have relevant technical standing to properly operate and maintain this important motorway network. The innovative financial structure of the project, while issuing a guaranteed project bond to refinance a "brownfield" project, has allowed an effective debt management and the financial close. This solid innovative financial instrument, applied to a well-designed and fully operational infrastructure project, can represent a relevant option to refinance the debt accrued during the construction phase of major motorway projects. The demand for CAV's project bond has exceeded the amount issued (EUR 830 million) by over 30%, demonstrating a very strong market appeal for specialist investors.

Cons

Factors affecting results:

- Traffic
- Tariffs

Key items which affect CAV's cash generation capacity:

- Revenues
- Operating costs

8.4. CASE: AUTOSTRADE DEL LAZIO

The Italian Interministerial Committee for Economic Planning (CIPE) (Decision no. 121/2001) has scheduled the construction of the connection "A12- Pontina- Appia" (highway A 12 and the two state road Pontina and Appia) and the construction of the link road between Cisterna and Valmontone.

Later, the CIPE (Decision no. 50/2004) has approved the preliminary design of the above-mentioned works, providing for the construction of an unique highway system.

The CIPE (Decision no. 50/2004, confirmed by Decision no. 88/2010) also allocated EUR 468 million as non-repayable public funding for the above-mentioned works.

Then, the Ministry of Infrastructure, the Lazio Region and ANAS S.p.A. entered into an agreement: the Ministry supported the establishment of a new company owned in equal shares by the Lazio Region and ANAS S.p.A. and decided to co-finance the intervention.

"Autostrade del Lazio S.p.A." (ADL) has been established on 2008 (with Law no.244/2007): it is a joint enterprise (owned by the Lazio Region and ANAS S.p.A.) in charge to plan and conduct the procurement procedure as an Awarding Authority.

As the Awarding Authority, ADL decided to apply the "Public works concession" which is a contract of the same type as a public works contract except for the fact that the consideration for the works to be carried out consists either solely in the right to exploit the works or in such right subject to payment.

On 20 December 2011 ADL – as Awarding Authority – has published the contract notice to award the public concession about design, implementation and management of the so called "highway Pontina". ADL used the restricted procedure to award the works by adopting the criterion consisting in choosing the most economically advantageous tender.

The estimated value of the public concession was equal to EUR 2,729 billion net of VAT.

The whole works included the construction of a 186.2 km road system (of which 100 km of highway).

The contract notice determined the economic and quality criteria which, taken as a whole, would have made it possible to determine the most economically advantageous tender: quality criteria (weighting 40 point, broken down into four sub-criteria) and quantitative criteria (weighting 60 point, broken down into four sub-criteria) evaluated as a whole up to a maximum of 100 points in total.

One of the quantitative criteria was the "non-repayable public funding charged to the concessionaire" (30 point): the tenderer could use part of the non-repayable public funding provided by ADL (almost EUR 970 million but the more public funding was requested by the tenderer the less points were given to the tender.

On April 2014, ADL invited the five selected candidates to submit their tenders and – at the time limit for the receipt of tenders - only two candidates had submitted admissible tenders (Consorzio Sis and Salini Impregilo).

Then, the Jury examined – on the basis of the criteria set out in the contest notice – the tenders submitted by the candidates and, also after the opening of the economic offer, the successful tenderer proved to be Consorzio Sis.

Later, the tenderer second in the standings – Salini Impregilo – brought an appeal before the Regional Administrative Court of Lazio against the decision to award the contract to Consorzio Sis.

Initially, the Regional Administrative Court (Court of first instance) dismissed the action brought for the annulment of the procedure's documents. Later the State Council (Court of second instance) granted the appeal. Therefore, the Court annulled the original invitation to tender and it also ordered ADL to draft a new document containing the review of the above said mathematical formula to be sent to all the economic operators which have been part of the initial procurement procedure.

According to Salini Impregilo's viewpoint, the Jury made a mistake in evaluating Consorzio Sis's offer: the successful economic operator declared to fully use the non-repayable public funding and to give it back at the end of the concession and thanks to this it had obtained all the 30 point provided for this specific criteria. Thereby, the amount guaranteed to Consorzio Sis was a financial help rather than a public funding and, therefore, it was in branch of the procedure's rules.

8.4.1. Pro-Cons analysis

Cons

- The procedure has been subjected to a long legal dispute. As a result, it has not been possible to sign the contract between ADL and Consorzio Sis and therefore to start the works: such "strategically important" infrastructure works are still suspended.
- According to the Administrative Courts the invitation to the candidates is erroneous: the mathematical formula adopted infers that a waiver of all public funds equates to of the use of the public funding and its subsequent repayment.
- Nowadays there are new trends focusing on how to face the situation due to the long period elapsed from the publication of the notice (2011) until today. The priority, for ADL and for all the public authorities involved, is the performance of the works.

Lessons learned

The contract award criteria are the basis for a comparative assessment of the quality of tenders therefore a special attention must be reserve to it. In this specific case even though one of the awarding criteria was a mathematical formula (adopted to calculate the “non-repayable public funding charged to the concessionaire” (30 point)) it had an impact on financial aspects which had not been adequately considered before: the event of completely using the non-repayable public funding and subsequently repaying the same has not been taken into consideration, and, as a consequence, one economic operator was favoured over the other.

In addition, the long period elapsed from when the need of the public works has arisen until today, inevitably originates the risk, from the one hand, to lose the competitiveness of the offer, and on the other hand, to lose the Public Administration’s interest in building the highway. Therefore, drawing up the procedure’s documents, it would be useful to consider all the new perspectives, which may determine a change of priority both for the Italian State and for the private economic operator even if it is not easy to consider all possible scenarios.

8.5. CASE: FRAMEWORK AGREEMENTS FOR THE SCHEDULED MAINTENANCE WORKS

Anas S.p.A. has implemented the instrument of framework agreements for the scheduled maintenance works.

A framework agreement means an agreement between one or more contracting authorities and one or more economic operators, the purpose of which is to establish the terms governing contracts to be awarded during a given period, in particular with regard to price and, where appropriate, the quantity envisaged.

Usually, the framework agreements are divided into lots. A maximum estimated amount of money is provided for each lot. This non-binding estimated amount comes from the sum of the amount of all the specific contracts that will probably be signed between Anas S.p.A. and the tenderer. There is no a minimum scheduled payment: the amount provided for each lot will be paid according to consumption and, therefore, only if Anas S.p.A. requires a scheduled maintenance work on an area covered by the framework agreement.

Because of the subdivision into lots, the number of lots that may be awarded to any one tenderer is limited (possibility of tendering only one of the lots).

Anas S.p.A. enters framework agreements for scheduled maintenance works on the sole basis of the best price-quality ratio. Contracts based on a framework agreement are awarded in accordance with the most economically advantageous tender.

Therefore, Anas S.p.A. decides the relative weighting which it gives to each of the objective criteria used to choose the best tenderer.

Such criteria may comprise, for instance:

- proposals for improvements of the site environmental management (i.e. reduction of the environmental impacts which may cause groundwater pollution or noise pollution);
- proposals for improvements of the site monitoring (i.e. installation of means of surveillance of vehicles and staff).

The procedure called "TO 58/19", for instance, was a framework agreement for the execution of the maintenance works of the roads of Piedmont.

The total amount payable, net of VAT, as estimated by Anas, was EUR 5 million (non-binding estimated amount) but the real sum payable by Anas was not established in advance but it depends on the execution project needed and, therefore, on a specific agreement signed. The sum provided for every specific agreement is then deducted from the above said total amount (EUR 5 million).

Please find below a practical example:

- A Piedmont's State Road needs some maintenance works; therefore Anas draw up the execution project. The amount payable by Anas for those works is equal to EUR 500,000 therefore a specific agreement is signed between Anas and the successful tenderer of the framework agreement. An amount of EUR 4.5 million remains and can be used for different maintenance works of the Piedmont's roads.

Obviously, the use of the framework agreements for the scheduled maintenance works has the lowest total cost impact on Anas's management of the procurement procedures.

8.5.1. Pro-Cons analysis

Pros

The use of framework agreements has numerous advantages:

- Possibility to start the competitive procedures before the allocation of public funds;
- Considerable reduction of the time necessary to award a contract;
- Increased flexibility of supplies.

Cons

The use of framework agreements for the scheduled maintenance works implies that several works could be executed at the same time. The successful tenderer knows the above said assumption (made clear in tender procedure's documents) but whenever there is a need to open construction sites simultaneously, the same is unable to guarantee the execution in parallel of the works.

9. MEXICO

9.1. BACKGROUND ON FUNDING IN THE COUNTRY

Mexico has about 390,000 km of roads.

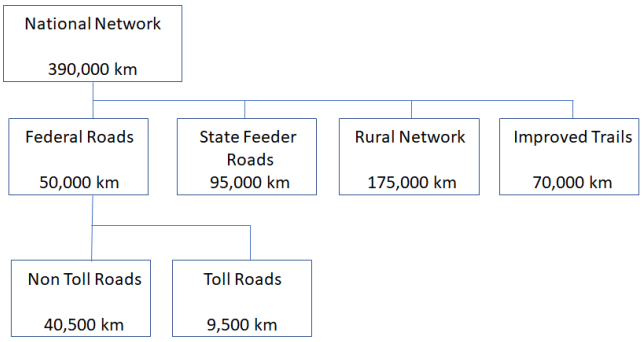

Figure 3: Road network in Mexico

Toll roads have been a reality in Mexico for some years now, at the beginning, as concessions granted by the federal government, and later by state governments. As a result, sources of financing have increased for some time, there are plenty and can be as simple or as complex as one can expect. Today there are many players in the funding arena, private banks, development bank, supranational banks, funds, private equities, etc. So, there is a lot of appetite, but what we sometimes lack are projects, willingness to develop them either by the government, private entities or both.

Non-toll roads are financed by the government, using traditional procurement and public budgets. Basically, using a build only procurement scheme.

In recent years, different PPP schemes have been used, giving the government more options to develop or maintain existing infrastructures.

9.2. CASE: CONCESSION AGREEMENT – KILOMETRES LENGTH EXTENSION

Since the late 1980s, PPP projects have been highly useful. When they were first introduced for roads, PPPs were accompanied by an extra “motivation”. Please note that in the beginning, only construction firms were interested even if they didn't have a lot or even a little of experience in PPPs. Hence, the “motivation” was included in the concession agreements, which stated that the scope of the concession could be extended up to the original km granted. For example, if the original agreement was for 100 km an extension up to 100 km could have been provided for, without the need of a bidding process. The only obligation was to be up to date with the obligations and the minister could grant that extension in case it seemed feasible (with a previous formal request from the concessionaire).

All the early PPPs had this “motivation” attached to the concession title. Then by mid and late 90s, most of the projects we withdrawn by the government due to a mix of several issues; bad traffic forecasts, construction overprices and the 1994 crisis led most to a financial breakdown.

Two or three concessions withstood that period and remained property of private partners who were able to make the most out of that original “motivation” years later (mid 2010’s). By then, the government and the private entities were able to reach mutually beneficial agreements and develop projects that individually would need a grant from the government. By doing this, this grant

is given by the existing tollway segment, opening opportunities for projects that were not appealing before for the private entities and are of interest for the government.

In 2012, two projects were developed using this modality. One of these projects is the “Laguna Bypass”, a 40 km, two-lane tollway that bypasses one of the most important industrial areas in the country, thus allowing better mobility for goods and the population and less traffic within the cities. The total investment of this project was approximately USD 185 million / EUR 151 million and with traditional procurement the government would have had to acquire a right of way, design, process all the licenses and organize a bidding procedure, on the other hand a PPP with only this project would require a yearly grant of approximately USD 15 million / EUR !2 million for 30 years to make up for the lack of revenues. This project was done using the ”motivation” previously mentioned and stated in the PPP contract, thus the government had to put in zero money, the acquisition of the right-of-way, the license, the design and the financing was a responsibility of the private partner, also the grant needed was fulfilled with the surplus of revenues from the brownfields. Two important things that should also be taken into account: (a) the project finance rests on the proven track record of the brownfields, therefore there are less constraints for the new project and (b) there is an important reduction in terms of time schedule because (i) there is no tender process, (ii) there is almost no bureaucracy: initial documents are signed, basically the responsibility lies within the private partner, the sooner the project start to operate the better for everyone, hence the aim is to start as soon as possible.

Now, in 2020, government officials are trying to use this scheme as much as possible. Some with this basic approach, others with more creative methods, like a toll re-equilibrium.

Using brownfields to sponsor greenfield opened new spaces for agreements, creativity, projects that were forgotten, proper risk allocation and real more efficient PPPs.

9.2.1. Pro-Cons analysis

Pros

There are several, but some are more significant than others.

- Proper Risk Allocation
- Mix and match of brownfields with greenfield allows better funding conditions, less restrictions to move forward.
- Faster processes to start a project.
- More involvement between government and the private sector at the beginning and after, almost all the risks are borne by the private entity. But more flexibility, thus efficiency for the private entity and the project.

Cons

- It's an option open to a limited number of participants; hence it might seem a bias. First, you need to have a brownfield and second, your initial agreement needs to provide for a right to extend the length.
- Since it contains certain conditions previously needed, it can be expanded/used as much as needed.

10. NAMIBIA

10.1. BACKGROUND ON FUNDING IN THE COUNTRY

This case study addresses road funding in **Namibia**. Namibia is situated in the southwest of the African continent, bordering Angola in the north, South Africa in the south, Botswana and Zambia in the east, and the Atlantic Ocean in the west. The case study pertains to the funding for developing and maintaining the core road network in the country. Namibia ranks number 21 in the World Economic Forum's Quality of Roads Index (2019 edition).

Institutional setting: The Namibia Road Authority (RA) manages a road network size of approximately 48,000 km, which includes both the paved and gravel roads.

LENGTH OF NAMIBIAN NATIONAL ROAD NETWORK				
ROAD TYPE	TRUNK ROADS Length (km)	MAIN ROADS Length (km)	DISTRICT ROADS Length (km)	TOTAL LENGTH KM
Bitumen	5046.2	2750.1	463.1	8259.4
Gravel	0.0	8362.8	17526.5	25889.3
Salt		21.8	167.5	189.3
Earth		232.5	13127.5	13359.9
TOTAL	**5046.2**	**11367.2**	**31284.6**	**47698.0**

Table 3: The road network of Namibia

Urban authorities manage the urban road networks. The RA outsources 99% of its work to contractors. The remaining 1% is being implemented by the Roads Contractor Company (RCC), which is housed in the Ministry of Works. Namibia has a second-generation Road Fund, the Road Fund Administration (RFA).

Maintenance funding: The RFA is responsible for the collection of road user charges. The RFA does not receive appropriations from government. The road user charges that are in place are: fuel levy, vehicle registration fee, foreign vehicle import fee, driving permit fee, weight-distance charges and transit fees. With the funds obtained, RFA finances 100% of the operational expenses of the RA. Over the financial year 2018-2019 the RFA disbursed NAD 2.5 billion, equivalent to EUR 153.4 million.

Funding for network development: Construction projects are usually funded through budget attributions of the Government of the Republic of Namibia (GRN) to the Ministry of Work and Transport. For some recent projects, Chinese grants and loans have been obtained (i.e. for Phase 2, Sections A and B of the TR 9/1 Windhoek - Hosea Kutako International Airport to freeway standard).

Furthermore, there is a development in the mandate of the RFA that traditionally pertains to the collection of funds for road maintenance. The RFA was able to build reserves, which were used for a loan to government for construction works. An amendment of the RFA Act is being prepared to allow an extension of the mandate.

Addressing future challenges: As the revenues from fuel levies are likely to decrease, the RFA is starting to explore the charging of electric vehicles and alternatively fuelled vehicles (e.g. hydrogen). Innovation and automation are key principles guiding this exploration.

11. POLAND

11.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Polish road system comprises of roads with a total length of 424 563.9 km (as at the end of 2018 - source Central Statistical Office).

According to the Act on public roads, roads are divided into four categories:

- national roads (19,403.1 km),
- regional roads (28,924.4 km),
- district roads (12,4572.4 km),
- local roads (251,664 km).

Regional roads, district roads and local roads are managed by local government units and constitute over 95% of public roads in Poland.

National roads are managed by the General Director for National Roads and Motorway (GDDKiA), which is the central administration authority for issues related to the national road system. The General Director performs its tasks with the support of the General Directorate for National Roads and Motorways.

Currently, the national road network in Poland includes 4,146.5 km of express roads, including 1,693.8 km of motorways.

Currently 95 investments are being performed, which covers road sections with a total length of 1,178 km.

19 tender procedures are underway for the construction of roads with a total length of 228.3 km.

135 tasks are under preparation that cover the implementation of roads with a total length of 7,717.3 km.

According to plans in force in September 2019, the planned expressway network will ultimately count around 8,177 km, including approximately 2,100 km of motorways and approximately 6,077 km of express roads.

