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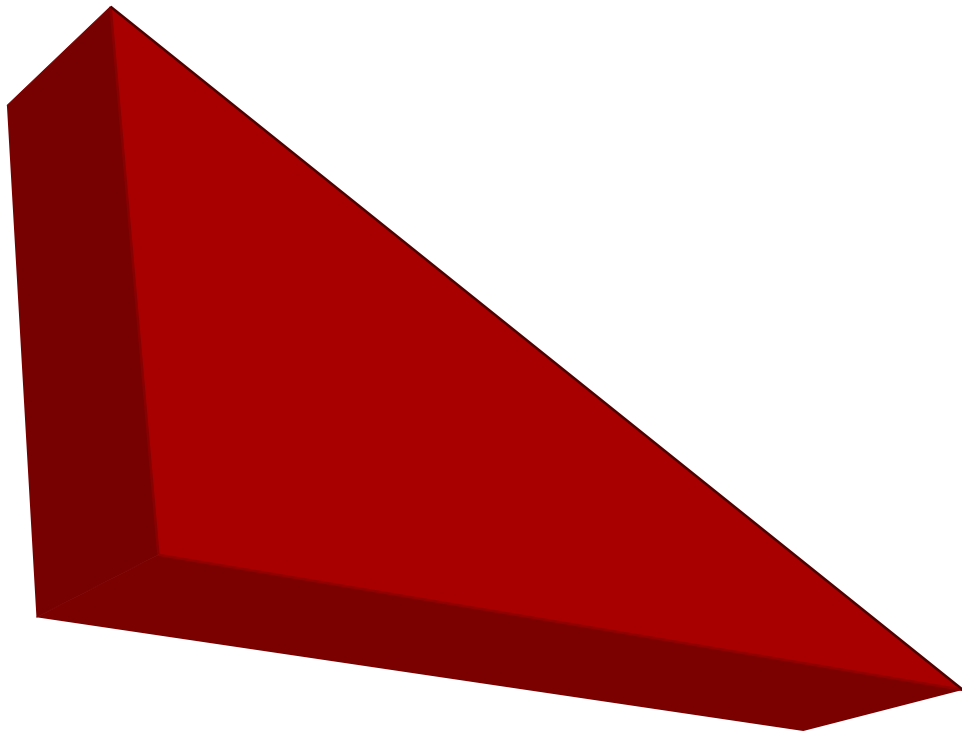
***sIEconomics Regulatory Insights***

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# **Funding Public Infrastructure**

**Stephen Labson, March 2010**

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Economics Consulting in Utilities and Infrastructure

*sIEconomics is a boutique economics consulting firm providing specialised advice to governments, regulators and corporate clients in the area of utilities and infrastructure. We are based in Sydney Australia and have an international network of associates to bring global experience to local initiatives.*

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## 1 Overview

The purpose of this document is to provide an overview to broad options at hand in funding public infrastructure. In developing this overview we have had regard to a number of funding approaches found in practice, and have provided a small set of case studies so as to illustrate key aspects of various approaches and options.

While there is indeed a great deal of local and global experience to be utilised in this area, we do not mean to suggest that any one approach is in all cases optimal - nor would we recommend one try to do that as there is no 'one-size-fits all' in regard to funding major public infrastructure programmes. The aim here is rather to provide a point of reference in developing a sustainable and efficient approach to funding public of infrastructure suitable to the situation at hand.

### *Options for funding public infrastructure*

The funding of public infrastructure is unique from purely private sector investment given the options that government has through loan support, equity injections, or grants - and that charges and recovery of capital invested in public infrastructure is often subject to regulatory oversight. This leads to the ongoing balancing of the four broad components of public infrastructure funding:

**Debt financing** - which can be sourced directly by the public enterprise where a standalone corporate entity has been established and/or by government through loans or loan guarantees.

**Equity injection** - in which government as shareholder can provide cash injections to the sector.

**Government grants** - whereby government as a policy decision allocates its resources in the development of public works.

**Regulated revenue and tariffs** - which (outside of government grants) are ultimately relied on to repay capital investment over the longer term.

With these broad sources of funding in mind governments (and associated public enterprises) can potentially fund major projects on a 'pay-as-you-go' basis from retained earnings, revenue, equity injections or direct contributions; or through borrowings from the capital markets (with or without direct government support).

