

CHAPTER 12

# FINANCING, FUNDING & CHARGING



## 12.1 Introduction

Central to investing in transport infrastructure, delivering services and promoting economic growth is financing and funding of infrastructure. Fiscal gaps are likely to result when the expenditure need / demand outweighs the revenues generated from taxes and borrowing. Our historic backlog in infrastructure investment (see Figure 12.1 below) coupled to the 2008 global financial crisis, which had a dampening effect on the wider South African economy, is negatively impacting revenue sources for capital expenditure.

Figure 12-1 shows that between 3% to 4% of the GDP was invested in transport in the 60's to mid-80's, then investment reduced to 1.5% to 2.5% of GDP over next 25 years until 2008. Capital investment in transport declined in particular from 1984 to the early 2000s.

This has created a backlog in transport investment which will require massive investment over the next 20 years simply to recover. Whilst it is recognised that government has invested billions of Rands in transport since 2008, the long-term funding and investment in transport remains a challenge and there is a need to identify other sources beyond the National Treasury.

This chapter considers how transport initiatives ought to be paid for; both who should pay and what the mechanism of paying should be. These considerations are different from *what* should be provided and *who* should provide it. What to provide should be the rational choice from a set of potential solutions; who to provide should be selected based primarily on efficiency considerations; who should pay depends on who benefits.

The second part of this chapter puts to bed the *what* and *who to provide* questions. It briefly recapitulates the project identification and prioritisation decisions and the choice of delivery mechanism. These topics are treated more comprehensively elsewhere in this report. The projects identified and prioritised in that manner typically include investments that are lumpy (capacity is provided ahead of demand) and risky (technically, but especially commercially). Costs are front-loaded while benefits are deferred and not assured.

At this stage, it is useful to draw attention to the key terms used in this chapter, specifically the distinction between "financing", "funding" and "charging". "Financing" is the activity of amortising (postponing and smoothing) what would otherwise have been up-front financial

obligations, so that the cost stream becomes aligned with the benefit stream. Financing is an intermediary service provided by parties who do not benefit from the transport project itself but who are rewarded for providing the amortising service. The topic of financing is addressed in the third part of this chapter.

The fourth part considers "funding". "Funding" implies how the project is ultimately paid for. It, therefore, equates with "revenue", i.e. the ongoing financial contributions of the project's clients to offset the (now-amortised) costs. The clients are users who enjoy the project benefits themselves or those who subsidise other users to enjoy the benefits.

In the fifth part of this chapter, "charging" is considered. "Charging" refers to the mechanics of how users pay, i.e. the type and level of fee they pay and the form of payment. It is, therefore, a sub-set of "funding".

Although financing, funding and charging can be seen as quite discrete activities, there are some important feedback loops between them. For example, tension will arise if an equitable funding determination requires a user contribution but an accurate and efficient charging

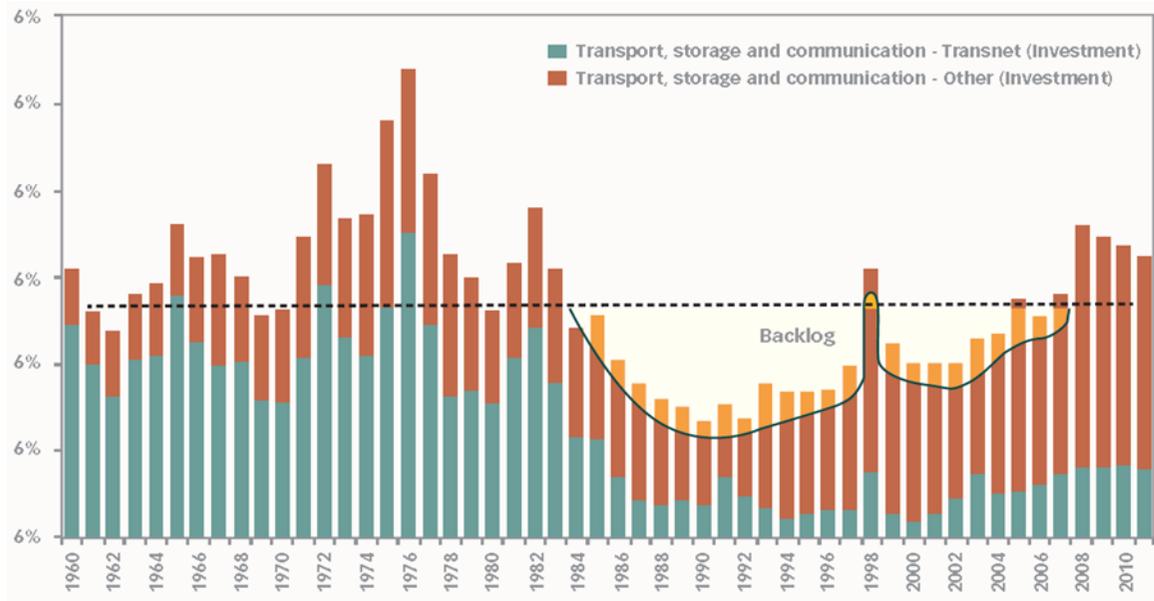


FIGURE 12-1: NATIONAL TRANSPORT CAPITAL INVESTMENT TRENDS

mechanism is not available; or if an inequitable funding allocation requires too high a user contribution, in which case financiers may not be comfortable risking capital for the project.