Sources of financing public roads in Poland:

- budget funds,
- resources from EU funds (Cohesion Fund and structural funds)
- National Road Fund (NRF) (It's an earmarked fund, managed by Bank Gospodarstwa Krajowego – BGK, that supports the implementation of the government's Road and Motorway Construction Program in Poland by accumulating funds for the preparation, construction, reconstruction, renovation, maintenance and protection of motorways and expressways, as well as other national roads)

The NRF's main financial sources are:

- steady revenues from the fuel surcharge,
- payments made by toll motorways operators,
- revenues from tolls for motorways
- fees and penalties collected under the Road Transport Act and the Public Roads Act.

- funds from loans taken by BGK for NRF and inflows from the issue of bonds carried out by BGK for NFR,
- funds collected by GDDKiA for: paid access to real estate acquired for the purpose of road construction (Travelers Service Area), retention of the bid security deposit with interest, retention together with interest of the security on due performance of the contract, contractual penalties.

11.2. CASE: NIEPOŁOMICE JUNCTION ALONG THE A4 MOTORWAY

Location of investment: Malopolska Voivodeship

Financing years: 2015 - 2019

Works years: 2018 – 2019

Investment scope:

Expansion of the motorway by building on and off lanes on the section A4 Krakow - Tarnow from km 435.370 to km 436.069

Construction of the slip road of the motorway node WB (partly collision-free),

Construction of two medium-type single-lane roundabouts at the intersection of the junction with the provincial road.

Investment purpose:

Niepołomice junction, located at the intersection of the A4 motorway and the regional road DW964, opens access to the directly adjacent towns to the highway and also to more distant places, which are large clusters of buildings and population. Directly in the vicinity of the proposed node are the towns of Wieliczka, Niepołomice. In Wieliczka, which is a tourist town, there are grade A monuments (salt mine). An economic zone is located in Niepołomice, in which many companies and producers from various industries established their headquarters, among others: MAN, Coca Cola, Nidec Motors & Actuators, Woodward Governor, Royal Canin, Food Care, Meiller Kipper.

Entering the highway in the new node creates convenient access to the economic zone and gives the opportunity to handle the traffic it generates more efficiently.

In addition, the Niepołomice node limits transit traffic from the Targowisko node to the economic zone through the Niepołomicka Forest designated as a Natura 2000 site and numerous towns located on the regional road DW964. The location of the node is conducive to the development of the Industrial Zone, which currently employs approximately 4,500 people, and ultimately will employ 8,000.

This investment is important not only as an element of the national road network but it also contributes to the development of adjacent areas, in particular the Niepołomice Commune, and fulfils the environmental objectives of the Małopolska Voivodeship (relieves the area of the Niepołomice Forest).

In order to implement this investment, a cooperation agreement was concluded between three entities: the State Treasury represented by the General Director of National Roads and Motorways, as well as local government units - the Malopolska Voivodship and the Niepołomice Commune.

The agreement defines the scope of the parties' obligations in connection with the task and the principles of the parties' participation in the costs of the task.

Sources of financing: local government funds, state budget funds

Total investment cost: PLN 48million / EUR 10.7 million, including the value of construction works: PLN 42 million / EUR 9 million

Under this executed agreement, the investor of the task was the Commune, GDDKiA acted as a substitute investor in the scope of conducting the procurement procedure for the implementation of works.

The Commune is responsible for the substantive and financial aspect of the works contract. The Malopolska Voivodeship and GDDKiA participate in the cost of works based on submitted debit notes.

The junction and associated infrastructure is the property of the State Treasury and requires year-round maintenance, which will be financed from the administrator's current funds from the budget in the amount of PLN 140,000 /EUR 31,164 per year.

Cost sharing:

- State Treasury - General Director of National Roads and Motorways: 57.5%
- Małopolska Voivodship: 14.6%
- Niepołomice commune: 27.9%.

11.2.1. Pro-Cons analysis

Pros

- the investment made it possible to achieve the socio-economic objectives of the Malopolska Voivodship and the Niepołomice Commune, it will contribute to a more dynamic economic development of the adjacent areas, creating additional jobs;
- involvement of the local government in the preparatory process and implementation of the investment streamlines operations, especially at the stage of public consultations;

Cons

- The need of cooperation between three entities requires coordination of activities and proper flow of information. It may affect the task's timeliness. However, no such situations were noted on this task.

11.3. CASE: CONSTRUCTION OF THE S7 ROAD ON THE LUBIEŃ - RABKA SECTION

- Location of investment: Malopolska Voivodeship
- Financing years: 2007 - 2023
- Works years: 2016 – 2021
- Investment scope:
    - Construction of the S7 express road between Lubien and Rabka Zdroj over a length of 15.83 km;
    - Construction of a new section of national road no. 47 on the section Rabka-Zdrój - Chabówka 0.877 km long;

- Construction of a double-tube tunnel with a length of 2,058 m with emergency transitions between tubes, two portals and full infrastructure with technical equipment;
- Construction of two road junctions connecting the S7 express road along national roads;
- Construction of 28 engineering structures with a total length of approximately 5,945 m;
- Construction of the Expressway Maintenance Facility and Tunnel Service Point;
- Construction at three locations of Passenger Service Facilities;
- Construction of accompanying devices.

Investment purpose:

The purpose of the investment is to improve traffic on the national road No. 7 and 47 on the section Kraków - Rabka Zdrój - Zakopane, increase the capacity of the road section, improve the safety of users and driving comfort. In the area, the existing national road No. 7 is the most important element of the communication system on the section Lubień - Rabka Zdrój - Chyżne - the state border. It acts as a north-south transit route (E7) and leads to the only passage for TIRs in Malopolska. In addition to transit traffic, it supports the main tourist routes to Orava and Podhale, as well as local traffic.

Road No. 7 Warsaw - Krakow - Chyzne, on the section Lubień - Rabka Zdroj is characterized by very heavy traffic (according to the General Traffic Measurement of 2015, the average daily traffic is 16,117 to 17,166 vehicles / day). This traffic increases significantly during the summer season, winter holidays and weekends.

Way of completing the task:

The investment has been divided into three implementation sections:

- Construction of the S7 express road Kraków - Rabka Zdroj on the Lubien-Naprawa section;
- Construction of the S7 express road Kraków - Rabka Zdroj on the section Naprawa - Skomielna Biała together with the construction of a tunnel;
- Construction of the S7 express road Kraków - Rabka Zdroj on the Skomielna Biała - Chabowka section and construction of a new section of GP road no. 47 on the section GP Rabka Zdroj - Chaboówka

Separate procurement procedures were conducted for each task, under which three contracts were signed with three different contractors.

Sources of financing:

This task is a project co-financed from EU funds under the Cohesion Fund (under the Operational Programme Infrastructure and Environment) financed and included in the EU 2014-2020 financial perspective.

It is also co-financed by the MFIs (International Financial Institutions) - in this case from the European Investment Bank (EIB), i.e. from a loan. The national source of funds is the National Road Fund (KFD). At the preparatory stage, the task was also funded from the state budget.

Total investment amounting to PLN 2.535 billion / EUR 564 million has been financed from the following sources:

- the EU Cohesion Fund: PLN 1.3 billion / EUR 294 million
- loan from the European Investment Bank: PLN 751 million / EUR 167 million

- the National Road Fund: PLN 409 million / EUR 91 million
- the State Treasury: PLN 52 million/ EUR 12 million

11.3.1. Pro-Cons analysis

Pros

- Increasing access to the TEN-T trans-European corridor and improving the quality of internal transport links
- Obtaining funds from external sources (loan from the European Investment Bank) granted for the implementation of the investment
- The division of investments into 3 implementation sections gave rise to a diversification of risks (three separate Contractors), more efficient implementation (it is easier to manage a smaller section)
- Separation of the tunnel section from the others resulted in increased competitiveness in other tasks
- This method of investment implementation and its financing is also successfully used on other investments

Cons

- Greater personal commitment on the part of the contracting authority (three implementation sections),

11.4. CASE: DBFM OF EXPRESSWAY N. S6, BYPASS OF „METROPOLIA TRÓJMIEJSKA"

- **Project/programme/infrastructure name** - DBFM of Expressway n. S6, bypass of „Metropolia Trójmiejska" (Metropolitan Area of Gdańsk, Gdnia, Sopot). Project is meant to be launched in May this year.
- **Jurisdiction and country** - Poland. Awarding procedure will be held under polish PPP act and other applicable laws, especially Public Procurement Law, in terms of awarding procedures, in line with competition rules. Specific procedure for awarding the contract will be a competitive dialogue, provided for in the Polish Public Procurement Law Act, implementing EU Directive 2014/24/UE.
- **Brief project description** - A subject matter of the contract is the design, financing, construction and long-term maintenance of the S6 express road Słupsk - Gdańsk on the section of the Tri-City Ring Road, together with engineering facilities, accompanying infrastructure and traffic safety devices.

The planned road is located in the north-eastern area of the Pomeranian Voivodeship, Poland. The length of the two-lane expressway section is about 30.7 km. The Project also envisages the construction of the Żuków Bypass of about 6.8 km.

- **Public sector project sponsors** - National Treasury through the National Road Agency (GDDKiA)
- **Private partners (if applicable) -** To be awarded.
- **Cost of infrastructure construction (in local currency and, if possible, euros) -** Confidential, due to project phase.
- **Period of construction (start date and end date) -** 2023 – 2025, if the PPP contract will be concluded in 2021.

- **Annual O&M costs/km (or miles) (in local currency and, if possible, euros) -** Confidential, due to project phase.
- **Duration of the contract (if concession, PPP, etc) -** 30 years, subject to changes during competitive dialogue.
- **Source of project funding (toll revenue, shadow tolls, availability payments, milestone payments, etc.) -** availability payments
- **Structure of the project (spv, commercial contract, with banks, sponsors, public bodies, etc**) - PPP agreement with economic operator selected in competitive dialogue. Legal structure of economic operator is not restricted – consortia and SPVs are allowed.
- **Sources of financing (private bank, bond market, public sector financing agency, multilateral lender, equity, etc.) and key terms for each** - The private partner will be responsible for obtaining financing for the project. The financing structure arises from the share of private partner's equity, commercial banks as well as the EIB and EBRD. The assumed division of financing is:
    - 20-30% equity;
    - 70-80% (financial sector, including about 50% EIB, and the other 50% EBRD and commercial banks).
- **Key elements of risk sharing -** Sharing of key risks: 1) design and construction risk - private partner**,** 2) accessibility risk - private partner**;** 3) demand risk - public partner**.** In addition, it is assumed that the risk of inflation lies with the public partner, the currency of the project will be PLN, therefore there will be no exchange rate risk. No State Treasury guarantee is foreseen for the obligations of the Private Partner towards financing institutions.
- **Some additional information on different mechanisms which enabled the project/programme implementation (new construction or renovation)** - GDDKiA has made efforts to obtain the so-called "Booking" EIB funds for the project. In January 2020, an EIB mission was held at the GDDKiA Branch in Gdańsk. In April this year the project was approved by the EIB Board and the final decision of the Board of Directors should be taken in May this year.

11.4.1. Pro-Cons analysis

Pros

- long-time distribution of financing, whereas a rapid investment process of constructing new motorways in Poland is in progress and needs a direct financing,
- construction of a new express road without public funds, by the time of commencing operation.

Cons

- compared to the a traditional system, a much higher cumulative investment cost (over the life cycle of the project), taking into account, apart from investment and maintenance costs, the cost of external financing;
- a long and complicated procedure for the preparation and implementation of a PPP contract in terms of lack of applicable experience, many stakeholders (both on the public and private side). Moreover, GDDKiA experience in the implementation of concession contracts dates back 12-15 years, thus it does not comply with current conditions.

12. ROMANIA

12.1. BACKGROUND ON FUNDING IN THE COUNTRY

Romanian National Company of Road Infrastructure Administration ("C.N.A.I.R.") is the government company responsible for the financing, development, improvement, maintenance, and management of the national road network, which currently comprises 849 km of motorways and 86,234 km public roads which has been described as Romania's largest infrastructural asset with a notional value of RON 6,895 million RON / EUR 1,414 million.

During such times, after recovering from an economic crisis and which, from an economic standpoint, are more volatile than dynamic, a strategical geographical, political and military placement is crucial for Romania's future. This strength of positioning, a latent opportunity which is unfortunately shaped only in times of political crisis in the region, can only be capitalized on by creating a unified transport network that would connect all the major cities with the neighboring countries and first and foremost with the Port of Constanta. Territorial cohesion should ensure the harmonious development of regions, enable citizens to exploit the potential of the territory in the simplest way, to turn this diversity into an asset that contributes to the sustainable development of the entire territory and, above all, to complement and strengthen economic and social cohesion. Thusly, territorial cohesion policies should seek to reduce the differences in development between the geographical regions, between urban and rural areas, between downtown and outskirts, as well as to prevent the increase of territorial discrepancies. The completion of the national road infrastructure as a unified network can be achieved in record time only by implementing public-private partnership projects, as this is an efficient method already tested in other developed countries which have shaped and adopted out of necessity the principles of contracting and financing.

A PPP project for infrastructure development is the success method implemented in other countries, aimed at creating a unified network of highways and E-roads in a timely manner and create efficient transport for Romania, developing the national economy through punctual access to fuel resources in minimum amounts of time. PPPs are mechanisms for implementing projects aimed at building infrastructure (including modernization or expansion) and/or providing services which are generally defined by the mutual understanding and risk-taking by a public and a private party.

The PPP project is a complex customized concept, developed on a model that interrelates the economic, financial, technical and legal framework.

Any project where the investment (or a part thereof) benefits from the contribution of the private sector and where there is an agreement regulating the relations between the public and private sectors in terms of risk allocation for the provision of infrastructure and / or services can be defined as a PPP project. The level of PPP complexity will differ depending on the sector, type of project or country, depending on the risk prevention mechanisms and the use of project financing for project payments. The participation of the private sector in the provision of public goods and services implies that, regardless of the contractual arrangement between the two parties, the adequate return on investment - strictly from a financial perspective - must be able to materialize.

An important advantage is the implementation of large-scale projects, managed and self-sustaining over the decades, which cannot be achieved using traditional methods. The experience and

competitiveness of the private partner will leave their mark on the entire project design, execution and management process.

The mechanism of the PPP is defined by the following elements: cooperation between the public partner and the private partner, a long-term agreement, mixed financing, achievement of the common goal and equal distribution of risks.

12.2. FINANCING OF A SINGLE PROJECT OR ROAD INFRASTRUCTURE CONSIDERED TO BE A BEST PRACTICE

In this chapter, we developed two simple scenarios which will demonstrate the optimal option that can be adopted in Romania: the PPP tax or Taxes on fuel.

Prioritizing public infrastructure projects for an optimal allocation of limited financial resources is a sensitive and complex issue. Setting aside the political component that such decisions inevitably have, when conducting an analysis for prioritizing projects, it is generally done by treating projects separately and independently, following models based on cost-benefit analysis (ACB) (Grecu, 2013).

Scenario I

The implementation of infrastructure projects in PPP often leads to the collection of duties with the help of stations equipped with barriers, video cameras, text message payments or toll passes applied to the windshield. This leads to a significant redistribution of traffic on national roads.

The real results will be reflected both in the dissatisfaction of the traffic participants on the targeted highways due to the toll and the financial implications due to the maintenance necessary for the excessive exploitation resulting from the redistribution of traffic.

According to C.N.A.I.R.in the national road tax version, the traffic on the new highway segment will be 66.7% of the traffic achieved if the drivers wouldn't have to pay the national road tax" (Cozmei, 2014).

The state's second solution is collecting a highway toll on all segments, including those built from EU funding or state budget sources, where the concessionaire is only responsible for maintenance. The state undertakes to pay annually to the concessionaires, through availability payments, a minimum amount from which they repay the money borrowed from the banks and will achieve their estimated profits. "If there are no highway concession projects, the banks stop their payments unless the state undertakes the traffic risk", the CNADNR interim general manager stated (Cireașă, 2013).

Scenario II

The second option involves avoiding the implementation of infrastructure projects developed in PPP by adopting a new excise tax of 7 eurocents on fuel.

This scenario will not only lead to compliance with the forecasts for traffic assimilation on highways, but will exceed them by the simple fact that moving between two destinations on a highway will save fuel and automatically the excise will be felt even less as consumption by the percentage of kilometers traveled on the highway out of the total trips made by a traffic participant will be higher. Thus, this will be not only a continuous and sustained method of funding, but the desire for fuel economy will be subtly insinuated into the true meanings for participation in highway traffic: increased safety and average speed.

