

Revenues

This section defines revenues for a PPP project, also known as cost recovery, from the public sector perspective. It presents the sources of revenue available to fund PPP projects, the economic agents within the community from whom those resources will be collected, either toll payers/road users or tax payers or a combination, and the mechanisms involved.

The associated subject of investment recovery is that addressed in the Finance section and discusses how the private sector is remunerated once it has contributed to prefinancing the project.

Payment to the private sector

Private firms involved in PPP are obviously very concerned about how they will receive the payments that cover the costs of their investment, including annual operating and maintenance costs. Contracts are often long-term and private firms will be very reluctant to embark on the project if they are not convinced that the funds will be provided and will be sourced from stable sources.

It is important to distinguish the concepts of revenues (eg toll collection) and payments to the private sector, since they are not necessarily linked.

For example, and as discussed in Module 2 -> Risk, it is not always in the public sector's interest to transfer the commercial risk to a private operator. It is possible to engage a private firm to collect tolls on behalf of the Government, which then pays the road operator. The toll collector and the road operator can even be the same company, but in such a case, cash flows are kept separate and remuneration of the operator is not related to the revenue collected. Payment of private firms by the public sector, although leaving the commercial risk outside the operator's responsibility, does not prevent efficiency incentives being included in the contract agreement (performance-based contracts). Such contractual provisions are often used in the mass transit sector.

Sources of revenues

Revenue for developing road infrastructures comes mainly from two economic agents: road users, tax payers or a combination of the two groups.

Road users should be understood in a broad sense to include private or business owners of vehicles driving along a road from which a charge is collected on a distance, time or usage basis. Various systems are available to collect the revenue whether pre paid, stickers (vignettes) or mechanical/human.





Taxpayers' contributions are made through:

- general taxes (such as income tax or VAT) that enter into the general State budget,
- specific or earmarked taxes related to car ownership or utilization (such as excise on petrol, vehicle import tax, vehicle licensing tax, etc.). These specific taxes can be dedicated to the road network improvement if they are allocated in a Road Fund.

There is however no clear border between road user charges for a specific road, and general taxes related to car ownership or usage since these are paid by all vehicle owners and therefore all road users. Although fuel/oil taxes and vehicle licensing fees are not collected to recover costs for a specific project, they are indeed road user charges at the network level.

Besides, road construction or improvement will also have indirect positive impacts to the surrounding economic environment. Therefore it is reasonable that part of this gain should benefit the project finance through revenues from advertising, land rents along the road corridor or from secondary business activity.



Payment Mechanisms, 2004

Revenues from taxpayers

General Taxes: Funding Roads from the General Budget

General taxes will obviously not be exclusively used to finance infrastructure facilities. Consequently, financing road investments from the general budget is somehow discriminating for non road users who contribute to financing an infrastructure they do not directly benefit from. Also, externalities are both positive and negative, since the general public indirectly benefits the lower consumer prices resulting from reduced transport costs whilst also sharing negative effects from the environment.

Specific taxes are not only justified for the sake of fairness in the collection of resources from the community, they also allow Governments to adjust their general tax policy to their political objectives (energy-saving measures, environmental protection, and transport policy).

However, social considerations can be addressed by specific taxes only to a limited extent. Vehicle licensing usually takes into account either the cost of the vehicle or the engine capacity but which may have little correlation to the users' social conditions.

Beyond the political question about who shall pay for road investment and maintenance, setting up an efficient cost recovery mechanism addresses a vital concern for the management of the road system.



Shadow tolls and/or annuities (also known as availability based payments) are funded either partly or fully by the taxpayer not the road users. Under both schemes the private sector builds the infrastructure and is repaid after the project opens. Under the shadow toll scheme payment is linked to traffic levels. Under the annuity/availability, the concessionaire is repaid according to pre agreed payments when the road is available for use. There is no toll i.e. road users are not charged and the government, through the tax payer, pays the concessionaire directly. Annuities are popular in India and shadow tolls have been used in Portugal and in the UK but there has been less interest in shadow tolls recently. In the UK, the National Audit Office has criticized shadow tolls for lack of risk related incentives and many toll roads have been funded through annuity / availability type schemes.