*“Cost recovery from users is a key foundation of infrastructure sustainability, together with fiscal support for access to essential services.*

*I therefore wish to endorse the Deputy President’s carefully balanced approach to resolving the Gauteng Freeway financing matter. Concerns regarding the socio-economic impact of toll tariffs have been heard, and revised monthly ceilings will shortly be proposed. But cost recovery from road-users will continue to be the principal financing mechanism for this major road system.”*

**Minister of Finance Nhlamhla Nene**  
2015 Budget Speech

## 12.2 Decisions Preceding Financing and Funding Considerations

It is not the intention here to develop the procedure for identifying and prioritising projects or for determining the most appropriate delivery method. Chapter 13 provides more details about prioritisation, option or solution development and implementation along with associated steps and decisions to be made. It is, however, useful to briefly review these steps, since they impact directly on achieving an efficient, best-cost project for which financing must be raised and funding secured.

### 12.2.1 Project development and selection

Project development and selection precede financing and funding considerations and are often overlooked in terms of their value in the project creation decision-making process. The starting point entails three broad steps:

- Understand the existing local context in terms of supporting planning and transport policy implying a review and understanding of:
  - The problem that needs to be addressed within the context of national, provincial and local planning policy context
  - The main issues and challenges that need to be addressed
  - Stakeholder engagement, if necessary.
- Define the objective that needs to be addressed or achieved. This is important to ensure that an option/intervention is not predisposed towards projects that might not be optimal or appropriate. This is influenced by asking the question: *“What am I trying to achieve?”*
- Define the needs – ask *“What problem am I trying to solve and why is it important to implement the project or option?”* and identify gaps that need to be filled by the proposed option intervention.

Then develop suitable options/interventions and prioritise them. The process of prioritisation is referred to as “option selection process” (see Chapter 13).

The benefits of an objectives-led approach are that it:

- Recognises the importance of transport in supporting wider policy objectives
- Recognises the DoT’s organisational objectives and uses these to prioritise and package emerging options
- Provides a clear and robust framework for considering the merits of different outcomes and interventions.

Most option selection exercises include proper benefit–cost assessment or appraisal where alternatives (mode vs. mode, modal option vs. modal option, etc.) are considered. Projects scored highly must have inherent economic merit. Strategic merit plays a role, but this element should be assessed critically and honestly. The relative priorities and opportunity costs of projects must be properly assessed, given the constrained resource envelope (i.e. everything cannot be a priority). In short, the right projects must be identified and prioritised before being taken forward.

### 12.2.2 Least cost provision

The prioritised projects must be elaborated to achieve the lowest, sustainable, lifetime costs. Trade-offs between design (up-front cost) and operations (ongoing cost) stages should be considered, as well as the implications for reinvestment and recapitalisation requirements. Projects must, therefore, be efficient. Part of the efficiency considerations also includes who should develop and operate the project (the spectrum of public vs. private delivery is discussed under “Choice of Delivery Method”).

### 12.2.3 Cost of capital considerations

Transport infrastructure and services require large up-front investments to unlock benefits over the long term. Typically, cash flows are uneven and not synchronised with the benefits stream. Up-front costs should be smoothed (“financed”), but this comes at a cost. The costs are

different in type and size, depending on the mix of public and private finance involved. The cost not only of providing but also of financing the project should be optimised.

### CHOICE OF DELIVERY METHOD

Projects may be executed in various ways along a spectrum of pure public to pure private provision. The typical delivery methods are shown in **Table 12-1**. They are mainly distinguished by the extent to which the government assumes project risks and does the actual management of the project.

The choice of delivery method would classically have been for public goods to be provided by the public service sector and private goods by the private sector. Public goods are services of which the benefits extend beyond the direct user to the advantage of the general public; the benefits of private goods pertain to users only. For example, an airport is more private than a railway line and a railway line more private than a road. However, in practice, delivery methods are selected not only in terms of economic considerations but also for strategic and ideological reasons.

In South Africa, with the exception of some toll roads, one rail concession and some airports and all transport infrastructure of national significance are provided by government departments or agencies, irrespective of its public vs. private good nature. Agencies are also typically horizontally (NPA, ACSA, ATNS, SANRAL, etc.) and sometimes vertically (Transnet, PRASA) integrated monopolies that may or may not generate economies of scale, efficiency and scope. These agencies are, typically, statutory monopolies but, arguably, not natural monopolies.

Putting strategic considerations to one side, from an efficiency perspective, the way a project is delivered should, ideally, entail the best combination of least cost and lowest cost of capital considerations. This is often referred to as the test for value for money (VfM). In PPPs, VfM is achieved if increased private sector efficiencies

offset lower public sector cost of capital (after properly considering all risks).

As shown in **Table 12-2**, there are various reasons the private sector should be more efficient than the public sector in delivering a project, but there are also detractions from private delivery.

Because the government has a constrained fiscal envelope (it cannot afford all priorities) and wants to serve as many needs as possible (deliver the most projects), it has to stretch its available means as far as possible. Generally, the aim would be to achieve least cost provision, to move the financing burden and risk away from the government and to the private sector so that public resources can be freed up. The government would also prefer not to incur long-term commitments that may compromise its fiscal scope or flexibility.

The model applied in South Africa has been to obtain the best of both worlds by allocating the delivery responsibility to quasi-private (to achieve least cost) state-owned companies (to reduce cost of capital) that source financing themselves (to free up government resources).

The challenge with this approach is that state-owned companies (SOCs) are often poorly managed against the financial metrics that would apply to private sector companies and government oversight is weaker than that of the private sector, resulting in periodic financial crises and the need for emergency recapitalisation (leading to additional stress on the national budget and the country's credit rating).