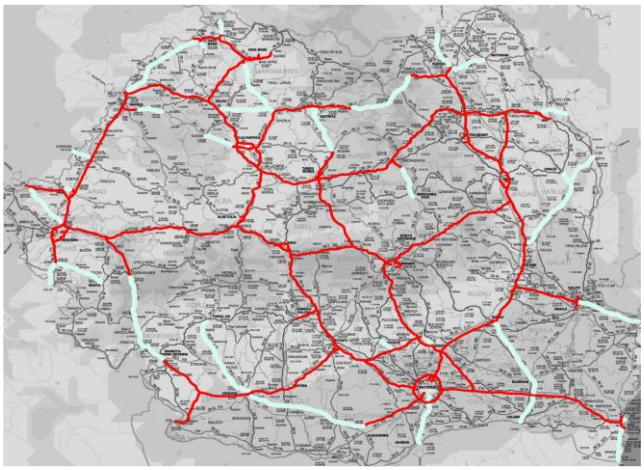

Figure 4: The road network in Romania

FINANCIAL AND TRAFFIC FORECASTS

The following financial and traffic forecasts are compared in two different tables because two different types of PPP contracts were considered:

- The tax is transferred directly to the state budget;
- Only half of the tax is transferred to the state and the other half is paid to the concessionaire.

General hypotheses

The calculation hypotheses are theoretical, and the data is estimated for each individual scenario but accurately reflect by comparison the differences resulting from the adoption of different systems for the implementation of infrastructure projects. A calculation period of 20 years was used, an average period for a PPP project. According to the data from the general census on road traffic, a national annual average of 6,046,377 vehicles was estimated for 2010 and a traffic of 20,000 vehicles was estimated on 8 existing and future segments of highway, leading to an national annual average of 160,000 vehicles. The excise duty is calculated at RON 0.315 / EUR 0.07 and the consumption index represents the average consumption of 7.5 liters per kilometer multiplied by 10 kilometers for the estimated average distance traveled daily by each vehicle on the national road network. The toll for highway access was calculated at RON 7 / EUR 1.4, the amount recently proposed for the Comarnic-Brașov highway segment. The annual daily averages will be multiplied by 365 days corresponding to a calendar year. Forecasts for situations when the PPP tax is fully assimilated by the state budget

YEAR	NATIONAL MZA	MZA HIGHWAYS	EXCISE	INDICA-TOR	TAX	EXCISE REVENU	PPP REVENU	DIFFERENCE
2010	6046377	160000	0,315	0,750	7.000	521.386.647	408.800.000	112.586.647
2015	6439392	170400	0,332	0,791	7.385	618.036.937	459.317.460	158.719.477
2016	6857952	181476	0,351	0,835	7,791	732.603.448	516.077.615	216.525.833
2017	7303719	193272	0,370	0,881	8,220	868407.339	579.851.906	288.555.433
2018	7778461	205835	0,390	0,929	8,672	1.029.385.419	651.507.106	377.878.313
2019	8284050	219214	0,412	0,980	9,149	1.220.204.267	732.017.D96	488.187.171
2020	8822524	233463	0,434	1,034	9,652	1.446.395.515	822.476.109	623.919.406
2021	9395989	248638	0,458	1,091	10,183	1.714.516.202	924.113.594	790.402.608
2022	10006728	264799	0,483	1,151	10,743	2.032.338.856	1.038.310.932	994.D27.925
2023	10657165	282011	0,510	1,214	11,334	2.409.076.813	1.166.620.2D5	1.242.456.608
2024	11349881	300342	0,538	1,281	11,957	2.855.651.296	1.310.785.297	1.544.865.999
2025	12087623	319864	0,568	1,352	12,615	3.385.008.017	1.472.765.590	1.912.242.428
2026	12873319	340655	0,599	1,426	13,308	4.012.492.454	1.654.762.598	2.357.729.857
2027	13710D84	362798	0,632	1,504	14,040	4.756.294.701	1.859.249.886	2.897.044.815
2028	14601240	386380	0,667	1,587	14,813	5.637.976.778	2.089.006.690	3.548.970.088
2029	15550320	411495	0,703	1,674	15,627	6.683.097.696	2.347.155.692	4.335.942.004
2030	16561091	438242	0,742	1,766	16,487	7.921.954.375	2.637.205.457	5.284.748.919
TOTAL	**178325924**	**4718883**				**47.844.826.761**	**20.670.023.232**	**27.174.803.529**

Table 4: The evolution of the contribution for the two scenarios when the PPP tax is transferred entirely to the state budget

In Table 4 above, the annual daily average of 6,046,377 multiplied by the excise duty of RON 0.315 / EUR 0.07 EUR and corrected by the consumption index per 10 kilometers (estimated average daily travel distance) gives us, by multiplying by 365 days, the national mobility in a continuous income of approximately RON 521 million / EUR 107 million for 2010. This income almost doubles every 5 years due to the increase in traffic flows, the allocation of the 5.5% discount rate of investment and inflation. The total income from excises at the end of the 20 years from the perspective period will amount to RON 48 billion / EUR 9.8billion.

Considering that the tax will be paid in full to the state budget, the annual daily average for highways estimated at 160,000 vehicles has multiplied by the RON 7 / EUR 1.4 tax estimated as a

tax to be considered by the Romanian Government. This income almost doubles every 7 years due to the increase in traffic flows, the allocation of the 5.5% discount rate of investment and inflation. The total income from PPP taxes at the end of the 20 years from the perspective period will amount to RON 20.7billion / EUR 4.2billion.

The total difference between the total revenues obtained by implementing the two different scenarios will be RON 27 billion / EUR 5.6 billion, a difference that represents 131.47% compared to the total value of revenues obtained through the PPP tax.

FINANCIAL AND TRAFFIC FORECASTS

Forecasts for situations when the PPP tax is partially assimilated by the state budget.

*MZA: annual daily average

YEAR	NATIONAL MZA	MZA HIGHWAYS	EXCISE	INDICATOR	TAX	EXCISE REVENUE	PPP REVENU	DIFFERENCE
2010	6046377	160000	0,315	0,750	3,500	521.386.647	204.400.000	316.986.647
2015	6439392	170400	0,332	0,791	3,693	618.036.937	229.658.730	399.379.207
2016	6857952	181476	0,351	0,835	3,996	732.603.448	258.038.808	474.564.640
2017	73D3719	193272	0,370	0,881	4,110	868.407.339	289.925.953	578.481.386
2018	7778461	205835	0,390	0,929	4,336	1.029.385.419	325.753.553	703.631.866
2019	8284060	219214	0,412	0,980	4,574	1.220.204.267	366.009.549	854.195.719
2020	8822524	233463	0,434	1,034	4,826	1.446.395.515	411.238.055	1.035.157.460
2021	9395989	248638	0,458	1,091	5,091	1.714.516.2D2	462.056.797	1.252.459.405
2022	100067213	264799	0,483	1,151	5,371	2.032.338.855	519.155.466	1.513.183.391
2023	10657165	282011	0,510	1,214	5,667	2.409.076.813	583.310.102	1.825.766.710
2024	11349881	300342	0,538	1,281	5,979	2.855.651.296	655.392.648	2.200.258.648
2025	12087623	319864	0,568	1,352	6,307	3.385.008.017	736.382.795	2.648.625.222
2026	12873319	340655	0,599	1,426	6,654	4.012.492.454	827.381.299	3.185.111.155
2027	13710084	362798	0,632	1,504	7,020	4.756.294.701	929.624.943	3.826.669.758
2028	1460124D	38638D	0,667	1,587	7,406	5.637.976.778	1.044.503.345	4.593.473.433
2029	1555032D	411495	0,703	1,674	7,814	5.583.097.696	1.173.577.845	5.509.519.85D
2030		438242	0,742	1,766	8,243	7.921.954.375	1.318.602.728	6.603.351.647
TOTAL 178325924	**178325924**	**4718883**				**47.944.826.761**	**10.335.011.616**	**37.509.815.145**

Table 5: The evolution of the contribution for the two scenarios when the PPP tax is partially transferred to the state budget

In Table 5 above, the annual daily average of 6,046,377 multiplied by the excise duty of RON 0.315 RON / EUR 0.07 and corrected by the consumption index per 10 kilometers (estimated average daily travel distance) gives us, by multiplying by 365 days, the national mobility in a continuous income

of approximately RON 521 million EUR 107 million for 2010. This income almost doubles every 5 years due to the increase in traffic flows, the allocation of the 5.5% discount rate of investment and inflation. The total income from excises at the end of the 20 years from the perspective period will amount to RON 48 billion / EUR 9.8 billion.

Considering that the tax will be paid partially (50%) to the state budget, the annual daily average for highways estimated at 160,000 vehicles has multiplied by the RON 3.5 / EUR 0.07 tax estimated as a tax to be considered by the author. This income almost doubles every 7 years due to the increase in traffic flows, the allocation of the 5.5% discount rate of investment and inflation. The total income from PPP taxes at the end of the 20 years from the perspective period will amount to RON 10billion / EUR 2 billion.

The total difference between the total revenues obtained by implementing the two different scenarios will be RON 37.5 billion / EUR 7.7 billion, a difference that represents 362.94% compared to the total value of revenues obtained through the PPP tax.

As an example, following the simple methodology presented, we can refer to the future Comarnic-Brașov highway valued at an execution cost of EUR 1.8 billion where we have an national annual average of 38,000 vehicles (until 2045) for a 29 years concession and a EUR 1.55 toll per vehicle. According to the following calculation necessary for finding the national annual average solution necessary for the durability and sustainability of the project, we arrive at an unrealistic estimate in relation to the traffic in Romania:

$$\frac{EUR\ 1{,}800{,}000{,}000}{29\ years * 365\ days * EUR\ 1.55} = 110{,}000\ vehicles$$

12.2.1. Pro-Cons analysis

Pros

The successful use the public-private partnership mechanism requires us to identify the problems that could arise in the implementation of road infrastructure projects through PPPs and to amend the legislative framework accordingly. Adapting and using models that have already proven successful and have been accepted by the market will significantly increase the interest and confidence of potential bidders and investors. It can be noted that in recent years there has been a convergent trend between the various types of PPP contracts for highways. Therefore, the use of a model familiar to the market will increase the probability of success and reduce the costs of preparing and implementing these projects.

The detailed regulation of the exceptional measures in which the public-private partnership contract can be terminated is all the more necessary as in this situation the private partner will be entitled to receive compensation if this termination causes him any damages. In order to attract investors, it is necessary for Romania to have a predictable legal framework in this matter, so that the legal framework applicable to the public-private partnership is known from the beginning. Or, such a provision that does not transparently regulate the aspects that can lead to the unilateral termination of the contract leaves room for arbitrariness and a wide margin of action to the public partner in the development of possible public-private partnership contracts, which can affect the investment climate (R.M., 2014).

Cons

We are assuming that Romania will implement a hybrid system. The concessionaire will propose a fee, the state will approve it and collect the money. The concessionaire will receive availability payments, thus called because their level is conditioned by the availability proportion of the highway. The improper maintenance of the highway will result in the reduction of the payments. Outside this situation, the private partner will have no other risks. This condition makes the project attractive for funding from banking institutions. The Romanian system presents the risk of mandatory payments to concessionaires in higher amounts than those collected by the state from the highway tax. In this case, the difference increases the budget deficit. To avoid this risk, the Government has proposed two other solutions - either taxing drivers on already finished segments of the highway, or increasing the excise duty on fuels (Cireașă, 2013).

Among the most important real disadvantages are the increased complexity for preparation-contracting and the long-term pressures exerted on the general consolidated budget.

Under the current conditions of mediocre traffic on the main roads (future highways) and the financial reflexes of the country's citizens, the adoption of the PPP system can become a short-term trap and could be extremely harmful in the medium and long term. Revenues from tolls levied on highways will not be fully transferred to the state budget, only partially and insufficiently. In response to the national annual average requirement for the sustainability of a PPP project, from the tables presented above we can see how by applying the excise duty on fuel in the first 8 years, more than 1.8 billion euros is collected, which for example is the amount needed to complete the Comarnic-Brașov highway through a realistic, demanding and safe scenario.

13. RUSSIAN FEDERATION

13.1. BACKGROUND ON FUNDING IN THE COUNTRY

The total length of the Russian highway network is about one million kilometres, of which 7 thousand of highways managed by the Russian Highways State Company (Avtodor).

Highways are tolled and those incomes, added to public grants, finance their maintenance and new constructions.

As a developing nation, Russia wishes to encourage steady economic growth. Public-private partnerships (PPP) can be both a direct and indirect player in this process. PPPs in Russia are considered a solution for many economic problems, the most critical of which being the poor state of transport infrastructure.

Despite recent positive trends registered in some sectors, the existing public infrastructure does not fully satisfy the needs of Russia's development, especially because of a limited number of roads and their unsatisfactory conditions.

One of the biggest obstacles to being competitive on the international market is the incompatibility of the transport system with foreign trade needs. Today, transit through Russia`s territory represents less than 1% of trade between European and Asian countries, which means that only 5–7% of its transit potential is used.

Due to the uncertain global economic situation, volatile oil prices and economic sanctions against Russia, public expenditure on infrastructure will be limited, because current social obligations are the priority for the Russian government. The deficit of federal and regional budgets, and reduction of intergovernmental transfers, creates a need to identify additional, non-budgetary financing opportunities and attract the private investments that can be provided by PPPs.

An important factor of Russia`s economic recovery is the gradual de-monopolisation of public services in various sectors. PPPs may play a significant role here, as the private sector gives its contribution in terms of professional experience, efficient management skills, flexibility and effectiveness in decision-making processes, and the ability to innovate.

Initially, Russian legislation on PPP at the federal level consisted only of the Federal Law No. 115-FZ "Concession Agreements" (Russian Law on Concessions) dated 21 July 2005, with only one of the numerous PPP models regulated — the concession. The concessionaire constructs and/or reconstructs and operates at its own expense, while the grantor agrees to provide the same with rights of use of the resulting facility.

The object of the concession can involve public roads; railways; sea and river ports and ships; airfields and airports; waterworks; thermal power plants; public-utility infrastructure systems; metro and public transport systems; healthcare, educational, cultural, sports, and tourism facilities.

However, these assets always remain in the ownership of the grantor and cannot become the property of the concessionaire. The length of concession is established with respect to the term of creation of the facility, investment amount and its payback period, as well as other factors. The fee paid by the concessionaire to the grantor is mandatory.

Foreign companies can participate in Russian concessions as concessionaires. It is important that concession agreements are concluded in accordance with the model agreements approved by the

Russian government. Currently, 13 model agreements with respect to different objects are approved.

A striking feature of the PPP regulatory environment is the fact that, in addition to federal legislation, there is also regional PPP legislation.

Recently these differences have been overcome. On 1 July 2015, after many years of elaboration, the Federal Law No. 224-FZ "On Public-Private Partnership and Municipal-Private Partnership in the Russia" (Russian PPP Law) was adopted.

The Russian PPP Law defines a PPP as a cooperation between the public partner and private partner legally formalised for a certain period, and based on the pooling of resources and risk allocation. This is implemented based on the respective PPP agreement, to attract private investments to the economy, make goods, works and services available, and improve their quality. This definition of a PPP generally corresponds to the common approach to PPPs recognised in major international acts and specialised literature. The Russian PPP Law introduces concepts and terms that were previously absent in the Russian legislation (sponsor, direct agreement, comparative advantage, etc). The Russian PPP Law introduces the Value for Money concept, which is an assessment procedure widespread throughout the world. An interesting feature of the Russian PPP Law is the possibility of concluding joint PPP agreements involving several public partners. Other important provisions of the PPP Law is to guarantee the rights of the private partner: a guarantee ensuring compensation for damages; a guarantee ensuring tariffs for he products and services; a guarantee of the equal and non-discriminatory status of the private partner; a guarantee ensuring the return on investment of the private partner in the case of a change in legislation. For these purposes, the public partner has the right to increase the size of budgetary financing, the term of the PPP agreement, provide the private partner with additional guarantees, etc. The PPP Law establishes an obligation for the public partner to assist the private partner in obtaining permits and/or approvals.

The Russian PPP Law has created a clearer, more stable and uniform legal environment for PPP projects in Russia, reduced legal risks and improved guarantees, and established important procedures and tools for the preparation and implementation of PPP projects. At the same time, the PPP Law contains several shortcomings and legal gaps.

In the road sector, the first PPP projects were assigned or tempted by the Highway State Company (Avtodor) according to the BTO scheme, with large transfer of risks on the concessionaire. The most important example is the BTO contract assigned to North-West Concession Company, which comprises the French company Vinci Concessions and private Russian investors, with the aim to develop on a 30 years basis a specific section of the Moscow - St. Petersburg M11 Highway. The State provided 39% of the construction costs, while the concessionaire covered all the rest during construction and operation through direct tolling.

Due to the problems incurred during the development of the above mentioned greenfield projects, Avtodor tested also a different PPP scheme in the brownfield sector, named "long-term operation agreement", as described in the box below.

13.2. CASE: M4-S4

Anas International Enterprise RUS (AIE RUS) and the Russian Direct Investment Fund (RDIF) invested in the re-construction of the federal M-4 "Don" federal highway from Moscow to Novorossiysk, on the Section 4 between Rostov/Don and Krasnodar (section km 1,091.6 - km 1,319), through the SPV called Road Investment Company (RIC).

The Russian Direct Investment Fund (RDIF) was established in 2011 to make equity co-investments, primarily in Russia, alongside reputable international financial and strategic investors. RDIF, fully owned by Russian Government, acts as a catalyst for direct investment in the Russian economy. Several RDIF's international partners, including leading Middle Eastern funds, invested in this project alongside RDIF.