However, the sheer size of investments typically associated with major infrastructure programmes can limit the practical feasibility of the pay-as-you-go model as cash reserves are seldom sufficient, the level of government support is often constrained by competing budget commitments, and the sudden impact on tariffs associated with a pay-as-you-go approach may be prohibitive. Indeed, where public entities have requirements to fund infrastructure on a pay-as-you-go basis this is often cited as a key constraint in regard to funding needed infrastructure.

Given such constraints a combination of borrowings, equity injection, government contributions, and regulated revenue options are more often relied on to smooth out the impact of cash requirements stemming from a major capital expenditure programme.

### *Sustainability and efficiency*

Long term sustainability and efficiency are key factors in finding the optimal balance of debt, equity injection, direct government grants, and regulated tariffs and charges.

In regard to the crucial aspect of long term sustainability, borrowings ultimately need to be repaid and an appropriate return on equity be provided for by way of future revenues. As such, the ability to employ various financing options is largely dependent on the underlying regulatory framework for setting future revenue allowances and regulated tariff levels. In this sense, financing options serve to smooth the impact of lumpy capital requirements, but ultimately it is the regulatory approach that allows for recovery of capital expenditure and the long term sustainability of the funding model.

Of course, governments have the choice to make direct subsidy contributions where there is not the expectation of a return, but this is a policy choice and needs to be evaluated against other financial commitments of government. Long term sustainability is often an issue as it may not be viable from an economic or policy perspective for government to subsidise major infrastructure growth on an ongoing basis. This practical aspect of government contributions needs to be factored in to a well balanced approach to funding public infrastructure.

Getting the balance right between various funding options is also importantly about efficiency. Each financing option will have its own level of risk adjusted cost and some options may have the potential to provide more cost effective financing outcomes, thereby increasing the efficiency of the funding model.

Our review of international experience has demonstrated that a variety of approaches can be found in the funding of public infrastructure. This variation is driven by the unique aspects of the sector and jurisdiction in mind. Key factors include<sup>1</sup>:

- *Infrastructure characteristics — affecting the user profiles and revenue raising capacities of particular assets*
- *Fiscal and macroeconomic conditions — potentially restricting use of particular financing vehicles because of their budgetary consequences*
- *Institutional arrangements — defining the legal and regulatory framework as well as the intergovernmental relationship within which public infrastructure assets are operated and financed*
- *Perceptions of the role of government — and voters' expectations for the involvement of government in delivering specific services and managing the economy.*

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<sup>1</sup> Productivity Commission, *Public Infrastructure Financing: An International Perspective*. March 2009.

Not only are these key factors unique to the sector and jurisdiction being considered, but they will change over time. For example, a sector going through a major stage of capital expansion will rely on a balance of funding options different from that where the predominant cost drivers are limited to operations and maintenance. This constant re-balancing of funding strategy is part-and-parcel of capital structure generally, and is perhaps even more relevant to funding of public infrastructure. A sustainable and efficient funding model will therefore need to be dynamic in nature and adjust to the changing environment in which it is meant to function.

In the table below we summarise our view as to the sustainability and efficiency of the four key components of public infrastructure funding.

**Sustainability and efficiency of funding public infrastructure**

Funding components	Sustainability	Efficiency
<b><i>Debt finance</i></b>	Medium	Medium/high
<b><i>Equity injection</i></b>	Low/medium	Medium
<b><i>Government grants</i></b>	Low	Low/medium
<b><i>Regulated revenue and tariffs</i></b>	High	High

While debt financing will inevitably play a significant role in funding major a public infrastructure programme, we characterise this as medium in terms of sustainability, noting that sufficient cash flow is needed to service borrowings and must be fully repaid in the long term. That is simply to say that borrowings must ultimately be repaid from cash generating sources.

In regard to efficiency, debt finance is typically an important component of infrastructure funding and with a sound capital structure borrowings in its various forms are used extensively in development of large infrastructure projects. Clearly, well designed capital structures and debt instruments can provide cost effective ways in which to fund infrastructure projects and there is considerable experience locally and globally in this regard.

For major public infrastructure projects equity injection is seen as low/medium in regard to sustainability, as governments’ ability to provide the large sums required in such cases are often constrained. We also note that such equity injections (as opposed to pure government grants) imply a future stream of dividends to shareholder, and in this sense are not seen as a long term solution for development of public infrastructure.

From an efficiency point of view the balance of equity and debt will have important implications for the appropriate return on equity and cost of debt. The key point we wish to make here is that the full opportunity cost of capital should be considered when comparing the relative costs of government equity injection vs. alternative forms of funding.