Road Funds: Ensuring stability and dedication of resources

In strict economic terms, funding the maintenance of infrastructure facilities from the general budget is preferable so that its allocation may be subject to same scrutiny and accountability by public authorities as for other public funds and that the overall use of public resources in the budget may be adjusted to reflect their economic optimum.

However, most countries, and in particular low- and middle-income countries, faced with a shortage of tax revenue and budgets and public budgets combined with political imperatives, often draw resources from road maintenance budgets to other more favored sectors. Such a process often results in insufficient and unpredictable road maintenance budgets which can seriously compromise the efficient long-term management and sustainability of the road network.

Road funds, or road maintenance funds, are dedicated funds for the purpose of road maintenance, funded largely from public sources (taxes, levies and duties), possibly supplemented with road tolls. Road funds are thus intended to ensure stability and dedication of funds for road maintenance and operation by separating the resources allocated to the roads from the government's consolidated budget and managing them on a stand-alone basis.

The notion of a road fund is not a new idea. There were, and still are, a range of such funds in the developed world, notably in the United States of America and Japan established in the 1950s. A central road fund has existed in India since 1929. They also exist in quite a large number of transition and developing countries.

Initial road funds comprised the earmarking of selected road related taxes and charges and their depositing into a special off-budget account, or road fund, to support spending on roads. These funds were not entities as such but national budget line items managed by the sector ministries concerned and which were intended to be dedicated to the funding of road maintenance.

The performance of such funds had, however, been mixed. Some of the common problems cited were: poor financial management; absence of independent audits; extensive use of funds for unauthorized expenditures; diversion of funds; and weak oversight. As a result, many of these earlier road funds, sometimes known as "first generation" road funds, have actually been closed down, very often at the express urging of the World Bank and IMF, notably in Europe and Central Asia (Georgia, Latvia, Romania and the Russian



Federation, for example) but also in sub-Saharan Africa (Mali). A number of other "first generation" road funds in sub-Saharan Africa are under restructuring in an effort to address these problems (Gabon, Madagascar and Senegal, for example).

As a result of these weaknesses, "second generation" road funds have been established. A critical dimension of this form of road fund was the creation of a specific legal and institutional framework, which would assure proper management of the funds and accountability to users and government. "Second generation" road funds are thus governed by specific legislation which sets out the roles and responsibilities of a representative management board to oversee operations and a secretariat to manage the business of the road fund on a day-to-day basis. The legislation has generally sought to set up an institution, which has a unique mandate for securing resources and channelling these funds to mandated road agencies.

The key characteristics of "second generation" road funds, as generally understood are set out below:

- Sound legal basis separate road fund administration, clear rules and regulations.
- Agency, which is a purchaser not a provider of road maintenance services.
- Strong oversight, board based private/public board.
- Revenues incremental to the budget, coming from charges related to road use and channeled directly to the Road Fund bank account.
- Sound financial management systems, lean efficient administrative structure.
- Regular technical and financial audits.

Road funds must also be reconciled with the concern of the IMF and some ministries of finance, for maintaining a common, disciplined budget. IMF criteria in determining the acceptability of road funds, as outlined by Potter (1997) include:

- a focus on dedicated road maintenance funding rather than on avoiding strict budget discipline
- the separation of the purchaser function of the road fund agency from the road maintenance service provider
- the presence of a management board with private sector participation but free from producer pressure
- the adoption of a robust financial management system to assure equal or better standards to those prevailing in central Government.

In Sub-Saharan Africa, the Sub-Saharan Africa Transport Policy Program, SSATP, contributed to the setting up of second generation road funds from the end of 1980s under the Road Maintenance and Financing (RMI), RMF/SSATP.

The SSATP through analysis of its database (RMI Matrix) considers that whilst road funds have secured overall a more stable and predictable flow of funds for road maintenance, country progress varies widely and, although a country might have established a road fund, this does not necessarily mean that it is either fully efficient, or fully autonomous. In most cases, the establishment of a road fund has not resolved the insufficiency of funds for road maintenance. The results also show that more efforts are required to capture and sustain the efficiency gains that could derive from the improvement of road management practices and better use of available re-sources.





The RMI Matrix of SSATP is updated on an annual basis, and summarizes the state of advance of reform implementation in 30 countries of Sub-Saharian Africa with a particular emphasis on road funds performance.