Anas International Enterprise RUS (AIE RUS) was established in 2017 to implement in Russian Federation and neighbouring countries the international strategy of the ANAS Group (Italian Road Agency fully owned by the Italian Government). AIE RUS acts as the holding company with the aim to invest on dedicated SPVs and transfer the Italian know-how in the road O&M sector. AIE RUS is also owned by SIMEST, which belongs to Cassa Depositi e Prestiti Group (Italian Investment Bank controlled by the Italian Government).

RIC signed with Avtodor a long-term operation agreement aimed at implementing for 13 years the following:

- Creation of junctions and overpasses/underpasses;
- Installation of barriers and lightning;
- Installation of traffic control system and tolling facilities;
- Reconstruction and upgrading works;
- Maintenance, repair, surveillance and operation.

According to the agreement until 31 December 2030, the total cost of the civil and technologic improvements will amount to around RUB 7 billion (about EUR 100 million). The works started at the end of 2017 and were completed in 18 months, when the last toll gate was inaugurated and RIC started the second phase of the project, acting as the operator. Based on this role, RIC must maintain the infrastructure, ensure the service for users, operate the automated traffic control system and the toll collection systems (both manually and through transponders). Furthermore, RIC started the collection of toll fees on behalf of Avtodor, according to the fees defined at State level. Currently, the fees range from RUB 1.8 /km / EUR 0.03 /km for light vehicles to RUB 7 /km / EUR 0.1 /km for heavy vehicles, during day time with manual collection (Avtodor introduced lower tariffs during night time and using the transponder device consenting to save up to 50%).

The civil and technological improvement works were 55% financed directly by the State, through Avtodor, as a grant. The remaining 45% were financed by RIC according to the following funding mechanism: 75% as senior loan and 25% as equity provided by the shareholders.

The part financed by RIC will be reimbursed by Avtodor until 2030 through regular "investment payments" upon conclusion and approval of the works, providing for the refund of the capital and its remuneration net of inflation.

The equity was provided by the shareholders in terms of SPV share capital and shareholder loan, while the senior loan was negotiated on the Russian market among the most important banks of the country. The financial closing was reached based on:

- A loan agreement between the selected Bank and RIC, aimed at providing the necessary financial means with a market lending rate guaranteed by the "investment payments";
- A pledge agreement between the selected Bank and the shareholders, aimed at pledging the shares of RIC and project remuneration in favour of the Bank until 2030;
- A direct agreement between the selected Bank and Avtodor, aimed at committing Avtodor to provide the "investment payments" to the Bank even in case of execution of the long-term operation agreement or RIC bankruptcy.

It is important to note that the senior loan was provided on a "project financing basis", without any recourse mechanism on the shareholders.

The operation and maintenance services will be paid by Avtodor until 2030 through regular "operation payments". Such availability payment, even if funded through the toll collection, are not linked to the level of traffic. The operation payments (approx. RUB 4 billion per year, i.e. about EUR 60 millions per year) can be considered as fixed, although the instalments are subject to verification by Avtodor of the level of service provided by RIC and annually adjusted, to the actual road condition.

13.2.1. Pro-Cons analysis

Pros

- Public grant up to 55% of the investment costs, this improves the financial structure of the contractor and keeps the cost of the senior loan down;
- Private investment remuneration based on road KPI;
- Financial regulatory framework able to provide the necessary loans without recourse on the private investors;

Cons

- Concession regulatory framework to be further implemented to increase transparency;
- Maintenance level to be officially stated in a dedicated manual;
- High volatility of the exchange rate and absence of compensation mechanism.

14. SLOVAKIA

14.1. BACKGROUND ON FUNDING IN THE COUNTRY

The road network In Slovak republic up to 1 January 2020 consist of 18,072 km of roads in total, which are divided on motorways (496 km), expressways (271 km), I. class road (3,333 km), II. Class road (3,631 km) and III. Class road (10,340 km). Motorways and expressways in Slovakia are prepared, constructed, operated and maintained mainly by state company called Národná diaľničná spoločnosť (National Motorway Company – NMC), and partly by the private company GRANVIA, a. s. (based on first PPP contracts in the Slovak road sector). Slovenská správa ciest (Slovak Road Administration) is responsible for the construction, operation and maintenance of I. class roads. Likewise, eight self-governing regions are responsible for II. and III. class roads.

There are only two PPP projects in the road sector in Slovakia, managed by the Ministry of Transport of the Slovak Republic. Already in operation is the expressway in Middle Slovakia (R1 PR1BINA), designed, constructed, operated and maintained by consortium GRANVIA. PThe poject consists of an expressway with a total length of 51.6 km (profile R22.5/120) and a total of 831 structures , of which 81 are bridges with a total length of 7 km, 10 intersections, more than 450 engineering network relocations, earthworks in the volume of 5 million m^3, 1,100,000 m^2 of roadways, 127 km of crash barriers and 32 km of noise barriers. The financial closing was carried out in August 2009, the first 4 sections were put into operation in October 2011, and the last part in July 2012. The 880 million EUR represents construction costs and the basic annual fee paid by the Slovak republic to the concessionaire is 125.3 million EUR. The term of contract is 30 years. In the form of a senior loan, the project was originally funded by 13 commercial banks and also by European Bank for Reconstruction and Development. In November 2013, the original funding of the project was replaced by a new one with more favorable conditions. The project was refinanced by issuing project bonds and brought the contracting authority savings to approximately 145 million EUR. The second PPP project, which is still under the construction, is described in part II of this case study.

As of 31 December 2019, the NMC managed a total of 811 km of motorways, expressways and selected sections of I. class roads (499 km of motorways, 229 km of expressways and 83 km of selected sections of I. class roads). Currently there are 786 bridges on the motorways and expressways with a total length of 90 km. There are 7 tunnels in operation, which are longer than 500 m, with a total length of tunnels of 16.9 km.

Total costs of repair and maintenance of NMC motorways and expressways in 2019 amounts to EUR 99.5 million (state budget EUR 15.8 milion, NMC's sources EUR 83.7 million). The total investment costs of NMC in 2019 including costs for the preparation (EUR 71.7 million including land purchases)and construction of motorways and expressways (EUR 414.1 million) as well as other investment expenditures (EUR 35 million) amounted to EUR 520.8 million.

Road infrastructure tolling aims to ensure operability, improve quality, ensure development and improve services on the roads. The scope of the tolling system is the responsibility of the Ministry of Transport of Slovak republic. The level of individual forms of tolls is determined directly by the Slovak Government. Funds obtained from tolls on all motorways, expressways and I. class road in Slovakia are a NMC income. Nowadays, cars in the territory of Slovakia are charged up to 3.5 tons in the form of time tolls (motorway vignettes on motorways and expressways) and trucks over 3.5

tons in the form of power charging (electronic tolls on motorways, expressways and selected sections of I. class roads).

Net toll revenue (EUR 211.2 million in 2019) includes total revenue (EUR 297.6 million in 2019) from the sale of vignettes and electronic toll collection minus the costs of an independent expert, commission costs to the vendor collection and registration service, bank charges, fuel card operating costs and total payments, respectively, the increase in liabilities towards the electronic toll system provider in 2019.

In 2019, the NMC had the following sources of funding:

- grants- state budget and EU funds. Subsidies from the state budget (EUR 237.8 million) were used to finance the preparation and construction of motorways and expressways, as well as to finance the maintenance, preparation and implementation of repairs in motorways and expressways. In 2019, EU funds used by NDS totaled EUR 205.6 million. The vast majority of motorways and expressways constructions is financed through EU funds.
- own resources - electronic tolls, vignettes, other own resources (income from rentals, services rendered, sales of assets and materials, interest income). In 2019, the NMC's own resources were used to repay the principal of the syndicated loan, to repay interest on loans, to finance its own current costs, to finance operating construction and machinery investments that were not covered by the state budget sources. To a lesser extent, to finance the preparation and construction of motorways and expressways.

Fuel levies, vehicle registration and licensing fees, traffic fines, and development impact fees are included in the income of the state budget and are not directly linked to the budget of Ministry of Transport of Slovak republic.

14.2. CASE: BRATISLAVA BYPASS PPP PROJECT MOTORWAY D4 & EXPRESSWAY R7

The second PPP in the Slovak road sector is under construction since 2016, and relates to the southern motorway part of Bratislava (the capital of Slovakia) Bypass and part of the southern expressway network (The Bratislava Bypass PPP project Motorway D4 & Expressway R7), linking the west and the east part of Slovakia. The project is intended to ease traffic congestion in the capital city of Bratislava the D1 motorway across the Port Bridge. The Port Bridge is the busiest road section in Slovakia and more than 100,000 cars pass through it every day.

The concession agreement, awarded through a tender procedure, was signed on 20 May 2016 between the Ministry of Transport of Slovak republic (after approval of Slovak government) and the D4R7 project Concessionaire - consortium Zero Bypass Ltd (consortium consisting of the international companies Cintra, Macquarie Capital and PORR AG). The consortium is responsible for the design, construction, financing and operation of a section of 27 km of the D4 motorway (category D26.5/120 and D33.5/120) around Bratislava, as well as a section of 32 km of the R7 expressway (category R24.5/100). The project consists of 14 interchanges, 122 bridge structures, bridge crossing over the Danube river (the total length of this bridge is 2,935 m).

Construction costs amount to EUR 860 million and annual state availability payment of EUR 52.8 million (the public procurement originally provided for EUR 56.7 million, although after the financial closing on 20 June 2016 the availability payment was reduced), which after 30 years is expected to be EUR 1.76 billion taking into account inflation. On 1 February 2017, the Project Finance

International Magazine (“PFI”) awarded the "PPP Deal of the Year 2016 in Europe" Award to the D4/R7 Project in Slovakia.

The concession covering a period of 30 years shall start on the first day of operations after completion of the first section of the D4/R7 construction works. This is a concession with a risk of availability on the side of the concessionaire, in which the private partner (concessionaire) is entitled to payments for availability under a well-defined payment mechanism. During this period, any potential costs related to constructional defects of the motorway will be borne by the shareholders of the concessionaire. It is in the best interest of the concessionaire to build the motorway according to the highest quality standards specified in the concession contract between the Slovak Republic and the concessionaire.

Operational expenditures of the entire project amount to EUR 4.3 million per year, the Life Cycle Cost of this project amounts to EUR 43.3 million.

The first section (expressway R7) will be open to traffic in the spring 2020, and the last one in 2021. The new road infrastructure will provide increased transport capacity to the Bratislava and the neighboring region, improving connectivity locally and internationally with enhanced safety and more reliable travel time schedules.

14.2.1. Pro-Cons analysis

Pros

In addition to commercial banks, multilateral banks have also decided to invest in this project. These are in particular the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD). The European Investment Bank through the European Fund for Strategic Investments (EFSI) will support the construction of the project with EUR 426 million. For the EIB, this is the first transaction in Slovakia using EFSI resources.

The Slovak Republic participates in EFSI through a Slovak Investment Holding, which has invested in the project in the form of a mezzanine loan. The project concerns funds from the operational programs of the European Union dedicated to Slovakia within the programming period 2014-2020, co-financed from the state budget.

Through its financial instruments, the Slovak Investment Holding provides subordinate funding for the project amounting to EUR 28 million. The use of European Union and EFSI funds in this project has led to a reduction in the availability payment to be paid by the Slovak Republic and can serve as an example of sustainable financing of infrastructure projects in the European Union.

In the next 10 years, EU funds will not be sufficient for the need of the Slovak republic to finish its most important motorway and expressway network. NMC is based on EUROSTAT methodology relating to the public sector, therefore has limited opportunity for loans. Therefore, the new government in Slovakia, established in 2020 suggests to widely use the PPP models.

Cons

Due to the low price of construction works that has allowed the concessionaire to win the tender, the concessionaire was forced to change the project several times, thus reducing the overall quality of the project. The concessionaire was investigated by police for alleged use of poor-quality materials in embankments containing asbestos and plastic waste. One of these embankments must be removed and rebuilt. The design of the project's dominant - the bridge over the Danube River -

has also changed, which has not met the public's understanding not only in terms of aesthetics but also for safety reasons due to the location and the design of the pillars directly placed in the river. One of the consequences of the low price was also the reluctance of subcontractors to participate in the project and the lack of human capacities needed for construction. The concessionaire had to look for workers where it was possible, and this is the reason why, for example, the Transport Company of Bratislava lost part of its drivers and had a problem with dispatching public transport vehicles. For this project, these problems meant postponing the original completion date as early as 2019.

The Environmental Impact Assessment (EIA) process has shown a significant negative impact on protected birds within the Protected Bird Area (part of NATURA 2000) during the implementation and operation of the project. Therefore, the Government of the Slovak Republic has decided in 2014 that the implementation of the project is necessary for urgent reasons of higher public interest.

At the same time, the government imposed an obligation to take compensatory measures to compensate for the adverse environmental impact of the project.

15. SLOVENIA

15.1. BACKGROUND ON FUNDING

In Slovenia there are roughly 39,000 km of public roads; out of these more than 6,500 km are state roads and more than 32,000 km are municipal roads.

Slovenian motorways (MW) and expressways (EW) are all operated by DARS d.d. based on a granted concession. DARS is a company fully owned by the state, conducting business in accordance with the Company`s Act. Other national roads are governed by the Directorate of the Republic of Slovenia for Infrastructure, an entity within the Ministry of Infrastructure.

DARS operates 623 km of MW and EW, 23 km of turn offs, 141 km of link roads as well as 40 km of other roads. The whole network operated by DARS is tolled. In 2019 sources of revenues of DARS were:

- Tolling revenue: EUR 467 million (90 % of total DARS revenues):
    - EUR 195 million from vignettes (time related) tolling/charging system for vehicles up to 3.5 tons;
    - EUR 256 million from distance related tolling system for vehicles weighing over 3.5 tons;
    - EUR 16 million from a cross-border tunnel.
- Other sources (10%): revenue from leases, rents, financial revenue and other operating revenues.

Besides from DARS d.d. own revenues investments are funded from:

- EU funds: In the period 2010 – 2019, 17% of total investments were funded from various EU funds, mainly from the Cohesion fund, which is reserved to EU Member States whose Gross National Income per inhabitant is less than 90 % of the EU average. It aims to reduce economic and social disparities and to promote sustainable development.
- State budget: Funds earmarked for the land acquisition and preliminary spatial and environmental documentation. These funds are in fact generated from payments made by DARS for the superficies rights established to the benefit of DARS for the term of concession.

MARK-UP:

On 13 December 2018, the Government adopted a decision on the introduction of a surcharge on tolls on certain sections of the motorway network. DARS d.d. as a toll road operator was obliged to start calculating the mark-up on 1 January 2019. The collected funds will be earmarked revenue of the budget of the Republic of Slovenia and can be used exclusively for the second track of the Divača – Koper railway line.

The surcharge is charged to all users with a vehicle with a maximum permissible weight exceeding 3.5 tons, driving through the toll sections between Koper and Ljubljana and between Ljubljana and Šentrupert. It is the same for all vehicles, regardless of their EURO emission class. It amounts to 15 percent of the average infrastructure charge on the section from Koper to Ljubljana (including the Ljubljana ring road), and 5 percent on the section from Ljubljana to Šentrupert.

15.2. CASE: DEVELOPMENT OF THE NATIONAL MOTORWAY NETWORK

Based on the Motorway Company in the Republic of Slovenia Act (ZDARS) and in accordance with the Concession Contract, the financing of the national motorway infrastructure is under responsibility of DARS d.d.

At the end of 2010, the ZDARS-1 entered into force, in accordance with which DARS d.d.:

- performs special tasks in relation to spatial planning and integrating motorways into the environment, as well as tasks in relation to acquiring real property for the requirements of motorway construction on behalf of the Republic of Slovenia and for its account;
- constructs motorways on its own behalf and for its own account;
- manages and maintains motorway sections based on granted construction concessions.

By enforcing developmental documents, the state maintains strategic supervision over the development of motorways by determining new sections and deadlines for opening newly built sections to traffic.

The ZDARS-1 lays down the status, tasks and obligations of DARS d.d. and regulates real property relations connected to motorways. Under that Act, DARS d.d. was transformed into a concessionaire that was awarded the right of superficies for the term of the concession, and takes over all financial obligations related to the construction of new motorway sections. The Act further lays down that DARS d.d. continues the construction of motorways and expressways that it had commenced before the enforcement of the ZDARS-1, and continues to manage and maintain the existing motorways and expressways in the Republic of Slovenia. Pursuant to the Public Finance Act, which entered into force in 2012, the right of superficies established to the benefit of DARS d.d. is payable.

Since 2010, when the majority of the National motorway network has been completed and funds from the state budget were no longer available, the development of the Slovenian motorway network has been financed by loans taken by DARS, DARS own sources and EU funds.

Very important long-term financing sources are long term loans from Slovene and foreign banks (EIB), and EU funds like the European cohesion fund. In the past, all the loans DARS took had a state guarantee from the Slovenian government but in recent years the loans that were taken came with the EFSI[5] guarantee.