CATEGORY	DELIVERY METHOD
Public	Government department
SOCs	State agency/enterprise
PPP	Availability franchise
	Lease
	Concession
Private	Fully private (privatised)

TABLE 12-1: RANGE OF DELIVERY METHODS

TABLE 12-2: SOURCES OF PRIVATE SECTOR EFFICIENCIES AND INEFFICIENCIES

PRIVATE EFFICIENCY	PRIVATE INEFFICIENCY
<ul style="list-style-type: none"> <li>■ More focused compared to a public department with wide range or responsibilities</li> <li>■ Stronger incentives, based on own funds at risk and shareholder pressure</li> <li>■ Innovation, often because of competition for projects</li> <li>■ Specialisation and expertise attracted by private sector remuneration and reward</li> <li>■ More rigorous assessment of risks and contingent actions</li> <li>■ Discipline to deliver on time and within budget, often imposed by private financiers and due diligence process</li> </ul>	<ul style="list-style-type: none"> <li>■ Inability to deal with unforeseen and unplanned risk</li> <li>■ Shorter time horizon on investments and interventions</li> <li>■ Lack of access to funds under exceptional circumstances</li> <li>■ Business model is locked in at the outset, notwithstanding changing circumstances and socio-political requirements</li> </ul>

## 12.3 Raising Finance

The process of financing entails spreading the up-front investment into a least cost project over a longer period corresponding closer to the duration of the benefits received from the investment. The financing decision, therefore, deals with the cost of capital considerations. When private financing is involved, investors and lenders may explicitly or implicitly insist on an efficient project and proper delivery model, especially if the project is not underwritten by the government.

Table 12-3 shows that, depending on the delivery method, projects will have access to different financing sources and combinations thereof (gearing). There are essentially two types (corporate and project finance), two forms (equity and debt) and two sources (public or private). Corporate finance refers to the financing of the delivery entity as a whole (recourse to the entity's balance sheet), while project finance is for a specific project of which the revenue stream also services that debt (recourse to the project only). Equity refers to funds committed indefinitely, while debt is funds that have to be serviced and repaid.

Debt is serviced before equity is rewarded, with senior debt serviced before lower-priority debt. For completeness, the guarantees that make financing possible are also shown in the table. It should be noted that projects delivered by the government itself (i.e. by departments) are not financed in

the sense used here (smoothing of investment).

In the same vein, it is generally expected that delivery with more private involvement will be more efficient (least cost) than delivery by a more public entity (refer to Table 12-2). It would mostly be true that public equity and debt would come at a lower cost of capital than private equity and debt. This is because governments have more diversified risk and do not go bankrupt, which enables them to source capital more cheaply than the private sector; and because governments evaluate returns not just in terms of financial performance but also in relation to broader economic impacts. Finance channelled through non-company public entities also does not attract corporate tax.

### 12.3.1 Private sector finance sources

#### PRIVATE EQUITY

Private sector equity can be raised publicly via listed stocks directly or indirectly by means of listed and unlisted equity funds. In South Africa, no transport infrastructure agency is listed, so these mechanisms are not available here at present. It is, however, possible to invest directly into some airline, shipping or road transport or other transport services companies.

Private equity can, in principle, also be obtained through private (unlisted) raisings. In the transport sector, this approach is applied in the case of the toll road concessions (N3, TRAC, Bakwena and Chapmans Peak Drive), the Gautrain rapid rail link and (for a period) ACSA in the form of a strategic equity partner.

Primary equity investors are those who invest in a project from its outset. In South Africa, primary equity investors in transport infrastructure have been private contractors and equipment suppliers, both local and foreign, investment companies and financial institutions. In other domains, specialist multilateral infrastructure investors such as the IFC as well as private equity funds (e.g. Actis) are active. Dedicated infrastructure funds in South Africa include Old Mutual's South Africa Infrastructure Fund (SAIF), which invested in three toll roads.

Secondary investors buy equity of projects already developed and even operational, where construction risk is accordingly largely settled, the revenue stream is quite stable and operating risks are low. Whereas specialist infrastructure investors and banks more readily commit to primary investments, secondary investments are, in principle, attractive to institutional investors such as pension funds less comfortable with teething risk and more interested in the long-term, stable revenue stream provided by infrastructure projects. In South Africa, an example of a private institutional investor who has set up a vehicle for this purpose is Stanlib's African Infrastructure Private Equity Fund (AIPEF).

The Public Investment Corporation (PIC) is wholly owned by the government and invests funds on behalf of public sector entities such as the Government Employees Pension Fund (GEPF). It has equity investments in, for example, SANRAL. Although it operates like a private sector asset manager, the PIC has a higher risk tolerance reflecting its shareholder's needs, and is sometimes seen as an investor of last resort in public projects. The Industrial Development

CATEGORY	CORPORATE		PROJECT DEBT		GUARANTEE	
	Equity	Debt	Public	Private	Government	Other
<b>Public</b>	(The government finances its commitments itself)					
<b>Semi-public</b>	Public equity	Corporate loan Corporate bond	Public loan	Project loan Project bond	Implicit	
<b>PPP</b>	Private equity					Partial risk
<b>Private</b>						

TABLE 12-3: TYPICAL GEARING OPTIONS PER DELIVERY METHOD

Corporation (IDC) and the Development Bank of Southern Africa (DBSA) play a similar role in selected projects.

### **PRIVATE DEBT**

Private debt can take the form of loans or bonds. Whereas a loan is an agreement between the lender and borrower, bonds are usually tradable in a secondary market. Because the price of a bond fluctuates, the interest earned on it is effectively the sum of the stated coupon rate and price movement.

Loans, especially if corporate, are generally simpler and cheaper to arrange than bonds, which may require the issuing entity and/or project to be independently credit-rated.

Loans are made directly to project agencies, usually as corporate (on-balance sheet) loans but may also be made on a non-recourse (off-balance sheet, project finance) basis. Most, if not all, of the transport infrastructure agencies in South Africa are active in the corporate loan market.

Some infrastructure agencies have also accessed the corporate bond market, including Transnet, SANRAL and ACSA. However, project bonds have not been issued for transport infrastructure on a project basis. The largest project finance programme to date has been in the energy sector, specifically investment in the renewable electricity programme. That programme has demonstrated that there is a substantial debt market and appetite for financing infrastructure projects on a non-recourse basis.