While government grants often play an important role in infrastructure development, scarce resources must be allocated to meet a range of social objectives. This can constrain a government's ability to build major infrastructure projects by way of grants from the fiscus. In this sense government grants may not provide a sustainable way in which to fund public infrastructure.

There are also efficiency issues to consider in that charges and tariffs are not likely to reflect the true cost of service thereby limiting the role of price signals and often creating demand for services that outstrips supply.

Perhaps most importantly in regard to both sustainability and efficiency - the regulatory component of funding is crucial in that it provides the stream of future revenues that is fundamental to the long term viability of the overall funding approach. Outside of pure government grants, revenues based on regulated tariffs and charges are often the ultimate source of funding infrastructure development, with the other important components of funding (i.e. debt and equity injections) providing important transitional support to a long term solution. In light of this, a transparent and supportive regulatory regime is vital to the sustainability and efficiency of the overall funding approach taken in provision of public infrastructure.

We elaborate on our thinking of these issues in the body of our review provided below.

## **2 Debt financing**

### **2.1 Infrastructure development and borrowings**

Debt financing in its various forms represents a significant component of infrastructure funding due to the large capital requirements associated with capacity augmentation, the long term nature of the physical assets, and the (often) stable source of regulated revenue.

Optimal debt levels are dependent on a variety of factors and will vary over time with the capital requirements of a business and the availability and cost of funds. The availability and cost of funds is of course currently a critical issue with global capital markets under strain limiting the availability of funds and making borrowings relatively more expensive than compared to recent history. That said, where debt funding is available infrastructure projects continue to rely significantly on borrowings – albeit to a lesser degree than was the case prior to the current financial crisis.

In a recent report on global public/private sector infrastructure projects, the World Bank Group<sup>2</sup> reported that the debt/equity ratios in infrastructure projects reaching closure changed from around 85/15 in 2005–07 to 73/27 in 2008. 14 Projects reaching financial closure in early 2009 had debt/equity ratios of around 70/30. As a case in point, the US\$4.2 billion 3.3GW Jirau (Brazil) hydro power plant was reported to have closed financing with a debt/equity ratio of 69/31 in February 2009 while the US\$5.7 billion 3.3GW San Antonio (Brazil) hydro power plant closed with a debt/equity ratio of 67/33 in March 2009.

Nevertheless, availability of funds is clearly a challenge. The same World Bank Group study found that of some 365 greenfield infrastructure projects reviewed during 2008-2009, roughly 24% have either been delayed or are at risk of delay due in part to financing constraints. Of course, these examples are in regard to public/private sector finance. We will discuss a few key aspects more relevant to public sector finance in a section that follows.

### **2.2 Credit worthiness**

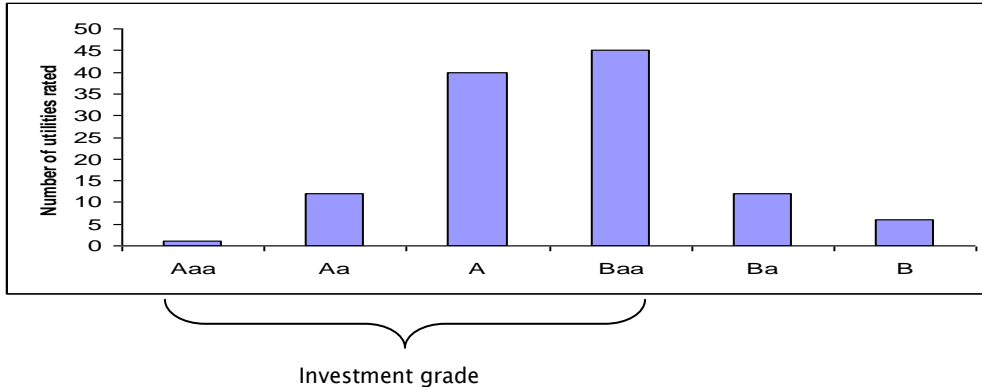
Both availability and cost of borrowings is directly dependent on the credit worthiness of the entity acquiring financing. Credit ratings by independent sources such as Moody's, Standard & Poors and Fitch are widely referenced in regard to credit worthiness. As shown below for the utilities sector it is common to stay within the investment grade range of credit ratings allowing for reasonable access to cost effective sources of funding.

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<sup>2</sup> World Bank Group, PPI data update note 22, June 2009. This note relies on data compiled in the “impact of the financial crisis on PPI” database, which includes 522 infrastructure projects with private participation in developing countries, which were trying to raise financing on a project finance basis or were in advanced tender stage between either January 2008 and March 2008 or July 2008 and March 2009.