DARS was granted a concession to operate the Slovenian road network until all debts were repaid in full, limited to 50 years. In last 10 years EUR 1,074 million have been invested into the new and existing motorway network, costs of O&M amount to anywhere from EUR 130,000 to EUR 170,000 per km of motorway per year.

Sources of funds are provided by tolls, which are regulated by the Government in accordance with the “Eurovignette Directive”. For vehicles weighing over 3.5 tons toll is calculated based on the distance traveled, the type of heavy vehicle (R3 vs R4) and the Euro class bracket that the vehicle falls into. From April 2018 the toll collection system is fully electronic, functioning in a free traffic

[5] EFSI is an initiative launched jointly by the EIB Group – the European Investment Bank and European Investment Fund – and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

flow. Vehicles weighing up to 3.5 tons pay a time-related charge dependant on the type of the vehicle (motorbike, personal car or van).

15.2.1. Pro-Cons analysis

Pros

- Tolling provides a stable long-term funding source for motorway development, operation and management as well as for debt servicing. Differentiation of toll for heavy vehicles according to the EURO emission categories also promotes companies and individuals to invest in more eco-friendly vehicles that help decrease pollution;
- The establishment of DARS enables a programme-based financing of road infrastructure;
- State guarantees or EFSI guarantees contribute positively to the distribution of risks between the company and the public sector.

Cons

- Toll tariffs as well as development plans are defined by the Government, whereas sound financial operation is under responsibility of the company.
- All the works and services must be tendered out based on the legislation regulating public procurement, which can sometimes cause delays in project dynamics.

16. SOUTH AFRICA

16.1. BACKGROUND ON FUNDING IN THE COUNTRY

The South African National Roads Agency SOC Ltd (SANRAL) is responsible for the development, improvement, maintenance, and management of the national road network, which currently comprises 22,214 km and has been described as South Africa's largest infrastructural asset with a notional value of R 413 billion (approximately EUR 23 million). The immense economic significance of the national road network can be gauged from just two figures:

- The national road network is not a static system. Its length alters as provincial roads are occasionally incorporated and as new sections of road are developed, usually to accommodate increased traffic flows and improve safety.
- About 87% of roads in the system are non-toll roads, funded entirely by a grant from Treasury, and the remaining 13% comprises toll roads, about half of which are managed directly by SANRAL and half by private companies granted concessions for the construction and management of these roads (based on 2018/2019 year ending March 2019).
    - General national/regional budget **87%**
    - Fuel taxes **0%**
    - Vehicle registration and licensing fees **0%**
    - Traffic fines **0%**
    - Development impact fees **0%**
    - Tolling revenue **7%**
    - Other sources **Concessions 6% (3 X 30-year concessions)**

16.2. CASE: N.004-120-2018/1 DNNN2 - PAMPOENNEK TO R512 (NON-TOLL)

The road network in South Africa comprises of national Roads, Provincial Roads and Municipal Roads.

The Provincial incorporation is between the Gauteng Province and the North West Province. This is a new direct link through the Magaliesburg Mountain Range which reduces the travel distance by 9.5 km. The current contract is in the construction stage and 95% complete. Once completed, a 12 months defects liability period commences. However, after construction is completed SANRAL has a Routine Road Maintenance (RRM) contract which will do the basic safe keeping and maintenance works. Through the lifespan of the new road, there will be various maintenance mitigation measures in place such as periodic maintenance, etc.

The R512 is a Greenfields project at a national roads level. The works comprise of a 6 km road through the mountain with some bridge structures and game underpasses. The reason for the game underpasses is that the mountain range is part of nature conservation area, which has the natural habitat of wildlife that we needed to cater for.

This project is part of a phased approach linking major economic zones within South Africa as well as part of an international corridor with Botswana. There are 2 remaining phases that is still required to complete the complete network link. The corridor linking South Africa and Botswana is with National Road (N4). This corridor has been effectively in place since 2002 where there is a PPP project in place. The client for this R512 project is the South African National Roads Agency SOC Ltd (SANRAL), which is a SOE. SANRAL is the implementation leg of the National Department of

Transport. The funding for this project comes from the fiscus through National Treasury. It is thus a non-toll funded project. SANRAL applies for funding based on a 3 to 5-year plan and National Treasury then allocates funding. If entities show efficient and effective spending of government's funds, National Treasury will then allocate funding accordingly. When projects are committed then the government funding is generally guaranteed.

The PPP project (N4 Bakwena Platinum Corridor Concession (BPCC)) was a corridor set up to enable an easier, more economical and safer transport route between South Africa and Botswana. This was one of the corridors constructed through the PPP process.

The Pampoen Nek project which commenced in March 2017 is an internal link within South Africa linking the two provinces of Gauteng and the North West Province. The link coincides with the N4 BPCC corridor as part of the internal national roads where the national roads provide a higher level of connectivity routes within the two provinces and ultimately to the N4 BPCC corridor that would be internationally advantageous as well. The PPP is based on the user pay principle with having conventional toll plazas and a boom down collection system. The Pampoen Nek project is through the application done by SANRAL to National Treasury as part of the full year budget applied for, for all types of projects let out per financial year.

SANRAL has initiated both the PPP and the Pampoen Nek projects as the National Roads Authority.

The envisaged routine road maintenance costs are approximately R 80,000/km per year / EUR 5,300/km per year) . The periodic maintenance costs will be determined by the exact works required at year 8.

The original construction period is 30 months. There have been various delays and extensions of time granted which would result in a 10-month delay. This includes the COVID 19 lockdown period.

- Project/programme/infrastructure name: The construction of National Route 4 section 12 (PWV 3) between road P123-1 and road 980
- Jurisdiction and country:SANRAL, South Africa
- Brief project description:construction of new 6 lane road and associated bridge
- Public sector project sponsors: National Treasury through The Department of Transport
- Private partners (if applicable): N/A
- Cost of infrastructure construction: R 300 million / EUR9.15 million (at the time of the tender)
- Period of construction: - April 2017 to September 2019
- Annual O&M costs/km: R 80,000/km/year (EUR 5,300/km/year
- Duration of the contract (if concession, PPP, etc.): N/A
- Source of project funding (toll revenue, shadow tolls, availability payments, milestone payments, etc.): NATIONAL TREASURY
- Structure of the project (spv, commercial contract, with banks, sponsors, public bodies, etc): N/A TO GOVERNMENT FUNDED PROJECT
- Sources of financing (private bank, bond market, public sector financing agency, multilateral lender, equity, etc.) and key terms for each: N/A
- Key elements of risk sharing: N/A

Some additional information on different mechanisms which enabled the project/programme implementation (new construction or renovation): N/A

16.2.1. Pro-Cons analysis

Pros

The complexity of the environment and the challenges going through huge cuts in the mountain were dealt with extremely well between the client, consultant and the contractor. Even though there are claims that resulted from the cutting the mitigation in reducing the losses was where the success was achieved.

The local communities around the project are extremely excited by the prospect of the improved economic benefits they all envisage. The local communities were also empowered to provide as much local labour and small business enterprisers were setup to contribute in the construction works. They thus gained economically as well as through gaining valuable experience with the help of the contractor.

Cons

The project value tendered was approximately R 100 million (EUR 5 million) under the estimate and R 60 million / EUR 3 million less than the second lowest bidder. This was highly problematic due to the poor rates tendered and still having to comply to the specifications and timelines.

17. SOUTH KOREA

17.1. BACKGROUND ON FUNDING IN THE COUNTRY

South Korea classifies the road types into seven categories by their location and function. As for the National expressways and General national highways, the responsibility for their management lies with the central government, the Ministry of Land, Infrastructure and Transport (MoLIT). Of these roads, the expressways are managed and operated by the Korea Expressway Corporation (KEC), to which the state has delegated its relevant administrative authority. This is based on the achievement of policy goals; the expressways need to be operated by a public organization with expertise in road construction and management to maintain their functions optimized.

- National expressways 4,437 km
- General national highways 13,976 km
- Special Metropolitan City roads and Metropolitan City roads 4,761 km
- Local(provincial) highways 18,121 km
- Si(city) roads 28,867 km
- Gun(county) roads 22,795 km
- Gu(district) roads 15,819 km

TOTAL: 108,779 km (December 31, 2019)

The MoLIT has invested in road projects by using the Special Account for Transport Facilities, the Special Account for Regional and Local Development, Local Allocation Tax, Local expenditure, KEC funds and private investment. The Act on Special Account for Transport Facilities enacted in 1994 for the purpose of establishing an efficient investment system and ensuring an expansion of traffic facilities; road, railway, transport system management and airport. The special account budget is comprised of tax revenues from the Transport·Energy·Environment Tax, the Special Excise Tax on gasoline & diesel of automobiles and customs duties on imported foreign cars, as well as other revenues such as facility usage fees and transfer revenues from the General Account.

Roads budget 2020 of MoLIT: UST 4.9 billion / EUR 4 billion

- National expressways USD 1.2 billion / EUR 0.98 billion
- General national highways USD 1.4 billion / EUR 1.15 billion
- Road management USD 1.5 billion / EUR 1.22 billion
- Private roads USD 0.5 billion / EUR 0.41 billion
- Local highways, Si roads, Gun roads and Gu roads USD 0.3 billion / EUR 0.24 billion

Funding of Roads budget 2020: USD 4.9 billion / EUR 4 billion

- Special Account for Transport Facilities USD 4.5 billion / EUR 3.7 billion
- Special Account for Energy and Special Account for Balanced Development USD 0.4billion / EUR 0.3 billion

17.2. CASE: EXPRESSWAY NO.110, INCHEON BRIDGE

- **Project name**: Incheon Bridge
- **Jurisdiction and country**: Republic of Korea (South Korea)
- **Brief project description**

Incheon Bridge is the longest bridge in South Korea, 21.38 km long (private section: 12.34 km). The bridge provides direct access between the Incheon International Airport and Songdo (near the mainland city), reducing travel time by up to one hour. It has shortened time from Seoul and southern parts of the Gyeonngi province by approximately 40 minutes, and since its opening in October 2009 over 10 million vehicles yearly used the bridge to get to the Incheon International Airport, Yeongjong Island, and other tourist attractions nearby.

- **Project Length**: 21.38 km, 6 lanes,
    - Private investment section: 12.34 km (2 toll plaza, cable-stayed bridge (center span: 800 m)
    - Government Financed Sections: 9.04 km
- **Project Length**: 21.38 km, 6 lanes, 2 toll plaza, cable-stayed bridge (center span: 800 m)
- Private section: 12.34 km
- **Public sector project sponsors**: MoLIT, KEC, Incheon Metropolitan city
- **Private partners**: Incheon Bridge Corporation, AMEC, KB bank, Samsung C&T JV etc. (total 27 companies)
- **Cost of infrastructure construction**: Approximately USD 1.4 billion / EUR 1.15 billion
- **Period of construction**: July 2005 – October 2009 (52months)
- **Annual O&M costs/km (or miles):** USD 22 million /21.38 km/ EUR 18 million/21.38 km (2019)
- **Duration of the contract**: 2009 – 2039 (30 years)
- **Source of project funding**:
    - toll revenue and MRG (Minimum Revenue Guarantee 15years)
    - Toll revenue: USD 84 million / EUR 69 million in 2019
- Structure of the project:
    - Private Investment Section: Incheon Bridge Co. (SPV)
    - Shareholders 2009: Incheon Metropolitan city, AMEC, KB bank, IBK bank)
    - Shareholders 2019: Macquarie Korea Infrastructure Fund (64.05%), KB bank (14.99%), IBK bank (14.99%), Incheon Metropolitan city (5.97%)
    - Government Financed Sections: KEC (Project Manager)
- **Sources of financing**: USD 2.2 billion / EUR 1.8 billion
    - Private investment section: USD 1.4 billion / EUR 1.15 billion (Net Private Fund USD 0.8 billion / EUR 0.65 billion, Government subsidy USD 0.6 billion / EUR 0.5 billion)
    - Government Financed Sections: USD 0.8 billion / EUR 0.65 billion
- The method of this project conducted in BTO (Build-Transfer-_operation). The ownership of bridge facilities was transferred the MoLIT in 2009 and subsequently the private sector (Incheon Bridge Co.) acquired the right to operation & management from 2009 to 2039.

- Under the current project scheme, the private sector has the responsibility for the risk that may occur in relation to construction, O&M, funding and any other parts of the project implementation process.
- The MRG coverage is 80% until 2024 to compensate the shortfall but the excess government authorities extract the excess portion, if actual revenue is over 120% compared to forecast revenue
- The private sector has operated and managed all project sections, 21.38km-long. Therefore, MoLIT is providing annually an operational cost (10 million USD/9.04km) for government financed sections roads (9.04 km-long) to the private sector through KEC. The purpose is to achieve government's goals maximizing operation-utility as well as reducing costs.

17.2.1. Pro-Cons analysis

Pros

- To ensure early realization to the users' benefits through timely construction in 2009. This is one of the most important effects, given the fact that publicly funded road projects are frequently delayed due to financial restrictions.
- The Incheon International Airport is a very important asset to propel the economy and create a global-hub aviation network at that time, therefore the second access bridge is essential to pursue the goals set by industries and the government.
- Especially in the global financial crisis taken place in 2008, the strong partnership between the public and the private had overcome the construction delay risk and project default risk.
- Cut down toll fares by balancing financial supply between foreign investment and domestic financing. In 1999, the foreign private partners asked for over 17.2% of Return on Investment (ROI) to the government. But the Korean government made them understand that reasonable and acceptable toll fares are an essential factor to launch this project as soon as possible and alleviate the resistance of road users to sustainable PPP projects after the bridge was completed. In conclusion, toll fares were set at 4 USD, i.e. reduced by half compared to the price planned in 1999.
- The project was built in just four and a half years, the bridge comprised 6 types of works; cable-stayed, viaduct, access, hybrid half-through arch, butterfly cable-stayed girder and Extra-dosud Bridge. To overcome time constraints, the private sector used a lot of creative approaches and developed new technology for fast construction of the grand bridge. Participant companies accumulated the key technology with the aim of minimizing construction cos/time and withstanding typhoon strength winds of up to 72m/sec, earthquake of up to 7 points in magnitude and impact from ship collisions.

Cons

- The negative aspect of this project is the high level of toll fares compared to the KEC. In Korea, toll fares of PPP roads were on average two times as high as those of the KEC expressways; the private investors have to recoup their investment cost within 30years as they are awarded the right to operate the project.

18. SPAIN

18.1. BACKGROUND ON FUNDING IN THE COUNTRY

We can distinguish among the following types of funding sources in Spain:

- Budgetary:
  - Traditional Funding
  - Shadow Toll Concessions
- Extra-Budgetary:
  - User Toll Concessions

In Spain, most of National highways are free and maintained by means of the public budget.

Red de Carreteras de España *(Spanish Road Network)*	Carreteras de gran capacidad (km) *High capacity roads*				Carreteras convencionales *(Single carriageways)* (km)	Total (km)
	Autopistas de peaje *(Toll motorways)* (km)	Autovías *(Motorways)* (km)	Carreteras multicarril *(Multilane roads)* (km)	Total (km)		
Red del Estado (National Road)	2.455	9.034	485	11.974	14.419	26.393
Otras (Others)	501	3.535	1.155	5.191	134.103	139.294
TOTAL	2.956	12.569	1.640	17.165	148.522	165.687

Table 6: The road network in Spain

The National road network comprises:

- 14,419 km roads (FREE USE)
- 11,974 km high capacity roads, of which:
  - 9,519 km FREE USE motorways and multilane roads, of which 1,042 km under PPP schemes (shadow toll or availability payment)
  - 2,455 km USER TOLL motorways

Regional and Local road networks are divided as follows:

- 134,011 km roads (FREE USE)
- 4,710 km FREE USE motorways and multilane roads
- 500 km USER TOLL motorways

The following picture shows toll roads (green and blue) and free use high capacity roads (red).

Figure 5: Map of motorways and high capacity roads in Spain

The budget of operation and maintenance expenditure in the public national road network was around EUR 1,330 million in 2009, and, in 2012 it reached a minimum budget of EUR 828 million, while in 2018 there has been an increase up to EUR 898 million.

Budget	EVOLUTION														
Millions EUR	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
453 B. Works	2.171	2.436	2.528	2.599	2.544	2.673	1.726	905	1.569	1.499	1.325	1.349	1.166	780	771
453 C. Maintenance	589	643	846	983	1.111	1.330	1.113	987	828	927	848	841	865	908	898
SEITT	0	0	15	307	376	730	555	473	323	271	351	219	148	155	122
Total	**2.760**	**3.079**	**3.389**	**3.889**	**4.032**	**4.733**	**3.394**	**2.365**	**2.720**	**2.698**	**2.525**	**2.409**	**2.179**	**1.843**	**1.790**

Table 7: Budget for operation and maintenance for the Spanish national road network 2004 – 2018

18.2. CASE: A-66 HIGHWAY, SECTION BENAVENTE-ZAMORA

In 2012, the concession for the Execution, Maintenance and Operation of the A-66 Freeway between Benavente and Zamora (49 km), was tendered.