### **12.3.2 Public sector finance sources**

The discussion here does not deal with how the government finances itself, i.e. from tax and debt, but how it provides finance to projects or entities delivering projects. Its fiscal envelope to finance transport projects obviously depends on its financial position, i.e. primary budget deficit, debt service obligations, borrowing capacity and other measures of financial health and fiscal prudence.

The public sector can provide finance to a project or entity by taking a shareholder's interest (equity) or lending to it. An equity injection (financing) is not the same as an operating subsidy (funding) – as discussed below. Both equity and debt could be availed via general budget appropriations. Debt could, however, also be sourced by means of loans taken up by the government, which are then on-lent to the project. Project bonds could also be issued, but in South Africa these are typically issued by the project delivery agency itself, with or without underwriting by the government.

Another source of public financing is capital recycling, i.e. reinvesting proceeds from sales of assets in one area into the financing in another area. It is quite common for governments to finance large and risky ventures (e.g. where the traffic level is uncertain), to refinance it when construction and traffic risks have moderated, and to then reinvest the proceeds in the next risky venture.

The last major contribution the government can make to financing projects is not to provide finance per se but to support the private financing stream by way of guarantees. The government could broadly underwrite the project's performance or stand in for specific risks (e.g. traffic demand, social risks) required unlocking and improving the terms of private financing.

### **12.3.3 Selecting the financing approach**

In the earlier discussion on delivery models, it was shown that, on balance, the private sector would probably deliver transport projects more efficiently than the public sector. When it comes to the financing of projects, however, it is generally understood that governments have a lower cost of borrowing than the private sector's cost of capital. This is primarily because no or few infrastructure agencies will have a better credit rating than the sovereign with its diversified risk. Other reasons include higher transaction costs associated with private finance (e.g. a PPP bidding process), the liquidity requirements on banks and pension

funds, and the illiquid corporate bond market for infrastructure finance.

It may be argued that applying a government's corporate interest rate does not reflect the specific project risks and, therefore, leaves the general taxpayer with some risk not reflected in the rate, but that does not change the fact that the project's cost of capital is lower if funded publicly.

The extent to which the government can provide infrastructure financing will, firstly, be limited by the country's fiscal health, i.e. the budget envelope, borrowing capacity and considerations related to future budget flexibility. Thereafter, the following could serve as a guideline for the mix of public vs. private financing:

- **Project priority:** Public financing should be provided to projects that are important and urgent, based on an objective economic evaluation (as explained previously in Section 10.2), and that could otherwise be delayed if not financed publicly.
- **Public goods:** Public financing should, firstly, be applied to projects where there are positive spill-over benefits not easily limited to users only.
- **Private goods:** Private goods (which should, in principle, be paid by users) should also be financed via private finance, except if there are specific, defined risks where a government contribution or guarantee may be required. **Delivery model:** It is expected that the extent of private financing will increase from semi-public, to PPP to private projects/ventures on the delivery model spectrum

## 12.4 Funding

The term “funding” refers to the process of actually paying for a project, i.e. the sources of revenue and income that service and reward the amortised (financed) investment and ongoing operational and other expenditure.

### 12.4.1 Sources of funding

There are, essentially, two types of funding that correspond with the spectrum of delivery models, namely pure public funding, at the one extreme, and pure user charging, at the other, with blends thereof in between. There are, furthermore, windfall types of revenue that may occur in the case of specific projects.

#### GOVERNMENT FUNDING

When a government pays for transport infrastructure projects, such contracts may be rolled up, for example in the form of turnkey design and construct contracts, or life cycle-based construct and operate contracts. But the typical model in South Africa has been to keep design, construction and maintenance separate.

Payment by the government is a direct subsidy from taxpayers in general to those who benefit from the facility. Such payments are, traditionally, direct transfers for construction, maintenance or service contracts. Alternative forms of payment and part-payment include:

- Construction and operating **subsidies**, i.e. where the government buys down the cost to the user because of demand risk or positive externalities, for example
- **Shadow tolls**, which replace or augment direct user charges
- **Availability payments**, where the government’s payments are postponed and amortised over the life of the project
- **Ridership guarantees**, under which the government only pays if the minimum required traffic does not realise.

#### USER PAY PRINCIPLE

The position in South Africa is, where feasible, to apply the user pay principle, i.e. to shift the responsibility to pay for direct benefits received and costs caused to the beneficiary of the project. In the transport sector in South Africa, private commercial transport services are paid for by the user. Public subsidies support specific public transport services such as metro rail, bus services, and BRT systems, but not commuter taxi services.

In relation to transport infrastructure, national rail and ports, airports and air navigation, and pipelines (provided by PFMA Schedule 2 Major Public Entities) are fully funded by users, whilst roads (a Schedule 3A National Public Entity) are partly user-funded (see **Table 12-6**). In the case of non-national, second-tier (provincial) transport infrastructure, although one project attracts a user contribution (the Gautrain), the norm is for provincial transport departments to pay (specifically for provincial roads).

The latter has come under the spotlight in public debates around the Gauteng e-toll system that endeavours to manage the user charging that supports SANRAL’s Gauteng Freeway Improvement Project (GFIP).

#### OTHER SOURCES OF FUNDING

Generally, it is a zero-sum matter, since whatever is not funded by the user must be funded by the government and vice versa. However, there are sometimes circumstances that produce some additional project revenue.

**Value capture** retains some of the value created by a project (increased property values) to part-fund the project. Forms of value capture include betterment levies (e.g. increased property taxes on those who benefit from infrastructure created in their vicinity), tax increment financing (using the expected increase in property values and, therefore, property taxes as security to part finance infrastructure) or property development (e.g. commercial revenues at a railway station or airport).