### Global Regulated Electric Utilities Ratings – Moody's



Data from Moody's Investor Services "Rating Methodology: Global Regulated Electric Utilities" March 2005

The key point we would like to draw here is that while infrastructure providers do in some circumstances work at the lower end of investment grade ratings, non-investment grade rating would not be a standard situation for such enterprises to remain in for any prolonged period of time.

To place this within the context of creditworthiness and cost of funding, we have taken estimates provided by Moody's on the relationship between the cost of borrowings and credit ratings. We caution (as do Moody's) that this relationship does not hold in lock-step and is dependent on a complex range of factors. Still, it does illustrate the additional costs of borrowings – especially if in non-investment grade range (Ba or lower).

Median Credit Spreads Over UST for 10 Year Maturity (as of 2/28/05)																
Aaa	Aa1	Aa2	Aa3	A	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa-C
40	48	53	58	63	69	78	88	99	118	141	169	205	250	304	435	622

Source: Moody's Investor Services, Market Implied rating. Nov 2005.

The spreads over US Treasuries reported in the table above represent the additional costs of borrowings as credit rating decreases (basis points spread above US Treasuries moving to the right of the table). One can see the considerable increase in costs on moving from low investment grade rating (i.e. Baa2 or Baa3) to non-investment grade of Ba1 or lower.<sup>3</sup>

<sup>3</sup> We note that this material is dated (2005). However, the incremental changes with respect to each credit rating notch currently would be qualitatively in line with what is shown in the 2005 estimates. We again note the illustrative nature of this analysis in any case.

### **2.3 Government loans and guarantees**

Where significant borrowings are required by a public enterprise it may be a practical necessity for government to provide support in accessing these sources of funds directly or indirectly. Governments can and do provide direct loans to public enterprises in which case they might be funded on a cash basis from general tax revenues, or government may increase its borrowings from the private sector to provide such loans to the public enterprise. However, pay-as-you-go type cash funding from general tax revenues is often not feasible for large infrastructure projects and borrowings from the private sector by government will in many cases be required.

The way in which government borrows from the private sector is complex in itself, and there are a range of methods employed including special purpose bond raisings based on securitized revenue streams through to general purpose short term treasury bills and long term government bond placements in domestic or foreign currencies. While there are a number of complex details associated with each of these various instruments, the point we would like to make here is that government borrowings (and ability to lend to a public enterprise) are often driven by many of the same broad market factors and constraints that the private sector faces. Particularly with the advent of the global financial crisis, governments' creditworthiness across the world has come under pressure and a number of developed and developing countries have seen their sovereign ratings downgraded over the past year making government borrowings relatively more expensive in such cases.

Moreover, the quantum of infrastructure funding requirements often represents a significant proportion of total public borrowings. For example, for fiscal year 2008/09 South African non-financial public enterprise borrowings represented some R32,5 billion as compare to R55,9 billion of total public borrowings and is growing at a considerable pace. The South African Reserve bank recently noted (in regard to calendar year figures) that "Net issuance of bonds by public corporations of R17,0 billion in the first five months of 2009 was already more than the R13,5 billion raised in 2008 as a whole. Together with the increased net issuance of R12,6 billion by central government and the R0,5 billion raised by local governments, total net issues of fixed-interest securities by the public sector amounted to R30,1 billion in the first five months of 2009, compared with net issues of R27,2 billion in the full year 2008.

Governments also have the ability to provide loan guarantees to enhance the credit quality of the borrowing public enterprise. In this case the credit rating and pricing of loan facilities will generally be based on that of the sovereign. Here again the quantum of guarantees sometimes associated with major infrastructure programmes can have implications for that of the sovereign rating, and where relatively large, can adversely affect the sovereign rating and cost of borrowings.

#### **2.3.1 Common Borrowing Authorities**

As a sub-set of government funding options we note the use of Common Borrowing Authorities (CBAs) whereby borrowing by public enterprises is undertaken centrally by a corporatised government entity, thereby providing explicit or implicit government guarantee on those loans. In these cases public enterprise borrowings often account for a significant proportion of overall public borrowings.