Best practice and experience in the setting up and management of road funds are described in:



Transport and Communications Bulletin for Asia and the Pacific, No. 75, Road Maintenance Funds, ESCAP, 2005



Financing of Road Maintenance in Sub-Saharan Africa. Reforms and progress towards second-generation road funds, Mustapha Benmaamar, SSATP, Sept 2006

Revenues from road users

Tolls

Tolls are payments required of users to access a section of road network that is directly or indirectly related to the distance driven on the road.

Because of the direct link between the provision of the service and the corresponding payment from the user, tolling can be considered as a fair way of mobilizing resources and an efficient manner of inducing psychological ownership of the roads by the public, who thus become aware of the cost of building and managing these facilities.

Direct collection by the private operator as a basis of its remuneration is the most popular way of structuring privately-financed toll road projects. The feasibility of such a scheme shall be studied by the public sector at an early stage to ensure that revenue to be generated from the project will be in proportion with the level of investment required from the private developers. (Module 5 -> Due Diligence and Feasibility Studies).

When expected revenue is not in line with the investment and the scope of work expected from the private sector, government support (Module 3 -> PPP Policy Framework -> Financial Framework -> Incentives and Guarantees) can enhance the project's bankability by reducing the private share in either the investment or the operation costs and placing the remaining activities and cost under the responsibility of public institutions.

Rules regulating how toll rates, which are crucial for the project's stability, are set must clearly be determined. Toll rates are often subject to specific contractual provision fixing, with a maximum level usually linked to inflation (Retail Price Index: RPI) or a more flexible formula which can incorporate inflation, traffic levels and performance indicators.

Traffic on toll road projects often does not match the forecasts prepared in the preliminary studies/project preparation. Variations both in traffic volume and traffic structure (types) will directly influence the private operator's revenue.





It is necessary to take into account such potential variations throughout the entire project life to ensure that both the community and the private players are fairly treated.

Financial regulation is one of the most important and difficult tasks for the public sector in PPP projects. (Module 3 -> Legal and Regulatory).

User Willingness and Ability to Pay

The acceptability of tolling is however often a challenge for public authorities and for private operators in charge of toll collection.

The principle itself of toll roads is not easily accepted by the public and the first toll road experience in a country often leads to strong protest, political debate and sometimes legal challenges from anti-toll lobbies.

Road users should be associated with the decision-making process at an early stage and efforts should not be spared to justify and explain the advantages of the toll system to the public. (Module 3 -> Economic Development and Public Interest -> Public Participation and Consultation).

People are more likely to pay for a new service rather than for a service which was free before, even if it has been improved. Therefore it is not recommended in countries without any experience with toll to start implementation of tolls with brownfield projects unless a major improvement is proposed.

Even when accepted as a principle, toll rates should be set and evolve at an adequate level. They have an influence on transport demand which is likely to affect both the economic and the financial viability of a project. (Module 3 -> Sector Planning and Strategy -> Planning Process -> Demand Forecasting -> Influence of tolling on transport demand).

Policy makers should decide if alternative "free" roads should be made available to users along the toll road corridor. Such a competing infrastructure facility would automatically capture traffic from the toll road but can be justified:

- socially, by keeping a transport alternative for the poor,
- psychologically, by greatly facilitating the acceptance of users who feel they have a choice,
- economically, by allowing each player to choose between two alternatives with different service levels (travel time, overall trip cost) depending on the importance of the trip,
- by bringing competition into a market that would otherwise be a monopoly and could lead to abuse of the dominant position of the operator.

The decision to allow a free alternative route shall only be made after a sound economic analysis along the corridor to assess whether the transport demand justifies duplicating the link. The rules of the game regarding availability of alternative roads should be clearly specified in the contractual obligations for both private and public parties and should not change over time.





Secondary services are another form of user charge.

These services comprise the provision of petrol stations, rest and service areas (restaurants, hotels, etc.) and the availability of information services along the road. Whereas they are generally directed towards all types of road users, they might also comprise services specifically addressing truck drivers who spend significantly more time on the road than most drivers. As most of the providers of these services have a captive market, they are able to charge a premium which can be shared with the road operator. Such sharing arrangements can take the form of a specific (property) tax collected by the public sector, a sub-concession fee (profit share, percentage of turnover, etc.) or an up-front payment or contribution towards the funding of the project.

Development gains are generated by the development of activities in the vicinity of the road which are not directly focused on the road users.