VALUE CAPTURE CONDITION
■ Locational benefits of clustering and access more prevalent in urban areas
■ Adequate local development conditions, including availability of land, land ownership patterns, levels of infrastructure, urban management
■ Coordinated and integrated land use and transport planning, land zoning
■ Legally, some of the VC benefits must be able to be channelled back to the project
■ Institutional context must allow VC, including established land and property tax systems, and good administration (to measure/value and collect the added value)
■ Most likely to succeed in large, city-shaping projects, typically on large land parcels
■ Timing of the economy, property market conditions

TABLE 12-4: CONDITIONS FOR VALUE CAPTURE

- **Capital recycling may not only be a source of financing (as discussed above under “Public Sector Finance Sources”), but could also be invested to buy down projects.**
- **Developer contributions** are sometimes considered additional sources of funding but are probably more accurately forms of financing, since these would have to earn a return and be repaid eventually.

### 12.4.2 Determining and ring-fencing costs

Before considering who (government vs. user) should pay for a project, the relevant cost should be established, i.e. how much is involved. Infrastructure price regulators work with the concept of eligible costs. These are the relevant and efficient costs that are often explicitly required to be established under competitive, arm’s-length contractual arrangements. Unnecessary and wasteful costs do not qualify. Eligible costs include administration, operation and maintenance expenditure and cost of capital to finance relevant fixed assets and other capital. Project costs should, furthermore, include the cost of internalising negative externalities such as safety, environmental and social impacts.

Costs must be properly ring-fenced, i.e. only costs actually pertaining to the project are considered. This may be a less awkward issue if the whole cost is carried by the government; under user charging, if costs are not cleanly apportioned, users, in effect, cross-subsidise one another. In South Africa, such cross-subsidisation happens between bulk and other rail, between ports and rail, and between national airports, for example.

### 12.4.3 Cost responsibility and benefit apportionment

Apart from properly valuing the cost of infrastructure, the nature of the cost should be well understood. Since transport infrastructure is provided as a network, often on a capacity ahead of demand basis, with variable daily (peak vs. non-peak) and even seasonal demand, and location-

specific characteristics, it is not always clear who causes the cost. In the same vein that the source of cost may be uncertain, so, too, can the beneficiaries be, since the benefits of the project may be confined to a very defined group (a private good) or could spill over to broader society (public good).

The more private the good, the more it is expected that costs be apportioned to and borne by the beneficiary on a marginal cost basis. This means that the user is fully responsible for any project features provided uniquely or incrementally for it and shares responsibility for common features. As a practical example, a ship operator should pay the full cost of the crane that handles the ship’s type of commercial cargo only and the full cost of the additional berth space required to handle its larger-than-normal vessel, plus make a contribution to the cost of the port navigation system. Using a roads analogy, heavy vehicles should be responsible for the additional road width, pavement strength and bridge load-bearing capacity they impose, and peak-time users should bear the cost of the additional lane capacity required to serve the peak. Generally, the minimum cost that any user should contribute is the direct marginal operating cost of the project (e.g. the incremental fuel cost of an additional passenger).

Therefore, as shown in **Table 12-5**, user charging is most appropriate where private goods and marginal costs intersect, i.e. where distinctive costs are distinctly passed on to distinct beneficiaries. Conversely, public funding is expected where benefits and costs are less discretely apportionable.

In principle, it would be inequitable for users to be charged more than the financial benefit they derive. However, there is a tolerance level of what users can afford. A user may be willing or able to pay more than the actual cost of the service or may unwillingly accept the higher charge if he or she has no alternative. Under such conditions of so-called Ramsey pricing, the agency may be able to pass more costs on to some users in the form of a more progressive

charges structure. Also, as is the case with the setting of SANRAL’s toll rates, the toll levels are not determined primarily by the cost of providing the road but by taking into consideration the user’s cost of taking another, alternative route.

TABLE 12-5: BOUNDARY CONDITIONS OF USER CHARGING VS PUBLIC FUNDING

		NATURE OF THE COST	
		Average	Marginal
NATURE OF THE GOOD	Public	Pure public funding	
	Private		Pure user charging

#### 12.4.4 Commercial vs. social infrastructure

The above discussion makes it possible, in principle, to distinguish between essentially commercial and essentially social infrastructure or services. Commercial projects entail a largely private good with direct (financial) benefits equal to or exceeding the direct (financial) costs. A project is increasingly social as additional economic benefits are required to outweigh the financial cost. In transport terms, high mobility projects, such as freeways, airports and ports, are commercial, while projects aimed at providing access, such as feeder roads or commuter transport services, are likely to be more social. Commercial projects should be charged through to the user. Social projects may justify external (public) or internal (cross) subsidisation.

Notwithstanding the classification of infrastructure by its commercial vs. social nature, it should also be considered to differentiate users on the same basis. Therefore, all users of commercial infrastructure should pay for use, and so, too, commercial users of social infrastructure. Examples include coal haulage trucks on lower-order provincial roads or scheduled flights from municipal airports.

#### 12.4.5 Affordability (equity) considerations

At the one extreme, users should not be expected to pay for the social or broader economic benefits premium obtained from a transport project. However, at the other, some users cannot afford to pay their share of marginal costs. Applying the principles previously discussed, no transport service should be completely free (users should pay at least the marginal operating cost they impose); the remaining marginal costs may be shared with other users within their tolerance levels (Ramsey pricing), with the government contributing to the extent that there are broader social and economic benefits derived from the project. However, the government should provide subsidies in a consistent manner and based on a clear policy. Subsidies should be specifically linked to achieving particular, agreed social objectives.