Financed through "availability payment": the concessionaire received an amount from the Public Authority based on the availability service of the infrastructure that could be decreased depending on the status of the road and quality of service (status and service indicators).

The section of the A-66 between Benavente and Zamora, 49 km long, was the only section of the Ruta de la Plata (between Gijón and Seville) that did not have the characteristics of a highway or motorway.

Figure 6: A-66 Highway in Spain

Due to budgetary restrictions and the territorial demand to complete this stretch of highway, in August 2011 a concession was put out to tender, within the framework of the Extraordinary Infrastructure Transport Plan (PEIT), which includes the construction of the highway and its subsequent conservation and operation for a period of 30 years from the formalization of the contract. In return, the Administration is obliged to make a monthly availability payment (the State would pay the concessionaire a fee based on compliance with a series of indicators).

The concession contract comprises three areas of action:

- Area 1: Works of first establishment. It includes the cost of construction of the motorway, the cost of expropriation and the payment of the "1% cultural" fee: EUR 243.24 million. That includes the payment of the "1% cultural" fee (The Spanish Historical Heritage Law - Patrimonio Law – provides for the obligation to allocate, in public works contracts, at least 1% of the budget for works aimed at the conservation or enrichment of Spain's historical heritage or the promotion of artistic creativity, with preference given to the work site itself or its immediate surroundings).
- Area 2: Replacement and major repair works. These actions relate to those infrastructural elements whose useful life is shorter than the term of the contract, in order to maintain the roads in optimum service conditions (fundamentally: pavement reinforcements, repair of structures and replacement due to obsolescence of elements such as signaling or safety barriers). Estimated amount of EUR 300,000 /km every 10 years.
- Area 3: Conservation and operation of infrastructures. This includes ordinary conservation, maintenance of viability (including winter maintenance) and administrative management tasks for the operation of the road. Amount estimated at EUR 26,000 /km and year, i.e., approximately EUR 1.3 million /year.

It is the concessionaire's obligation to carry out the activities that allow the values established in the indicators to be obtained. These must be measured by the concessionaire with the frequency established in the specifications and the same shall provide the values of these measurements to the Administration.

The Administration will carry out contrast measurements in its inspection and control activities.

The concessionaire will receive a monthly fee for providing the service from the time the first section to be executed is put into service. This fee will be depending on the correction of the state and quality indicators of the service. The specifications include 26 indicators such as: road surface

condition, slope and bridge condition, signaling condition, winter maintenance, roadway element cleanliness, road safety, barriers, etc.

On 24 August 2011, the tender notice for the concession contract for the construction, maintenance and operation of the La Plata motorway (A-66) between Benavente and Zamora was published in the BOE. The amount of the tender with VAT: EUR 1,356,307,800.52 (sum of the estimated fees over the 30 years of the concession).

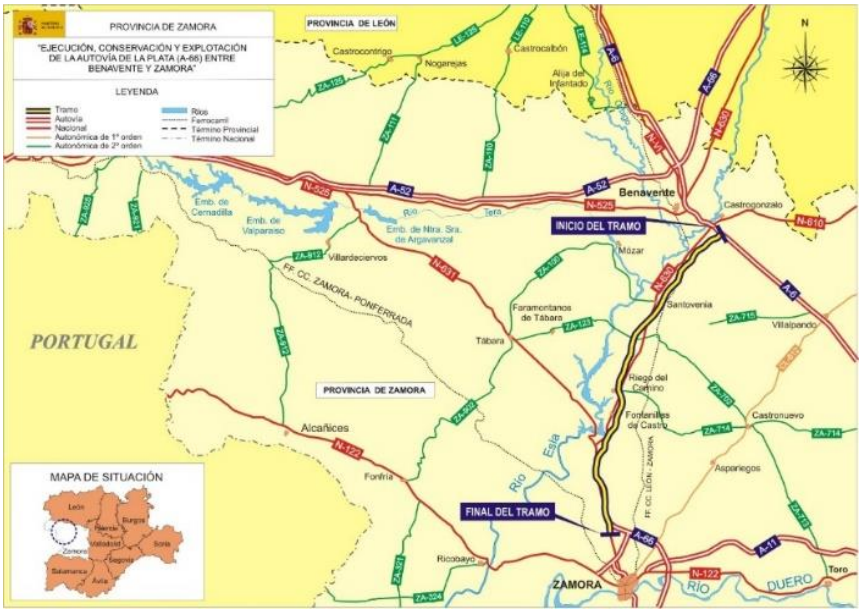

Figure 7: A-66 motorway between Benavente and Zamora (Spain)

- Project/programme/infrastructure name: A-66 Highway, section BENAVENTE-ZAMORA
- Jurisdiction and country: Spain (National- Ministry of Transport)
- Brief project description: Concession for the execution, conservation and operation of the Ruta de la Plata (A-66) highway between Benavente and Zamora.
- Public sector project sponsors: None - The contract with the concessionaire was signed by Ministry of Transport (formerly ministry of Public Works or Development)
- Private partners (if applicable): Consortium formed by the companies Cintra, Acciona and the Meridiam
- Cost of infrastructure construction: EUR 243.24 million
- Period of construction: September 2013 – May 2015
- Annual O&M costs/km: EUR 22.68 million (excluding VAT)
- Duration of the contract (if concession, PPP, etc.): 30 years
- Source of project funding (toll revenue, shadow tolls, availability payments, milestone payments, etc.): The Ministry is required to make a monthly payment to the concession operator for the availability of the motorway for free transit by users. The monthly fee will be increased or decreased depending on compliance with certain infrastructure quality indicators and the service provided by the concessionaire. The Ministry will carry out contrasting measurements of these indicators, in its inspection and assessment of the contract.
- Structure of the project (spv, commercial contract, with banks, sponsors, public bodies, etc) SPV: There is a concession contract between the Ministry and the consortium formed by the

companies Cintra, Acciona and the Meridiam fund for the construction, conservation and operation of the Benavente-Zamora section of the A-66 highway, the so-called Ruta de la Plata.

- Sources of financing (private bank, bond market, public sector financing agency, multilateral lender, equity, etc.) and key terms for each. It is the responsibility of the consortium formed by the companies Cintra, Acciona and the Meridiam to choose the best structure.
- Key elements of risk sharing: The concessionaire assumes risks relating to construction, expropriation, design and availability. However, traffic and environmental risks are not transferred.

18.2.1. Pro-Cons analysis

Pros

- Less uncertainty.
- Allows to anticipate the use of an infrastructure.
- Less negative impact on a country's budget deficit.
- Efficiency in the tender process.
- Less deviations in time and budget.
- Integrates Design+Works+Maintenance.

Cons

- Complexities.
- Requires long-term planning and budget stability (committed budget).

18.3. CASE: A-31 HIGHWAY, SECTION LA RODA-BONETE

The first toll-free multi-lane highways in Spain were built in the early 1980s using existing roads such as carriageways and were known as "first generation" highways. Increasing traffic flows, transit speeds and accident rates obliged the Government to adopt a plan to upgrade, modernise and improve the highways with the goal of meeting contemporary safety standards. The need to refurbish the network in a relatively short time and to maintain the same with high quality and service standards led to implementation under the Plan of a nineteen-year concession system.

The project envisages the upgrading of around 2,125 km of highways with the aim to provide users with safety and service levels similar to those offered by more recently built highways and toll roads. The upgrade programme includes two phases. The first applies to 1,525 km of the A-1 (Madrid-Burgos), A-2 (Madrid-Zaragoza), A-3 and A-31 (Madrid -Alicante) and A-4 (Madrid-Seville) highways, of which 1,000 km have already been reconditioned. The second phase envisages works on 580 km of the A-2 (Igualada-Martorell), A-5 (Madrid-Badajoz) and A-6 (Adanero-Benavente).

The scope of these contracts includes initial works of first establishment, reform, major repair, simple repair, conservation and maintenance, as well as the operation of the infrastructure throughout the concession period. These contracts are financed through shadow toll payment, in which the concessionaire receives an amount from the Public Authority based on the demand (actual traffic) of the infrastructure, including a mechanism of service control that entails that payments could be decreased depending on the performance of the road and quality of service (service and performance indicators).

In the following map, we can see the whole plan, in its First Phase (red) and Second Phase (blue):

Figure 8: Motorway upgrade plan in Spain

Within this programme, we will focus on the concession contract of the Autovía de Alicante dual carriageway, A-31, in the section between La Roda and Bonete in the province of Albacete in the length of 94.2 km. This section comprises two main roads, 27 junctions and several sections of roads and slip roads with a length of 94.2 km.

Figure 9: A 31 between La Roda and Bonete (Spain)

Regarding the aforementioned initial works, these were divided in two different categories: (i) first establishment; and (ii) reform. The former includes expropriation of 569,040 square meters, 17 km of new highway main sections, 7 km of auxiliary sideways and 22 km of road replacement; it also comprises 25 junctions and 9 structures; with an investment of circa EUR 60 million. The latter includes refurbishment of 77 km of highway main section, complete drainage improvement and repair, and replacement of road signals; with an investment of circa EUR 31 million. The total investment was later increased by the Ministry of Public Works in circa EUR 20 million.

In respect of operation and maintenance, the contract includes a 19-year responsibility for these tasks, with a set of 41 quality and performance indicators - 9 of them do not apply to this particular contract because they are related to tunnels.

- Project/programme/infrastructure name: A-31 Highway, section La Roda-Bonete
- Jurisdiction and country: Spain

- Brief project description: Concession for building and repair, conservation and maintenance, as well as the operation of the A31 highway, section La Roda-Bonete
- Public sector project sponsors: None - the contract with the concessionaire was signed by the Ministry of Development / Public Works.
- Private partners (if applicable): Cyopsa Sisocia, S.A. – Construcciones Sarrión, S.A. – Getinsa Ingeniería, S.L. – Visever, S.L.
- Cost of infrastructure construction: circa EUR 91 million (VAT not included)
- Period of construction: January 2008 – June 2011
- Annual O&M costs/km: circa EUR 26,000 per km
- Duration of the contract (if concession, PPP, etc.): 19 years
- Source of project funding (toll revenue, shadow tolls, availability payments, milestone payments, etc.): The project has a shadow toll, and also establishes a series of status and service quality indicators which oblige the concession holder to ensure that infrastructure maintenance provides optimum conditions for the user.
- Structure of the project (spv, commercial contract, with banks, sponsors, public bodies, etc): SPV: Autovía de los Llanos, S.A. There is a concession contract signed by the SPV and the Ministry of Public Works. There is a project finance in place signed by the SPV and 3 national banks. There is a participative loan signed by the SPV and the Ministry of Public Works.
- Sources of financing (private bank, bond market, public sector financing agency, multilateral lender, equity, etc.) and key terms for each: (i) Project finance loan, 3 private national banks, circa EUR 60 million, 15 years tenor; (ii) Public Participative Loan, Ministry of Public Works, circa EUR 20 million, 15 years tenor; (iii) Participative shareholders loan, circa EUR 11 million, 18 years tenor, and (iv) Equity, circa EUR 11 million.
- Key elements of risk sharing: The concessionaire assumes all project risks: design, expropriation and affected services modifications, construction works, maintenance, financing and operation of the highway and, in general, all the necessary activities required to perform the contract.

18.3.1. Pro-Cons analysis

Pros

Some of the advantages of the project scheme used are:

- Allows to anticipate the use of an infrastructure.
- Public budget does not have to bear the burden of the whole investment through the 2-3 first years, but it is able to distribute the total expenditure - both capex and opex - throughout the term of the 19-year contract.
- Increased efficiency through an infrastructure lifecycle holistic view.
- Lower deviations in time and budget.
- Integrates Design+Works+Finance+Maintenance.

An economic-financial rebalance was undertaken in 2011, mainly due to some additional investments required by the Ministry of Public Works. Apart from increasing the shadow toll tariff, and due to the financial crisis that was in place by that time, that extra investment was directly financed by the Ministry, and was especially successful because of two main factors: (i) it enabled concessionaires to finance those unexpected and new investments; and (ii) the fact of being a

participative loan, linked with traffic evolution, matched perfectly the business itself with its financing at least in this tranche.

Cons

Some of the disadvantages that this model may have are:

- Uncertainty about future traffic that increases risks and subsequently, price of the project.
- Requires long-term planning and budget stability (committed budget).
- Complexity.

The duration of the contract probably is quite short, so it may not be able to take profit from the deepness of capital markets in terms of tenor.

19. SWITZERLAND

19.1. BACKGROUND ON FUNDING IN THE COUNTRY

This case study addresses road funding in **Switzerland**. Switzerland ranks number 3 in the World Economic Forum's Quality of Roads Index (2019 edition).

Institutional setting: In Switzerland, responsibilities for road networks are divided between the Federal government, i.e. the Federal Roads Agency (FEDRO), cantonal authorities and municipalities.

The asset value of the Swiss motorway/national roads network is CHF 82.5 billion (equivalent to EUR 78.1 billion). The length of this network is around 1,850 km. (Source: FEDRO Roads and Traffic 2019)

Funding arrangements

Switzerland has two road transport funds in place:

The *Fund for Financing Motorway and Agglomeration Traffic* finances the expenditure for operation, maintenance, expansion, elimination of bottlenecks and completion of the motorway and national roads network. This went into operation on 1 January 2018. Funds that remain unused remain in the fund for later use, enhancing liquidity and sustainability. The Fund receives deposits from the following sources:

- Oil tax surcharge (100%)
- Motorway sticker (Vignette) (100%)
- Vehicle tax (100%)
- Oil tax (previously 5%, 10% as of 2020)
- Levy on electric vehicles (to be introduced)
- Compensation from cantons for transfer of cantonal roads to federal government (as per 2020)

In 2018, a total of CHF 3.2 billion (EUR 3.0 billion) was deposited in the Fund.

The *Fund for Special Financing of Road Transport* primarily support the cantonal road transport infrastructure. It is the single source for all transfer payments in the road sector at federal level and for administrative and research costs of FEDRO. It is financed through 50% of the oil tax revenues and, if necessary, complemented with vehicle tax revenue.

The figure below depicts the funding sources for each of the funds including 2019 figures:

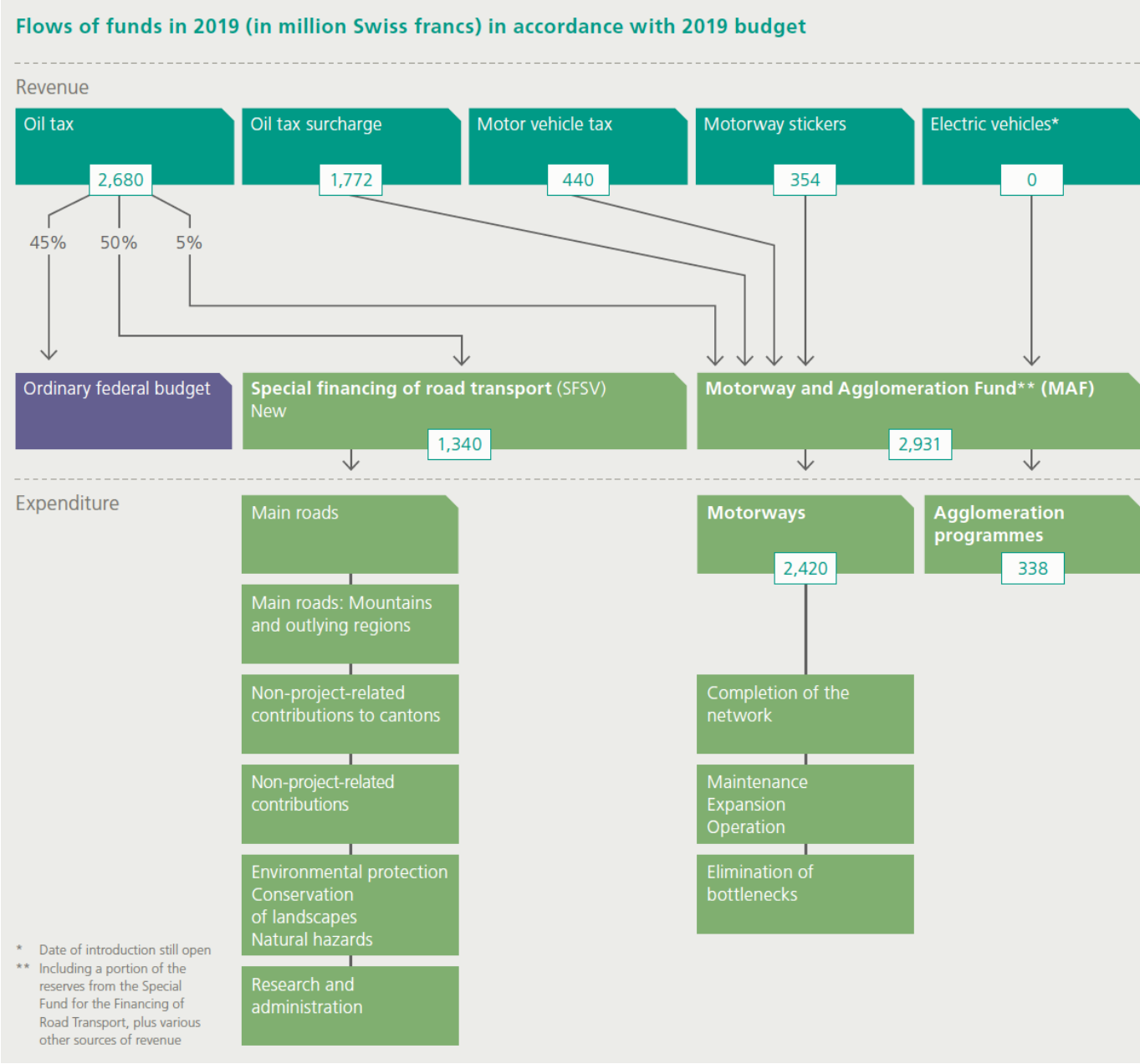

Figure 10: Funding sources for financing the Swiss road network

20. TURKEY

20.1. BACKGROUND ON FUNDING IN THE COUNTRY

As of 2017, the Turkish road network is about 70,000 km in length (excluding urban and local roads). It is divided into different categories: provincial roads (ca. 34,100 km), State highways (ca. 31,000 km) and tolled motorways (ca. 2.6 km, reaching ca. 5,000 km by 2023). Approximately, 95% of public road investments and expenditures are covered by national consolidated budget (general taxes but also road related excise taxes, vehicle taxes, etc.) managed by the Ministry of Finance; the remaining 5% is covered by tolls on motorways, without considering PPP motorway projects awarded to motorway operator companies. In fact, all new Turkish motorways realized (the so called "Otoyol") are tolled, therefore motorway operator companies are granted the right to directly collect tolls from users.