These activities include the development of shopping centers, leisure parks, office buildings and industrial sites. They benefit directly (access) or indirectly (better road connections) from the road but are developed under a completely different scheme to the road in terms of finance and land requirements.

Development gains also include services such as the installation of a cable along the motorway (i.e. cable companies using the road corridor to develop their networks).

In the case of purely public sector projects, the public sector might consider that it will benefit from such development gains through additional taxes and from the fact that they create employment and it therefore does not wish to negotiate further arrangements with these developers (in fact, the road connection might actually be the result of attracting these developers).

In the case of private sector-led projects, similar arrangements can be developed as for the ancillary services, including an invitation to participate in the funding of the road project.

PPP projects can also be implemented as part of a development, i.e. the private developer agrees to finance and build a road link in return for obtaining the approval to implement its (property) development interests.

Road pricing

Road pricing (road user charge rates), comprising mainly tolls but also dedicated taxes, is a fundamental question that should be addressed by policy makers beyond the financial constraints of project bankability for privately financed projects.

When determining road pricing, users' willingness and ability to pay should always be taken into account. Road pricing is a very clear method of translating the Government's policy on the portion of the overall cost (investment, maintenance and operation cost) to be recovered from road users and the portion to be recovered from the community as a whole.





Which part of the overall project cost should be funded by road user charges?

The marginal cost is the cost associated with any supplementary driver using the road once the infrastructure is functioning. Such a cost is typically low for road infrastructure facilities until congestion appears and maximum capacity is reached.

Charging road users at marginal cost would therefore imply low tariffs in non-congestion periods and a sudden sharp rise to adjust the infrastructure when maximum capacity is reached.

To reach the economic optimum (usually called the Pareto optimum) the user price has to be set at marginal cost. This would however result in a project budgetary gap due to the high initial cost of road infrastructure facilities. Two options are available to fill this gap:

- finance the original investment from community funds. Such a choice could be justified by the fact that the community (taxpayers) benefits from the positive externalities created by the infrastructure,
- charge some categories of users a higher rate than marginal cost to recover part or all of the investment cost (Ramsey pricing).

In general, integrating more than the marginal cost into road user charges leads to an economic sub-optimum for the project. To some extent, the economic answer to the question "Should a road be tolled?" is "No". When non-economic constraints are integrated, the practical question is often rather "A toll road or nothing?" Tolling is not a panacea but often a good way of making a project feasible.

Demand Management

User charges and tolls in particular can also be used for demand management. In other words, toll rates can be used as a factor to discourage traffic on the roads and optimize the use of the road network.

The main objectives of demand management are mainly threefold:

- Optimization of traffic flow to enhance the economic benefits of the road. Attention is paid in particular to:
 - o **traffic volumes:** when road capacity is exceeded, benefits decrease substantially,
 - o **traffic structure:** heavy vehicles with an incomparably adverse impact on maintenance costs (pavement distress).
- Optimization of toll revenue is closely related to traffic optimization but focuses on how much road users can afford to pay. On top of the above considerations, revenue optimization would tend to favor higher toll rates for users who are less price-sensitive.
- Social considerations: it could be a political objective not to penalize poorer road users. However, tolling is not an efficient tool for taking account of the social pricing of transport services since toll collection constraints do not allow pricing structures to be built on sophisticated parameters. More elaborate systems will probably provide more flexibility to policy makers in this regard. In developing



countries, with much bus use, bus operators could be charged lower toll rates or related bus passenger tolls could be foregone, for example.

Setting toll rates is a powerful way of achieving the above objectives. However, it can easily be seen that they may conflict with each other and priorities should clearly be set by the public authorities.

When the public sector is operating a road, adjustments can be made when the original tariff structure does not produce the expected results.

When tolls are directly linked to private sector revenue, these objectives shall be clearly reflected in the rules imposed on the private operator during the selection process: Module 5 -> Procurement.

The following parameters are usually used for demand management:

- Differentiate toll rates over periods of a day, a week or a year. Toll rates are increased during peak hours to minimize traffic and decreased during off-peak hours to encourage a more balanced, regular use of the road.
- Apply different toll rates per vehicle type. Typically, vehicles with an adverse influence on the traffic and on maintenance costs are charged more.