#### 12.4.6 The requirement for an alternative

When user charges (tolls) were originally introduced on some roads, the policy principle was that there should be an alternative non-tolled road. Users could then weigh up the benefit of not paying toll versus the increased cost (in terms of time, inconvenience and vehicle operating cost) of the alternative. Practically, that meant that the government provided and carried the direct cost of a social-type facility in the form of a provincial or local road. These were not created to serve a mobility function and accordingly provide a modest level of service. Users opting out of using the private good facility can hardly expect the same service from the public good facility.

#### 12.4.7 Behavioural aspects of charging

Allocating marginal costs to users does not only imply short-run marginal costs (SRMC) – that is, the costs of the facilities in their current configuration and capacity – but should also consider the long-run marginal costs (LRMC). Although additional capacity may eventually unlock economies of scale, it is more expensive than the previous tranche and will probably be underutilised for a period, implying that the LRMC is initially higher than the SRMC. The pricing of infrastructure should, therefore, not only look backwards (SRMC) but should anticipate LRMC and influence users' behaviour. A practical application of this principle is to charge peak users properly to induce them to use the facility in off-peak times and, thereby, to improve utilisation and postpone the next investment. Users who pay their full cost responsibility should also reduce unnecessary and wasteful use of the service

### 12.5 Charging Mechanisms

Now that the principles of what should be funded by the government and what by users have been defined, the discussion moves on to the mechanisms to recover users' part.

#### 12.5.1 Design principles

The user charges should be effective, which implies that they must be:

- **Sufficient:** Charges should recover all the relevant or targeted costs (however established, i.e. on average or on marginal cost basis).
- **Accurate:** The identified and apportioned cost should be accurately recovered per class of user, time period and location.
- **Administratively efficient:** The charges system should be simple and low-cost.

As noted previously, most of South Africa's transport infrastructure (i.e. except non-tolled roads and commuter rail) is funded by user charges. In that sense, the charges must generally be sufficient.<sup>1</sup>

With regard to accuracy, the question is how well the tariff reflects the actual use of the infrastructure or service. Does it consider different types of users, locations, time of day and other user characteristics that generate costs differently? **Table 12-5** compares alternative road user charges for accuracy. A more comprehensive review of user charges applied to transport infrastructure in South Africa is shown in **Table 12-6**, but highlighting road user charges

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<sup>1</sup> However, from time to time, user groups (e.g. of airports) point out that there is an overreliance on current revenues from user charges, and the government, as shareholder in these enterprises, should consider providing additional equity funding or at least equity financing.

is quite topical, given the ongoing discussion about the GFIP/e-toll programme.<sup>2</sup>

As far as administrative efficiency is concerned, the entire transport infrastructure system, except non-tolled roads, is provided like private goods, i.e. to identifiable users who can, accordingly, be charged in the course of doing business with the infrastructure and service provider. The administration of the charge is, therefore, rolled up in the interaction between the parties. For open toll roads (GFIP/e-toll), the identification of individual users is fairly straightforward in theory but has proven to be quite a challenge in practice. For non-toll roads, until recently, direct user charging has only been practical for heavy vehicles equipped with the necessary telematics but this option is also increasingly being explored internationally for the charging of light vehicles on a per kilometre basis (e.g. the state of Oregon in the United States and the Netherlands).

CHARGE	COST ALLOCATION	ACCURACY	COMMENT
<b>Vehicle licence Fee</b>	Per size/mass of vehicle and type of use (e.g. private vs. commercial)	Does not differentiate degree of use of the same type of vehicle	
<b>Fuel levy</b>	Per unit of fuel consumed	Fuel use under-represents the cost impact of a vehicle, especially heavier vehicles	Also used for general tax recovery and non-roads purposes (e.g. the RAF). Note that a likely negative impact of the fuel levy is that it over-represents the cost implications for older light motor vehicles that do not benefit from fuel-efficient engine technology and the damage that they cause to road infrastructure.
<b>Weight distance charge</b>	Per mass and distance travelled	Potentially highly accurate. Can differentiate vehicle mass, travel time, time of day, specific location	Typically applied to heavy vehicles
<b>Cross-border charges</b>			Typically applied to foreign commercial road transport operators
<b>Toll</b>			Closed tolls have a proven track record, whereas open tolls are more challenging to implement

TABLE 12-6: COMPARISON OF ACCURACY OF DIFFERENT ROAD USER CHARGES

<sup>2</sup> In the GFIP/e-toll case, the choice of charge favoured the accuracy aspect and free-flow benefits of open tolls, but has been criticised for its high administrative burden.

MODE	FUNDING MODEL	CHARGES	CLASSIFICATION			PRICE MAKING	COMMENT
			More hybrid	More marginal	Pure marginal		
<b>National road</b>	Mostly publicly funded, some user charging	Fuel levy		X		Set by Department of Minerals & Energy	
		Licence Fee	X			Set by Department of Transport	
		Toll (closed and open)			X	Approved by Department of Transport	
<b>National rail</b>	User charges, cross-subsidised by port terminals	Service charge	X			Based on quotation and negotiation (no list price)	Charges are confidential
		Rail charge levy		X		Annual internal review	For energy, steel price and forex exposures
<b>Commuter rail</b>	Mostly publicly funded, some user charging	Passenger fare		X		Overseen by Department of Transport	
<b>Gautrain</b>	User charges	Passenger fare		X		Approved by Gauteng	No time-of-use charge
<b>National ports</b>	User charges	National Ports Authority (landlord), various port tariffs and charges	X			Regulated by Ports Regulator of South Africa	
		Transnet Port Terminals, various user charges	X			Tariff book published, but no tariff regulation per se	Tariffs recover more than port costs. Terminals possibly not concessioned to obtain most competitive tariffs
<b>National airports</b>	User charges with property development	Passenger service charge		X		Regulated by regulating committee for ACSA & ATNS	Distinguishes between pax origin/destination
		Landing charge		X			Weight-based
		Parking charge		X			Weight- and time-based
<b>Air traffic &amp; navigation services</b>	User charges	Area, approach and terminal charges		X		Regulated by regulating committee for ACSA & ATNS	Weight- and distance-based, not time-of-use
<b>National pipelines (petroleum and gas)</b>	User charges			X		Regulated by National Energy Regulator of South Africa	Per specific pipeline, but no time-of-use

TABLE 12-7: SUMMARY OF CURRENT TRANSPORT INFRASTRUCTURE USER CHARGES

**Note:** "Classification" refers to where the user charge lies on the spectrum of average, indiscriminate charging to the very specific, discriminate recovery of costs. The most discriminate charge is "pure marginal". "More hybrid" is a charge that does not discriminate well between users' cost and payment responsibility.