In the last few years, the Government of Turkey has been implementing a plan for the refurbishment and maintenance of its existing road network and, in particular, a relevant and ambitious development plan of new important, modern and iconic infrastructures as highways, bridges and tunnels in order to increase the national motorway network. Main new motorway infrastructure projects ("greenfield projects") have been identified, planned and realized, essentially, through Public-Private Partnerships and using as preferred contractual mechanism, the BOT scheme, in accordance to the PPP national legislation (Law no. 3996 and following). This to involve national and international private operators and banks, mobilizing private capital for these relevant projects. In particular, as part of Turkey's "Vision 2023", important PPP motorway projects have been already implemented and realized as the "Eurasia Tunnel", the "Yavuz Sultan Selim/Third Bosphorus Bridge", the "Malkara-Canakkale Motorway", the "Gebze-Orhangazi-Izmir Motorway (including the "Osman Gazi/Izmit Bay Bridge")" and the "Northern Marmara Motorway" (partly under construction). Other relevant PPP motorway projects are currently under implementation, principally the "Canakkale Bridge" and the "Ankara-Nigde Motorway".

The Directorate General of Infrastructure Investments (AYGM), department of the Ministry of Transportation and Infrastructure, represents the public organization in charge of planning this development of the national motorway network, acting also as contracting Authority, being responsible for permissions and supervising the operation of the motorway infrastructures. The concession agreement (e.g. PPP contract through BOT scheme) for greenfield motorway projects provides for private operators to undertake the responsibility for building and operating the infrastructure, transferring the asset to the public at the end of the concession (within a maximum of 49 years). In the concession agreement, the economic and financial sustainability conditions are specified in order to cover investments and operation costs, with a fair return on the capital invested in the project. Usually, they are PPPs applied to user toll motorway concessions, with a user-pays scheme considered as a payment mechanism; moreover, the Turkish legislation in the sector foresees a minimum demand guarantee mechanism implemented under the responsibility of the contracting Authority (also responsible for the debt assumption). Mechanisms of profit sharing can be possible for parts exceeding these guaranteed revenues.

20.2. CASE: EURASIA TUNNEL

Istanbul is historically located at one of the most strategic crossroads of the international trades, the Bosphorus strait between Europe and Asia, and connected to various important international transport networks. Capital of the Marmara Region (richest and most densely populated Turkish region), it is the largest and most important city of Turkey and, at the same time, one of the world's most congested cities. Between the end of the 1990s and the beginning of the 2000s, Istanbul Metropolitan Municipality and the Turkish Government developed pre-feasibility studies in order to support regional and urban mobility, as well as the economy, realising relevant transport infrastructures for the city. The "Eurasia Tunnel" should be considered in this context of transport infrastructure development of these last decades (e.g. the "Yavuz Sultan Selim Bridge", also called the "Third Bosphorus Bridge", the "Marmaray Undersea Rail Tunnel").

The "Eurasia Tunnel" has been realized between Kazlicesme area (Kumkapı) on the European side and Goztepe area (Haydarpaşa) on the Asian side, connecting the two parts of Istanbul beneath the seabed together with the three existing bridges and the other undersea rail tunnel. Its length is 5.4 km (double-deck tunnel with two lanes on each deck) plus link roads (5.4 km stretch on the European side and 3.8 km stretch on the Asian side); the journey between the two continents takes about 5 minutes. In June 2006, after reaching positive results from the feasibility studies (cost-benefit analysis, value for money assessment, environmental impact analysis, etc.), the project got the approval to be tendered as BOT. The infrastructure, owned by the Ministry of Transportation and Infrastructure, has been realized under a PPP agreement (BOT scheme) awarded by the Directorate General of Infrastructure Investments (AYGM) to the SPV "Avrasya Tüneli İşletme İnşaat ve Yatırım A.Ş." (ATAŞ), i.e. "Eurasia Tunnel Operation Construction and Investment Co.", incorporated in 2009 by two sponsor companies: Yapi Merkezi İnsaat ve Sanayi A.S. (Turkish) and SK Engineering & Construction Co. Ltd (South Korean). Yapı Merkezi and SK E&C, equal shareholders (50%) and sponsors of the SPV, are leading international construction and engineering companies that have carried out very successful infrastructure and transportation investments in various parts of the world.

The PPP contract was implemented in November 2011 (investment of USD 1.4 billion equal to ca. EUR 1.3 billion) while the financing agreement was closed in December 2012; the construction period lasted 3 years, 11 months and 3 days. The "Eurasia Tunnel" was officially opened to traffic on 22 December 2016 and has an operation period of 25 years, 11 months and 9 days. The entire concession lasts 29 years and, according to the contract, the SPV is responsible for financing and construction of the "Eurasia Tunnel" project as well as its operation (project financing). The PPP contract entitles the operator to operate and maintain the asset, by directly collecting tolls by the users of the infrastructure during the timespan of the concession. In particular, the toll rate is fixed in Turkish Lira for an equivalent of ca. EUR 5 plus VAT for automobiles and EUR 7.5 plus VAT for minibuses (2020); these tariffs are being adjusted in accordance to the United States Consumer Price Index. The concession agreement includes a guaranteed minimum revenue provided by the contracting Authority and a profit sharing's mechanism for revenues exceeding the guaranteed revenue defined in the contract (the SPV pays 30% of surplus revenue over the minimum revenue guarantee to the contracting Authority). Basically, this minimum demand guarantee mechanism reduces great part of the risks of the project that the private party has to bear, in particular operative risks (demand/traffic risk), guaranteeing a minimum level of revenues regardless the traffic volume and securing the cash flows of the project. But, in general, the "Eurasia Tunnel" faces high levels of traffic in line with the traffic studies.

The “Eurasia Tunnel”, as other relevant transport projects in Turkey, has been realized through a project finance scheme (BOT) where the SPV provided ca. USD 277 million / EUR 253.6 million in equity whereas fixed interest rate loans for USD 960 million / EUR 878.9 million have been supplied by a pool of relevant international banks involved. In particular, the most relevant parts of the financial package came from EIB and EBRD. In fact, in these years, EBRD had an instrumental role in Turkey in order to help to design a legal framework which allows for greater private sector involvement in the infrastructure sector, including under PPPs schemes. Moreover, financing and guarantees for the “Eurasia Tunnel” was supplied by Korean EXIM and the Korean Export Insurance Bank, with the participation of other commercial banks (Standard Chartered Bank, Sumitomo Mitsui Banking Corporation, and Mizuho Bank). A hedging facility for the transaction was provided by some of them, too. Turkish banks were involved in the transactions but mainly acting as guarantors (Garanti, Türkiye İs Bankasi, and Yapi Kredi). Just in 2017, the project reached 70% of financial guarantee level.

20.2.1. Pro-Cons analysis

Pros

The “Eurasia Tunnel” represents one of the most relevant transport infrastructure projects for Turkey and at international level in recent years. A monumental work that is supporting the relieve of Istanbul’s transcontinental traffic pressure (ca. 120,000 cars/light vehicles per day), creating a direct, comfortable and convenient connection between the European and Asian sides of Istanbul. A valid alternative to the other existing bridges. Its success is based on sound feasibility analysis that showed the economic and financial viability of the project. Currently, this success is validated by many economic and financial data registered by the contracting Authority and the other public bodies involved. As for instance: TRY 1.2 billion / EUR 162.1 million of estimated overall economic benefits (2018), TRY 520 million / EUR 70.2 million of value of time savings, 23 million hours of estimated time savings, 30,000 tons of estimated fuel savings, job creation, innovation and technology transfer, etc. This PPP (BOT scheme), with its underlying payment mechanism in the form of tolling plus minimum guaranteed revenues, showed a very strong market appeal allowing the involvement of relevant private partners for the realization. Both Government’s commitment and the high standing of the sponsors of the SPV and their global experience contribute to the strength of the “Eurasia Tunnel”. Multilateral banks, as well as international and national commercial banks, were instrumental for the structuring of a complex and significant financial package (including guarantees and hedging schemes) in order to adequately finance and secure the realization of the project.

Cons

The internal PPP market and the application of the PPP legislation to the motorway sector are still relatively new in Turkey. Moreover, these complex infrastructure projects need a high level of investments to finance. In these last few years, Turkey is facing increasing political and financial risks, with relevant implications on the stability of the country. In particular, the instability on the financial markets causes high volatility of the Turkish Lira and a high inflation rate for Turkey. These negative macroeconomic conditions risk to seriously affect the development and management of capital-intensive transport infrastructure projects in the country, even if Turkey still represents one of the most interesting PPP transport infrastructure markets worldwide.

21. UNITED KINGDOM

21.1. BACKGROUND ON FUNDING IN THE COUNTRY

In 2018, the total road length in Great Britain was estimated to be 246,700 miles (about 397,025 km).

There were 31,800 miles (51,177 km) of major road in Great Britain in 2018, consisting of:

- 2,300 miles (3,701 km) of motorway
- 29,400 miles (47,314 km) of 'A' road

There were 214,900 miles (345,848 km) of minor road in Great Britain in 2018, consisting of:

- 18,800 miles (30,255 km) of 'B' road
- 53,400 miles (85,939 km) of 'C' road
- 142,700 miles (229,653 km) of 'U' road

The road and highway systems in the UK are managed as follows:

- Highways England is the government company charged with operating, maintaining and improving England's motorways and major A roads. Formerly the Highways Agency, it became a government company in April 2015.
- Local roads are managed by the relevant local authority
- Scottish and Welsh roads are managed by Transport Scotland and Welsh Assembly respectively
- London roads are managed by Transport for London

In 2017, there were over 50 ongoing PFI and PF2 projects funded by UK Department of Transport.

Some of the highways are managed through PPP concessions with no actual tolls collected from public (e.g. Concessionaire paid by authority on road use – the more the road is used the more the concessionaire is paid).

The UK Government planned a Road Investment Strategy (RIS1) for the period 2015-2020 consisting of GBP 15.2 billion / EUR 16.7 billion invested in over 100 major schemes to enhance, renew and improve the road network. The Government is now planning a RIS2 for the period 2020-2025 (GBP 11 billion worth / EUR 12.1 billion) which aims to have a road network which "supports the economy", "safer and more reliable", "greener", "more integrated" and "smarter".

Other information about the UK system:

Fuel duty rates in the UK are as follows: Petrol, diesel, biodiesel and bioethanol (57.95 pence/litre - EUR 0.64/litre) Liquefied petroleum gas (31.61 pence/kg - EUR 0.35/litre) Natural gas used as fuel in vehicles (24.70 pence/kg - EUR 0.27/litre)

New vehicle registration fee is GBP 55 / EUR 60.5 whilst the minimum penalty for speeding is a GBP 100 fine / EUR 110.

21.2. CASE: TRANSPORT FOR LONDON

Transport for London (TfL) is a statutory body created by the Greater London Authority (GLA) Act 1999, managing the day-to-day operation of the Capital's public transport network and managing London's main roads.

Transport for London manages the Transport for London Road Network (the TLRN or London's 'red routes') and is responsible for the maintenance, management and operation of the Capital's 6,000+ sets of traffic light. TfL also works with freight operators and other commercial drivers to encourage more efficient deliveries in London.

TfL is funded every year from four main sources. For the financial year 2019/2020, these amount to GBP 10.4 billion (EUR 11.4billion) as follows:

- Fares income (GBP 4.9 billion – EUR 5.4 billion)- this is the largest single source of our income (47%) which helps to cover the costs of operating and improving their transport services.
- Other income (GBP 1.2 billion – EUR 1.3 billion) - including income (12%) from the Congestion Charge, Ultra Low Emission Zone and commercial activities.
- Grants (GBP 3.4 billion – EUR 3.7 billion) – this income (33%) comes from Business Rates Retention (from a proportion of local business rates and paid by GLA), Crossrail funding (which goes towards the project to build the infrastructure for the Elizabeth line), other capital grants (E.g. from Northern Line extension financed from incremental business rates generated and retained within a new enterprise zone, and developers' contributions), other funds from GLA (e.g. from council taxes).
- Borrowing and cash reserves (GBP 0.9 billion – EUR 1.0 billion) – This is generated (8%) using a combination of mechanisms, including bonds, commercial paper, loans for specific projects from the European Investment Bank and the Public Works Loan Board.

TfL manages:

- the London Red routes (a network of key routes such as the A40 or A406),
- Traffic control centre (through the Network Management Control Centre (NMCC) where the road network is monitored 24 hours a day),
- Traffic information (electronic road signs to alert drivers and live traffic information directly to TV and radio stations, Satellite navigation companies such as Tomtom and Trafficmaster, web and app developers),
- Traffic lights (responsible for all of London's 6,300 traffic lights), roadworks (running a lane rental scheme and charge those carrying out works up to GBP 2,500 /EUR 2,800 a day for working in the most congested areas or at busy times. This encourages works to be completed during quieter times, and more quickly) and
- London Highways Alliance (a joint initiative between TfL and London's boroughs to collaborate on highway management, both in road maintenance and in the design and construction of new schemes).

TfL responsibility is within the M25 and does not include the local roads, which are managed by the local authorities.

All the maintenance projects (e.g. Hammershmith flyover bridge) are financed by TfL which is a public body, with no shareholders or parent companies, and therefore can reinvest every pound of

income in the transport network. In more details, for every pound they receive, around 79% is spent on the everyday running costs of the network and around 21% on improving it for the future.

The direct operating costs for the road concession and Ultra Low Emission Zone were respectively GBP 479 million (EUR 527 million) and GBP 277 million (EUR 305 million) in the financial year 2018/2019 with a net operating margin of -GBP 167 million (-EUR 184 million) and +GBP 9 million (+EUR 10 million).

The key elements of risk sharing are:

- Design delays for new assets and/or remedial works of existing assets which will affect the project costs
- Changes in TfL or national design and construction standards
- Land acquisition/consent for additional works. This would include negative outcome from a public consultation
- Unexpected archeological/ground/environmental conditions
- Cost overrun and delay not caused by a relief or compensation event
- Force Majeure risks (e.g. natural disasters, terrorism, etc.)
- Increased maintenance due to traffic volume
- Actual operating and maintenance costs higher than anticipated
- Damage/injury to third parties and claims from them
- Traffic accidents and vandalism

It is worthwhile to mention the innovative Healthy Streets plan which aims to have safer junctions and roads in general (e.g. reducing high speed limit to 20mph in several areas), increase the number of cycling infrastructure, decrease pollution with the introduction of the Ultra Low Emission Zone. This could also affect the financial elements because the number of private motorised vehicle are expected to be lower and therefore there would be less income from the Congestion Charges and Ultra Low Emission Zone.

21.2.1. Pro-Cons analysis

Pro

- TfL is committed to reducing costs and reinvesting all the income to run and improve services. It is a public body, which means TfL can reinvest every pound of income in the transport network
- The number of works helps the local economy and business activities.
- The number of incidents is likely to decrease with the Healthy Street plan. This “Green” plan is aimed to be successful and well accepted by third parties.

Cons

- Although TfL is a public authority, there is an overspent for the O&M of the road system due to the Mayor of London plan for Healthy Streets.
- The Healthy Streets plan is likely to decrease the income coming from Congestion Charges and Ultra Low Emission Zone and therefore the number of private motorised vehicles.