Demand management efficiency greatly depends on the availability and accuracy of information on the road users and in particular:

- Traffic volumes and structures,
- Origin/destination (O/D) matrices,
- Sensitivity of the various categories of road users to toll rates.

These parameters shall be carefully addressed during feasibility studies conducted on the project and in particular during the economic evaluation (Module 3 -> Sector Planning and Strategy -> Planning Process -> Demand Forecasting).

Both public players and private operators should also closely monitor these parameters to further optimize demand management during the operation period. In PPPs, adjustment of the toll rates is a very delicate exercise that is limited by the contractual obligations of both the public sector and the private players.



SELECTED TOLL RATES (2008)			
Country	Project	USD cent/km (approx)	Comments
Austria		13.5	>3.5 and <12 tons
		EUR 72.6 annual vi- gnette	light vehicles
Australia	M5	11	
Brazil		3.5	
Canada	407 ETR	15	Regular Zone Peak Rate
China		3 - 6	
Colombia	Bogota-Cartagena	3.6	
Croatia	Zagreb - Rijeka	6.9	
France		9	
Hong Kong		8	
India		2.2	
Italy		9	
Spain	Barcelona-Bilbao	8	
UK	M6 Toll	16.5	Day (06:00 - 23:00) rate
US	North Caroline Turnpike	8.4	

Source: Consultants, exchange rates at October, 2008

Toll Collection

Closed and Open Systems

In a closed system, toll plazas are situated at every entrance and exit of the highway which ensures that all users pay according to their use of the motorway.

In an open system, toll barriers are located at regular intervals along the main highway. Users thus pay a toll that is not directly related to the distance driven but more approximately, based on the number of toll plazas they have passed through.

On sections with particularly heavy traffic, toll collection has an adverse effect on congestion by stopping vehicles at the toll plaza. This problem is usually mitigated through the careful design of toll booths and plazas, in which the number of booths should be calculated based on the average time spent in collecting the tolls and the amount of traffic.

The closed system

In a closed system the user enters the toll road and cannot leave it without paying a toll based on the distance travelled and the vehicle category. This system requires toll plazas to identify the points of entry and exit of the user and the distance travelled, the vehicle category and to collect the toll. Thus toll barriers are located at the extremities of the network and at every interchange.





Generally, the closed system is considered to be well suited to interurban sections, for the following reasons:

- fairness of tolls: tolls are calculated on the distance effectively travelled;
- the average distance travelled is quite long: the number of toll transactions compared with the distance traveled is low, and the transaction time is short compared with the total travel time;
- outside urban areas, land is usually available at an acceptable price. For the same reasons, the closed system is seldom applied to urban areas.



The open system

In an open toll system, tolls fees are levied at certain points on the expressway, either on the main carriageway or at interchanges. These flat toll fees do not necessarily reflect a consistent rate per kilometer since they may relate to different trip lengths (tariff distortions are inherent in most open systems). The system therefore only requires toll plazas where users are identified by their category and pay a fixed toll per category. The toll barriers are generally located at regular intervals.



Usually, the open system implies:

- high traffic levels;
- a relatively large area of land for toll installations, although less when using electronic toll collection (ETC) systems;
- frequent stops over long distances.

Usually, this system is well suited to suburban areas or to urban sections:

- short average distance traveled;
- usually less land required as compared to a closed system.





Means of payment

The established method of payment in both open or closed systems is "stop and pay". New methods of toll collection have been developed and are now in operation where the driver is not required to stop; instead, the vehicle is identified by a remote control system as it passes, with or without stopping, through a special lane. The transaction is automatically recorded and the toll is debited from the subscriber's account. Such a system offers a much better service to regular users.

The following forms of payment are then possible:

- Cash payment: cash is the traditional form of payment, and the most common in many countries, especially for small tolls.
- Magnetic cards: such cards include national or foreign bank cards, credit cards, and private cards such as petrol company cards or automobile club cards, for example.
- For subscribers, specific payment systems: these are of special importance if the toll road is used by a large number of commuters on some of its segments. For regular users, stored-value magnetic cards (chips or stripe), automatic vehicle identification (AVI) systems, etc. could be used.
- For occasional users, **tickets or tokens** are very suitable.

Electronic Toll Collection Systems

Improvement in toll collection technology results in smoother traffic flow through toll plazas.