For example, in Australia where this model is used extensively, approximately 56 per cent of borrowings undertaken by the New South Wales Treasury Corporation in 2006 were on behalf of the State's public enterprises. As reported by Australia's Productivity Commission (*op cit*) expected borrowings by several state CBAs for financial year 2009/2010 are as follows:

- NSW Treasury Corporation = AUD \$10.4 billion
- Treasury Corporation of Victoria = AUD \$5.64 billion
- Queensland Treasury Corporation = AUD \$22.5 billion

[Note: AUD \$1 = R6.36 as of 13/7/09]

As set out in the same Australian report on funding, "the rationale for establishing CBAs was to bring borrowing under one umbrella for greater efficiency. The efficiency is derived from:

- *the rationalisation of approaches to the capital market to avoid unwarranted competition for scarce capital funds;*
- *improved liquidity of the bonds, improved debt management and enhanced secondary market turnover;*
- *increased marketability resulting in lower yield and thereby lower cost of capital;*
- *the provision of improved quality of information to investors, particularly in regard to the volume and maturity of existing securities;*
- *the facilitation of new debt instruments to target household investors; and*
- *developing expertise and specialist financial skills at a jurisdiction level rather than at an individual authority level."*

The potential efficiencies brought about by this model are interesting and no doubt a matter that governments closely consider in undertaking public sector borrowings.

### 2.3.2 Bonds

Bonds are a primary source of funding in countries with well developed capital markets. There are, however, various facilities applied in raising funds in this matter relying on different levels of government support.

As described in work carried out by the Transportation Research Board<sup>4</sup> (within the context of airports funding) four basic types of bonds are issued to fund public infrastructure capital improvements:

1. General obligation bonds supported by the overall tax base of the issuing entity.

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<sup>4</sup> Transportation Research Board, Airport Cooperative Research Program, *Innovative Finance and Alternative Sources of Revenue for Airports A Synthesis of Airport Practice*. 2007.

2. General revenue bonds secured by the revenues of the service provider and other revenues as may be defined in the bond indenture.
3. Bonds backed either solely by user charges and/or defined revenues generated by the business.
4. Special facility bonds backed solely by revenues from a facility constructed with proceeds of those bonds.

These bond facilities are categorised by the scope of government support provided in the table below.

**Types of bonds used in funding public infrastructure**

<b>Bond type</b>	<b>Level of government support</b>
General obligation bonds supported by the overall tax base of the issuing entity.	High
General revenue bonds secured by the revenues of the public enterprise and other revenues as may be defined in the bond indenture.	Low – depending on recourse in case of default.
Bonds backed either solely by user charges and/or defined revenues generated by related sources.	Low – depending on recourse in case of default.
Special facility bonds backed solely by revenues from a facility constructed with proceeds of those bonds.	Low – depending on recourse in case of default.

**2.4 Earmarked surcharges and asset backed securities**

Government mandated surcharges earmarked for payment of debt securities is an often utilised method of supporting investment in public infrastructure. For example, in the US air transport sector a Passenger Facility Charge (PFC) was created by Congress in the 1990 Aviation Safety and Capacity Act.<sup>5</sup> It is a surcharge on passenger fees and the earmarked flow of revenues can be used to service debt payments on asset backed securities. This source of funding is an often used in funding major infrastructure development.

Earmarked surcharges have also been used in the US utilities sector. Beginning in the 1990s such surcharges have been utilised to recover utility stranded costs stemming from electricity sector reforms. As explained by Moody’s Ratings Agency, legislatively approved surcharges on utility bills isolate a dedicated stream of cash flow into a separate special purpose entity and uses that stream of cash flow to provide annual debt service for the securitized debt

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<sup>5</sup> We provide further background on the PFC in section 5 of this review.

instrument.<sup>6</sup> This funding mechanism has more recently been used in funding investment in new facilities so as to provide a relatively greater level of certainty on cost recovery of such investments as an overlay to the regulatory regime.

While placed within the context of stranded assets, the general method of securitisation of surcharges on tariffs is explained by Moody's in the following way.

*“...the state regulator – and sometimes the state legislature – establishes the authority for a surcharge on customers' bills, and authorizes the sale of securitized debt. The utility then sells the right to collect a dedicated stream of future cash flows from its regulated customer base that is sufficient to provide debt service on the securitized piece of debt. The issuing utility is typically required to use the proceeds of the debt offering to retire both debt and equity in a manner intended to maintain a predetermined capital structure. The securitization generally has language that enables the tariff to be unilaterally raised in the event that future sales turn out to be lower than originally planned.*

*Generally speaking, Moody's views stranded cost securitization as being credit-neutral to credit-positive since it typically addresses a major credit overhang, some form of potential stranded costs, and legislatively requires the utilities to use the proceeds for debt and equity reduction in a manner that targets a relatively conservative capital structure.*