## 12.5.2 Price making

The actual determination of the user charge can basically take place in one of two ways, closely related to the choice of delivery model (as briefly discussed under “Choice of Delivery Method”). If the infrastructure is provided under monopoly conditions (e.g. by a state-owned company or state agency), there will be no natural price making tension, and allowing the monopoly to set prices itself is unlikely to lead to efficient prices. It has, therefore, been the norm to establish a dedicated oversight body (regulator) that evaluates applications and makes price determinations, or to entrust such duty to a minister or other public representative.

The alternative approach to price making is for market forces to establish the price, i.e. via competition. That could either be competition *in* the market (e.g. between road and rail for the freight market) or *for* the market (e.g. between bidders for a road concession). Whereas competition is already the dominant manner of price making in transport *services*, for competition to play such a role in transport *infrastructure* would require a substantial restructuring of the transport infrastructure agencies.<sup>3</sup>

**Table 12-6** presents a summary of the user charges employed in South Africa today, how accurate these are, and how their levels are established.

## 12.6 Implications for the NATMAP 2050 and Proposed Interventions

This chapter starts off with the assumption that only appropriate projects are selected for implementation. Clear guidelines need to be developed to guide the prioritisation of transport investments and to prove the feasibility of chosen projects. A draft framework in this regard is included in Chapter 13 of this report.

The chapter then briefly considers the choice of delivery method and notes the importance of its being essentially the least cost option. It is noted that, with few exceptions, delivery of transport infrastructure in South Africa is via integrated public monopoly. Here, it needs to be pointed out that the current delivery framework could inhibit the growth of the private sector infrastructure financing sector and that institutional reforms may be required to further stimulate that sector.

### 12.6.1 Promoting private project financing

Financial institutions already lend extensively to state-owned companies in the transport sector. This takes the form of corporate loans and, in the case of especially Transnet and SANRAL, corporate bonds. Such debt is explicitly or implicitly guaranteed by the government, who, in effect, stands in for the overall financial performance of the delivery entity.

Whereas the *corporate* debt market is probably quite mature, the potential lies in developing the *project* debt market. There are very few instances in which project debt has been extended so far. Work needs to be undertaken to explore how the project debt market can be developed. A key consideration should be to ring-fence potentially high-performing projects from the integrated SOCs. These could be new projects or legacy projects of which the capital could then be recycled. The analogy would be ESKOM’s historic corporate debt financing now being supplemented by project financing in the renewables sector. This has come about as individual projects were cut loose from the

electricity monolith so that they could be evaluated and supported on their own merit.

The basic architecture of the debt market is already in place in South Africa. As projects that are attractive to private project financing are released, there will be a natural knock-on effect in terms of specialist investment companies and investment funds being established. The bond rating process will be commoditised, reducing the cost and time of placing bonds. The secondary bond market will naturally grow. There will be less pressure on the national fiscal balance.

### 12.6.2 Formalising a subsidisation policy

Building on the principle of distinguishing between the commercial and social aspects of transport infrastructure and users, the government’s approach to the subsidisation of infrastructures, services and users should be clearly formulated. It should be clear under what circumstances subsidies will be provided, why they are required and what they will be purchasing. The subsidy policy should also be applied when considering to financially support SOCs, e.g. how their social or strategic roles are assessed in that decision.

### 12.6.3 Making costs more transparent

To ensure fair user charging, the costs of the business must be properly understood. Work is needed to look at the extent to which the costs of major business units in the integrated infrastructure agencies could be accurately financially ring-fenced. This consideration applies, firstly, to the vertically integrated Transnet, in terms of properly separating and understanding the costs of rail, port, terminals, pipelines and other businesses. The extent of actual transfer pricing should be investigated and transfer pricing rules agreed.

All transport infrastructure agencies should, furthermore, be required to understand their marginal costs, i.e. the short- and longer-term cost, as well as the use profile, of each service, location or project. For example, there is

<sup>3</sup>This could include horizontal unbundling (e.g. of ports and airports), vertical unbundling (e.g. between rail and ports) and the increased use of concessions for individual transport projects (e.g. toll roads).

significant cross-subsidisation between national airports in South Africa. There should be a consistent cost allocation methodology applied between all the modal transport infrastructure agencies. This would also necessitate the government to make clear the cost of capital expectations it has of each agency.

Next, the challenge is to price more marginally in general. Tariffs can only be fair if the rules of cost apportionment are clear and if the costs reflect actual use. The individual tariff regulators have adequate jurisdiction to pursue this initiative, the one major exception being rail. Much preparation work can be done under the auspices of the Interim Rail Economic Regulator (IRER) to properly understand service levels, cost structure and pricing. Although there is intermodal competition generally in transport, it is especially acute in the case of road vs. rail. The IRER should take care not to regulate rail tariffs before the road charging policy has been updated. Rail and road tariffs should be set consistently, preferably by a single, integrated transport economic regulator.