New systems based on electronic toll collection have been implemented in various countries with varying degrees of success but which constitute a promising development. Electronic toll collection systems are usually of three types:

- a system based on satellite positioning and navigation systems and cellular phone communication.
- dedicated short-range systems where an on-board unit communicates with roadside equipment.
- a system of cameras with OCR technologies to record license plates.

Such systems are constantly improving in efficiency and reliability and have proven their competitive advantage in particular on high traffic roads. This technology now allows road users to pass the toll booth plaza at a low speed without stopping (see Chile and UK M6 Toll Road case studies Module 6 -> Case Studies).

However, care should be taken to ensure that the user recognizes the service provided by the electronic collection system, and that the cost of the toll and the technology applied do not create additional costs and difficulties compared to manual collection.

The potential drawbacks of such systems shall be carefully assessed and in particular:

 even if equipment can be procured from abroad, adequate technological resources should be available in the project country (qualified labor, spare parts) and legal constraints need to be overcome regarding protection of privacy and enforcement



- issues: without full legal and operational ability to claim tolls from non-payers (enforcement rights), any fully electronic tolling system is useless
- multi-lane electronic tolling systems require the availability of well-developed payment systems (credit cards, etc.) and enforcement issues are increased.

Apart from being efficient, electronic toll collection systems create the paradox of making tolling less painful for users (who may barely even notice that they have paid) and who are therefore less aware of the associated costs of construction and maintenance of the highways, whereas such awareness of highway costs may be desirable in order to develop a feeling of "ownership" of the infrastructure facility within the community.

Low speed toll barriers

This technology uses a normal toll plaza with special reserved lanes for subscribers. The vehicle reduces its speed on approach to the toll barrier, to allow recognition of the subscriber and recording of the passenger by DSRC communication, before the barrier is raised a few seconds before the passage of the vehicle. This technology allows improvement of traffic flow through toll without significant changes to the toll plaza structures or to enforcement policy. In the event that the subscriber is not recognized, the barrier does not go up and the road user cannot cross the toll plaza.

Free flow tolls

With this technology the cars cross the toll plaza at normal speed. Free flow tolls uses equipment placed on gantries over the highway; there are no toll booths, which would be dangerous for traffic at normal speed. The equipment comprises DSRC devices to record the vehicles of subscribed users as well as cameras with OCR functions to record the license plates of unsubscribed users. However, such a free flow system requires an enhanced enforcement ability of the toll company, since the toll company must be allowed to check the license plate register for vehicles crossing the free flow toll without subscription (and thus without payment) and recover costs from these users.

Toll-free systems

With this technology there neither toll plazas nor gantries. The distance travelled by a user is calculated with a GPS installed in an On Board Unit (OBU), a communication device installed in the road user vehicle. The OBU contains information such as the type of car or its level of pollution which, combined with the types of road on which it travels, allows the toll to be invoiced at the end of the month. This system is particularly appropriate when governments decide to tax existing roads without the use of toll plazas. The first use of this system was the government of Germany which has introduced a tax for trucks using the Federal road network.

Urban tolls

Several cities, notably London and Stockholm, have introduced an urban toll. The cars which enter the designated inner city zone have to pay a tax and the cars are recognized through cameras with OCR software which allows them to record the license plate. The purpose of this taxation is generally to improve traffic flow and accessibility to inner city



areas by decreasing road congestion and raising funds for associated improvements in public transport. Since the funds are not used to pay back infrastructure or maintenance costs, such tolls are not considered to be directly relevant to PPP funding and are thus not developed further in this Toolkit.

Vignettes (Stickers)

An alternative way of collecting charges is to sell vignettes (stickers) that authorize a vehicle to use a road for a given period. The main advantage of this system lies in the fact that much less time is needed to control vehicles along the road than to stop them to collect tolls. Adverse effects on congestion are consequently largely limited, particularly when controls are made on the sample basis rather than systematically. Vignettes can be sold on the operator's premises along the road or in shops in neighboring towns.

Who collects tolls?

Tolls may be collected as follows:

- by a Government entity and transferred either to the general budget or to a road fund,
- by a public organization also in charge of road operation,
- by a private firm on behalf of the Government. In such a case the private firm only provides the toll collection service and is paid separately,
- by a private firm in charge of road operation. Remuneration of the private firm is then linked with the funds collected through the tolls.