21.3. CASE: A120 MILLENNIUM WAY, ESSEX COUNTY COUNCIL

The A120 forms an east-west route linking the M11 and Stansted Airport with the A12, Colchester and Harwich. Braintree is located half way along this corridor. The proposal adds two slip roads to connect with Millennium Way (B1018) to relieve congestion and provide improved access and accommodate growth.

The scheme will deliver:

- Alleviation of existing congestion and capacity constraints at Galley's Corner Roundabout
- Provision of more efficient transport of goods and people through Essex
- Localised housing growth Braintree 9,650 homes including the proposed Garden Community during the plan period up to 2033 (for further details appendix J)
- Unlock job creation – 700 jobs in the Braintree area and growth at Stansted Airport, especially for the increasing percentage of business fliers
- Further growth along and near the corridor (57,000 new homes), including Uttlesford, Colchester, Chelmsford and Tendring
- Improved air quality
- Incentivised skills and apprenticeship opportunities – at Stansted and through Ringway Jacobs

The project sponsor is Essex County Council (ECC) in the UK.

Ringway Jacobs looks after the O&M as part of a framework contract with ECC. In 2012, Essex County Council (and its road branch called Essex Highways) entered partnership with Ringway Jacobs to upkeep and maintain its Highways division. The contract was initially signed for 10 years to 2022 and contained an option for Councillors to extend the contract for a further five years if desired. On 25 February 2020, a meeting of Essex County Council's Cabinet approved the take up of an option to extend the contract for another five years, allowing investment in the network of approximately GBP 700 million (EUR 770 million) over that time period.

Jacobs UK has a framework contract with Ringway Jacobs for ECC and is looking after the project preliminary design. The detailed design will be then carried out by the D&B main contractor, Kier.

The preliminary design work started in 2017 and the construction was supposed to start and be completed in the financial year 2020/2021.

The total required funding is over GBP 13 million (EUR 14.3 million) and it will be provided by the UK Department for Transport (DfT), ECC, Braintree District Council (BDC) and Highways England (HE) over four financial years (from 2017/2018 to 2020/2021) as follows:

- DfT GBP 4.947 million / EUR 5.442 million 35.5 % (of total)
- ECC GBP 3.500 million / EUR 3.850 million 25.1 %
- BDC GBP 2.500 million / EUR 2.750 million 17.9 %
- HE[6] GBP 3.000 million / EUR 3.300 million 21.5 %
- TOTAL GBP 13.947 million / EUR 15.342 million

[6] If HE are unable to commit its contribution, ECC will make provision to cover this amount.

This represents a financial risk together with all the high chance of variation due to the design constraints (Network Rail bridge, Limited room due to the Braintree Freeport parking area & B&Q storage and High voltage National Grid substation).

The cost estimate includes scheme development cost, inflation and quantified risk assessment, but does not include optimism bias. Commensurate with the stage of the scheme development, 44% optimism bias should be added for the purposes of economic appraisal.

An application was made to SELEP for Round 3 of the Growth Fund, but, unfortunately, on a ranking basis, because of other priorities, it did not make the top 20 schemes that were selected to go forward as part of the Growth Deal.

There is a Stakeholder Plan which includes a public consultation to secure engagement and buy-in will be required and outcomes of this consultation will be considered. Ongoing liaison with key stakeholders (HE, Braintree District Council, Realm – Freeport, Braintree) will be essential to ensure buy-in, especially in delivery and decision-making.

21.3.1. Pro-Cons analysis

Pros

- In-House branch/department working with private company for O&M
- Although a small project, this is expected the help the local economy, housing growth and to reduce air pollution
- All public funds from different entities
- Public consultation was successful

Cons

- Overspending risk and/or profit less than expected
- Financial risk if HE will not provide funds
- Financial risk if the project will have variation due to its design constraints

21.4. Case: M25 and Dartford Crossing, Connect Plus

The M25 is one of Europe's busiest motorways. The Highways Agency (now Highways England) awarded in 2009 the M25 Design Build Finance and Operate (DBFO) contract (GBP 6.2 billion worth / EUR 6.9 billion) for the future development, operation and maintenance of the M25 motorway to the private sector consortium Connect Plus.

Under the contract the M25 had to be widened to four lanes between Junctions 16 and 23 and between Junctions 27 and 30, and the Hatfield Tunnel on the A1(M) had to be refurbished. The contract also included operation and maintenance of the M25 and the Dartford Crossing for a 30-year period. The network is used by, on average, between 150,000 and 200,000 vehicles a day and carries 15% of all UK motorway traffic. There are no tolls collected by the public users for the M25 whilst there is a toll to be paid for the Dartford Crossing (GBP 2.50 – EUR 2.75 cars, free for motorcycles, Cat C GBP 3.00 – EUR 3.30, Cat. D GBP 6.00 – EUR 6.60 and discounts for residents).

Connect Plus is a consortium that includes Equitix (37.5%), Dalmore Capital (20%), Grosvenor Capital Management (17.5%), Balfour Beatty (15%) and Egis Investment Partners (10%) - a unique partnership with a collective strength in highways maintenance and management. The contract is a private finance initiative (PFI) and was the largest highways PFI ever awarded.

Connect Plus Services, which includes Balfour Beatty (52.5%), Atkins (32.5%) and Egis (15%), is responsible for operating and maintaining the M25 motorway network, including all adjoining trunk and slip roads on behalf of Connect Plus and Highways England.

Key facts are:

- In the last 10 years, Connect Plus has delivered over GBP 1.4 billion / EUR 1.6 billion worth of road improvements and junction enhancements.
- Over GBP 400 million (EUR 440 million) have been invested in all major asset renewals since 2009.
- The Initial Upgraded Sections (IUS), a major widening project, was completed prior to the Olympics in June 2012 at Junctions 16-23 and Junctions 27-30.
- The introduction of Smart Motorways through the Later Upgraded Sections (LUS) at Junctions 23-27 and Junctions 5-7, the first All Lane Running project of its type, was subsequently initiated and completed in autumn 2014.
    - The end-to end asset management system, certified to ISO 55001, underpins the investment planning and execution of up to GBP 80 million / EUR 990 million of Connect Plus and Connect Plus Services renewals activities each year.
    - On 31 July 2018 Connect Plus (M25) Issuer Plc, a newly incorporated company and fellow subsidiary undertaking issued GBP 893 million / EUR 982million of 2.607% Fixed Rate Senior Secured Bonds due 31 March 2039 which are listed on the London Stock Exchange. The proceeds were used to repay the group's existing commercial loans and terminate their associated interest hedging contracts. However, in 2019 Annual report and financial statements, the company had a loss of about GBP 32 million (EUR 35.2 million) as result of this investment (compared to the GBP 18 million – EUR 19.8 million profit in 2018).
    - Connect Plus is exposed to financial risk through its financial assets and liabilities. The most important components of financial risk are interest rate risk, credit risk and liquidity risk (the latest is considered the most relevant).
    - Works to introduce smart motorway technology and permanent hard shoulder running on two sections of the M25 began in 2013 and completed by the end of 2014. Smart Motorways are a technology driven approach to the use of our motorways, increasing capacity and relieving congestion while maintaining safety. This includes variable mandatory speed limits, emergency roadside telephones, emergency refuge areas (every 2.5 km), all lane running (this includes the hard shoulder permanently converted into a traffic lane) and congestion monitoring technology (to detect and monitor congestion on the motorway and set appropriate speed limits to manage incidents and smooth traffic flows, making journey times more reliable). This is an innovative approach which is going to be implemented in other UK highways as well.

21.4.1. Pro-Cons analysis

Pros

- In-House O&M services
- The number of works helps the local economy and business activities

- The number of incidents is likely to decrease whilst journey reliability to improve with the Smart Motorway technology

Cons

- Overspending risk and/or profit less than expected
- Financial risk (e.g. Liquidity risk)

22. UNITED STATES

22.1. BACKGROUND ON FUNDING IN THE COUNTRY

The Federal-Aid Highway Program (FAHP) supports State highway systems by providing financial assistance for the construction, maintenance and operations of the Nation's 3.9 million-mile highway network, including the Interstate Highway System, primary highways and secondary local roads. The Federal Highway Administration (FHWA) implements the FAHP in cooperation with the States and local government, who are responsible for the roads. Local government, primarily counties, cities and towns, or local public agencies (LPAs), own and operate about 75 percent, or roughly 2.9 million miles, of the Nation's highway network. LPAs build and maintain this network using a variety of funding sources, including the FAHP.

The FAHP is an umbrella term for the separate highway programs administered by the FHWA. These programs are almost entirely focused on highway construction, and generally do not support operations (such as state DOT salaries or fuel costs) or routine maintenance (such as mowing roadway fringes or filling potholes). Each state is required to have a State Transportation Improvement Plan, which sets priorities for the state's use of FAHP funds. State DOTs largely determine which projects are funded, let the contracts, and oversee project development and construction. More recently, metropolitan planning organizations have played a growing role in project decision-making in urban areas, but federal project funding continues to flow through state DOTs.

Under the 2015 surface transportation reauthorization act, the Fixing America's Surface Transportation Act (FAST Act; P.L. 114-94), which authorized funding for FY2016-FY2020, 92% of FAHP funding is distributed through five core programs. All five are formula programs, meaning that each state's share of each program's total annual authorization is based on a mathematical calculation set out in the law. The remaining programs, generally referred to as discretionary programs, are administered more directly by FHWA, but the funding distribution of some of these programs is formulaic as well. The FAHP does not provide money in advance. Rather, a state receives bills from private contractors for work completed and pays those bills according to its own procedures. The state submits vouchers for reimbursement to FHWA. FHWA certifies the claims for payment and notifies the Department of the Treasury, which disburses money electronically to the state's bank, often on the same day the voucher is submitted by the state.

The Highway Trust Fund is financed from several sources, including taxes on fuels, heavy truck tires, truck and trailer sales, and a weight-based heavy-vehicle use tax. 5 However, approximately 85%-90% of trust fund revenue comes from excise taxes on motor fuels, 18.3 cents per gallon on gasoline and 24.3 cents per gallon on diesel. The HTF consists of two separate accounts—highway and mass transit. The highway account receives an allocation equivalent to 15.44 cents of the gasoline tax and the mass transit account receives the revenue generated by 2.86 cents of the tax. Because the fuel taxes are set in terms of cents per gallon rather than as a percentage of the sale price, their revenues do not increase with inflation. The fuel tax rates were last raised in 1993.

Sluggish growth in vehicle travel and improved vehicle efficiency have depressed the growth of fuel consumption and therefore the growth of fuel tax revenue. Since FY2008, the revenues flowing into the highway account of the HTF have been insufficient to fund the expenditures authorized under

the Federal-Aid Highway Program. Congress has resolved this discrepancy by transferring money from the general fund to the HTF.

The FAST Act provided for USD 70 billion (about EUR 60 billion) in general fund transfers and a USD 300 million / EUR 245 million transfer from the Leaking Underground Storage Tank Trust Fund (LUST) fund. The FAST Act also includes a 1 July 2020, rescission of USD 7.569 billion (about EUR 6.5 billion) in contract authority.

The National Highway System (NHS) is a network of strategic highways within the United States, including the Interstate Highway System and other roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. Altogether, it constitutes the largest highway system in the world.

Individual states are encouraged to focus Federal funds on improving the efficiency and safety of this network. The roads within the system were identified by the United States Department of Transportation in cooperation with the states, local officials, and metropolitan planning organizations and approved by the United States Congress in 1995. The National Highway System Designation Act of 1995 (Pub.L. 104–59, 109 Stat. 568) is a United States Act of Congress that was signed into law on November 28, 1995. The legislation designated about 160,955 miles (259,032 km) of roads, including the Interstate Highway System, as the NHS. The NHS was expanded to about 230,000 total miles in 2012.

Toll roads represent a very small portion of the entire road network throughout the Unites States. Toll roads represent approximately 5,800 miles in the United States, or approximately 2.5% of the NHS. Toll roads exist in 35 of the states. Federal-aid funding can and has been used on eligible toll roads; however, Federal statute limits Federal-aid participation to only certain eligible projects and provides restrictions for the use of toll revenues.

22.2. CASE: SOUTH BAY EXPRESSWAY

Project Profile: South Bay Expressway (SBX) (formerly SR 125 South Toll Road)

The California Department of Transportation (Caltrans) is an executive department of the U.S. state of California. Caltrans is headquartered in Sacramento. Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies.

The South Bay Expressway (SBX) toll road (the SBX Project) is a 9.2-mile, privately-developed southern extension of SR 125, extending from San Miguel Road in Bonita, CA near the Sweetwater Reservoir to SR 905 in Otay Mesa, near the International Border. The SBX Project connects the only commercial port of entry in San Diego to the regional freeway network. This project, made possible through an innovative public-private partnership, completes the missing link in San Diego's third north-south freeway corridor.

The SBX Project was developed pursuant to California's AB 680 legislation passed in 1989. Under the original franchise agreement, the private developer raised capital for the Project and constructed the road in exchange for a 35-year toll concession. Caltrans owns the highway but leases the road back to the franchisee. Currently, the San Diego Association of Governments (SANDAG) has the franchise, under an amended agreement executed when the toll road was sold to SANDAG in December 2011. Control will revert to Caltrans in 2042.

The project was delivered as a 35-year build-transfer-operate franchise with the State of California that allows the franchisee to set market toll rates. Construction period financing consisted of:

- Bank debt – USD 340 million / EUR 280 million (backed by toll revenues)
- Transportation Infrastructure Finance and Innovation Act (TIFIA) loan – USD 140 million / EUR 117 million (backed by toll revenues)
- Donated right of way – USD 48 million / EUR 40 million
- Investor equity – USD 130 million / EUR 110 million

This project was innovative for two reasons. The USD 140 million / EUR 117 million TIFIA loan was the first-ever provided to a private toll road development and the first with bank debt and private equity. Also, the original TIFIA debt service repayment structure was sculpted with mandatory and scheduled components.

22.2.1. Pro-Cons analysis

Pros

- The credit quality of the cash flow stream has been improved significantly through the sale of the Toll Road to SANDAG.
- On 30 December 2010, SBX LP filed a Plan of Reorganization (Plan) with the Bankruptcy Court, pursuant to which SBX LP was converted to a Delaware limited liability company, South Bay Expressway, LLC (SBX LLC), and the debt of the Lenders and TIFIA was restructured. The Bankruptcy Court confirmed the Plan on 14 April 2011, which included the settlement of all litigation matters with the contractor, Caltrans, and certain other parties.

Cons

- The burden of claims by the contractor that built the SBX Project, particularly the ongoing litigation costs.
- The SBX Project's financial condition was also a factor as the financial prospects were being impacted by lower than anticipated revenues due to the economic downturn.

22.3. CASE: CENTRAL TEXAS TURNPIKE

Project Profile: Central Texas Turnpike System

When the TIFIA loan closed, the Central Texas Turnpike System (CTTS) - now simply referred to as Austin Area Toll Roads - consisted of three contiguous toll highways serving the Austin metropolitan region and the Austin-San Antonio corridor:

- SH 45 North - 13 miles, four to six lanes, from Ridgeline Boulevard west of U.S. 183 eastward to SH 130
- Loop 1 - a northward extension of the existing Loop 1 (Mopac Expressway), three miles from Parmer Lane to SH 45 North
- SH 130 (Segments 1-4) - a 49-mile, four-lane tollway extending north-south through Williamson and Travis Counties, extending from I-35 north of Georgetown to US 183 southeast of Austin.

SH 130 is a four-lane, 91-mile toll road east and south of Austin designed to relieve congestion on the heavily traveled I-35, the primary north-south route through Central Texas. Segments 1-4 of SH 130 (which are part of the Central Texas Turnpike System that includes SH 45 North and Loop 1)

were constructed as a separate project and opened in stages between November 2006 and April 2008.

The project delivery method was design-bid for the SH 130 Segments 1-4. SH45 North and Loop 1 were delivered as design-bid-build. The overall cost for design, construction, right of way, interest, insurance, debt issuance costs, and reserve fund totaled USD 3.25 billion / EUR 2.7 billion. Sources of funds included:

- First tier revenue bonds/notes – USD 1,358 million (about EUR 1.1 billion)
- TIFIA loan – USD 900 million / EUR 750 million (used to retire Bond Anticipation Notes [BANs] in 2007 and 2008)
- State funding – USD 520.1 million / EUR 430 million
- Local contributions/Commission funds for ROW – USD 286.5 million / EUR 240 million
- Interest earnings/accrued interest – USD 185.2 million / EUR 155 million

SH 130 (Segments 1-4) was procured through Texas' first application of its Exclusive Development Agreement (later Comprehensive Development Agreement) provision, contractual arrangements equivalent to public-private partnerships. In this case, a design-build contract was used to accelerate completion.

22.3.1. Pro-Cons analysis

Pros

- Use of innovative financing and a fixed-price, lump-sum design-build contract for SH 130 delivered the CTTS components 25 years sooner than conventional pay-as-you-go financing would have delivered
- Components were delivered ahead of schedule and less than the original 2002 cost estimate

Cons

- Forecasted traffic and revenue growth have had challenges (SH130 Segments 5 and 6)

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