#### **12.6.4 Introducing congestion charging**

Aspects of marginal pricing that few, if any, charges currently accommodate include congestion (peak) and locational (site-specific) charging. In a country with an uneven distribution of infrastructure, locational charging is likely to be controversial because charges will increase in rural areas and for smaller cities and towns. However, given the lumpiness of transport infrastructure, congestion charging is a key instrument in signalling to users the cost they are imposing on the system and the immediacy of further investments in capacity.

It is, therefore, proposed that the government examine how user charging should be developed, specifically in terms of how it relates to the wider context of a national transportation demand management strategy. (This strategy is discussed in Chapter 11.)

#### **12.6.5 Improving price making and regulation**

Today, most infrastructure tariffs are available in the form of list prices, i.e. published beforehand and effective only for a certain period. Users know what the services will cost them and can make their decisions and choices accordingly. However, the key area that does not have such a transparent price schedule is freight rail. Prices are negotiated on an individual basis and users sign a confidentiality agreement to not disclose them. Therefore, it is not known whether prices are cost-reflective or whether they cross-subsidise other users or other businesses.

Rail freight and port terminals are the only ones whose tariffs are not overseen by a dedicated regulator (as for pipelines, airports, air navigation services and ports) or government departments (roads and commuter rail).

Work is required to investigate price making in the port terminal and freight rail domains. At least until such a time that there is competition in transport infrastructure provision, a consistent approach to price regulation should be applied across all modes, including those areas not currently regulated. An Interim Rail Economic Regulator (IRER) was established in 2012/13. The introduction of a single-transport economic regulator (STER) (which could reduce duplication, ensure consistency across modes and even facilitate intermodal competition and coordination) has already made progress and draft legislation is under consideration. This would follow the example of the single-economic regulator in the energy sector (for which there had previously been separate bodies, such as for electricity and piped gas, for instance).

#### **12.6.6 Formalising user charging approach**

User charges are already applied extensively in transport infrastructure. In most cases, the users are businesses or individuals who understand the benefit they derive from the infrastructure and, therefore, the need to pay (even if they do not agree with the level of tariff charged). The user pay principle is, therefore, generally quite well established

and accepted. However, the ongoing debate around paying for the GFIP project has shown that, when it comes to roads, the boundaries between what should be paid from general tax and what (and how) from user charges are not yet clear.

This chapter distinguishes between commercial and social infrastructure and proposes a basic definition to distinguish between the two. These concepts are not new and were, for example, also used in the report of the Premier of Gauteng on the GFIP/e-toll project. It would be useful for the government to formalise these terms and to classify transport projects and services accordingly. There should, ideally, be a checklist of objective characteristics considered when a project is classified. To the extent that a project is classified as commercial, it would, then, automatically attract a user charge.

#### **12.6.7 Introducing comprehensive heavy road vehicle charging**

An evident gap in the current user charging regime is the lack of a charging mechanism for heavy vehicles on non-tolled roads. Heavy vehicles have a disproportionately negative impact on road condition and congestion. There are some areas in South Africa where road haulage has a particularly harmful effect on public roads, for example roads used to transport coal, ore, forestry products and agricultural goods. Road freight is also almost exclusively commercial. There is a general feeling that a disproportionate share of freight moves on the country's roads as opposed to rail.

Applying the commercial vs. social distinction to roads would, therefore, imply not necessarily classifying the road infrastructure as commercial or social but, rather, treating the user as commercial (heavy vehicle, possibly restricted to some classes of use) or social (light vehicle).

Utilising the levy on diesel to charge heavy vehicles their rightful share of costs would probably be sufficient. However, it is quite indiscriminate and, therefore, inaccurate and inequitable. The relative increase in diesel

consumption by a heavier vehicle does not reflect the escalation in road deterioration caused. It will also not be very administratively efficient, as a refunding scheme would probably be required (to reimburse diesel car users, as well as all the other industries that use diesel, such as agriculture). This means that other charging mechanisms need to be investigated. These should go beyond the current approach of tolling (whether open or closed) or non-tolling. Given that much of the commercial road fleet is already position-transponder-equipped, that could be an option. Less sophisticated means (e.g. hubodometers) may also be explored but may not be administratively efficient.

The first step in applying a comprehensive, open heavy vehicle charging system would be to formulate a policy that spells out principles, considers the available options and assesses impacts.

#### 12.6.8 Introducing cross-border charges

To supplement the comprehensive heavy road vehicle charging, the possibility of introducing focused cross-border charges on foreign commercial road transporters should also be investigated. This concept has already been introduced in a number of other countries in the region and could usefully ensure that all non-local operators properly contribute to the funding of the South African road network. This would align with work at regional level to harmonise these charges.

As with the mass distance charge recommendation, formulating a policy that spells out principles, considers the available options and assesses impacts would be an important output of this work.

#### 12.6.9 Proposed interventions

In summary, over and above issues related to the project prioritisation, institutional reform and national transportation demand management already addressed in other chapters, the following interventions are recommended:

- Investigate and develop a policy position on clarifying the government's commitments to subsidising transport infrastructure and services, including those provided by state agencies and companies
- Develop a policy position and methodology for cost determination and marginal allocation by publicly-owned transport agencies and companies
- Develop guidelines on congestion charging and its application in the wider context of a national transportation demand management strategy
- Establish and implement the single-transport economic regulator (STER), which will ensure that the previous two recommendations are applied in a consistent manner across modes. In the meantime, the Interim Rail Economic Regulator will concentrate on non-tariff aspects of rail economic regulation (regulating third-party market access, monitoring service levels, ensuring sufficient capacity, setting and assessing standards, dealing with customer grievances, etc.)
- Develop a policy position on what constitutes commercial and social infrastructure and an approach to how social infrastructure should be financed and funded
- Examine the merits of mass-distance charging and cross-border charging to commercial road haulage and define a road map for the implementation of these strategies