*For the most part, the securitization tariff is separate from the “general tariff” charged to customers and any increase in the size of the securitization tariff is not at the expense of the general tariff. However, in two states, Illinois and Michigan, the utilities operate under a rate freeze, which precludes them from raising rates until the termination of their respective rate freeze. As such, any increase in the securitization tariff is at the expense of revenues and cash flow that would be available to service debt of the remaining creditors of the utility.”*

We note several key matters related to securitised surcharges on tariffs further noted by Moody's:

- “The size of the securitization tariff relative to the total tariff is an important element in evaluating the credit implications of a securitization because it can impact the future ability of a utility to obtain subsequent rate relief for other costs of service.”
- “In calculating balance sheet leverage, Moody's treats the securitized bonds as being fully non-recourse to the utility even though accounting guidelines require the debt to appear on the utility's balance sheet. Consistent with this view, all balance sheet capitalization metrics exclude the securitized debt from the capital structure given the legal separateness that exists between the debt of the utility and the debt of the SPE, and the fact that regulators set future rates based upon a capital structure that does not include the securitization debt.”

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<sup>6</sup> Moody's, Rating Methodology: Global Regulated Electric Utilities. March 2005

- “However, in looking at cash flow coverages, Moody’s analysis stresses ratios that include the securitized debt in the company’s total debt as being the most consistent with the analysis of comparable companies. “

As noted above, this broad form of securitisation is now being utilised in funding new facilities and in that sense is different from the recovery of stranded assets discussed by Moody’s. Nevertheless, the types of earmarked surcharges on tariffs and securitisation of those revenue flows provided in this approach can provide cost efficiencies in securing borrowings due to the enhanced certainty to the utility in regard to cost recovery and to financiers in regard to the utility’s ability to service debt.

As a final point, we would highlight the fact that ultimately customers pay both ‘base tariffs’ and additional surcharges. The degree that earmarked surcharges can be relied on for funding capital programmes will be proportional to any implicit or explicit constraints on the total charges customers are to pay.

## **2.5 Public Private Partnerships**

Public Private Partnerships (PPP) as developed in the UK in the early 1990s under its Private Finance Initiative (PFI) are employed extensively in the delivery of public services and building of infrastructure. We do note that PFI would typically have both debt and equity components and is perhaps better placed as a hybrid to these two broad categories - but we address it in this section as it is sometimes seen as an off balance sheet approach to debt funding.

As well, these programmes are generally broader than just financing and often aim to gain efficiencies from project design, construction, operation, and risk transfer. Still, private sector financing is often a significant component of PPP or PFI, and useful to set out as one option for financing public infrastructure. We set out an overview of the UK’s PFI below.<sup>7</sup>

### 2.5.1 The UK Private Finance Initiative<sup>8</sup>

The Private Finance Initiative (PFI) was announced by the then Chancellor, Norman Lamont, in the 1992 Autumn Statement with the aim of increasing the involvement of the private sector in the provision of public services. The PFI is a form of public private partnership (PPP) that marries a public procurement programme, where the public sector purchases capital items from the private sector, to an extension of contracting-out, where public services are contracted from the private sector. PFI differs from privatisation in that the public sector retains a substantial role in PFI projects, either as the main purchaser of services or as an essential enabler of the project. It differs from contracting out in that the private sector provides the capital asset as well as the services. The PFI differs from other PPPs in that the private sector contractor also arranges finance for the project.

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<sup>7</sup> PFI would typically have both debt and equity components, but we address it in this section as it is sometimes seen as an off balance sheet approach to debt funding.

<sup>8</sup> House of Commons, *Private Finance Initiative*, Research Paper 01/117, Dec 2001.

Under the most common form of PFI, the private sector designs, builds, finances and operates (DBFO) facilities based on 'output' specifications decided by public sector managers and their departments. Such projects need to achieve a genuine transfer of risk to the private sector contractor to secure value for money in the use of public resources before they will be agreed. The private sector already builds most public facilities but the PFI also enables the design, financing and operation of public services to be carried out by the private sector. Under the PFI, the public sector does not own an asset, such as a hospital or school but pays the PFI contractor a stream of committed revenue payments for the use of the facilities over the contract period. Once the contract has expired, ownership of the asset either remains with the private sector contractor, or is returned to the public sector, depending on the terms of the original contract.

In regard to financing, the private sector PFI sponsor is in some sense simply a financial intermediary. Contingent liabilities and counter party risk will still likely rest with a public enterprise purchasing the services or government. In light of this the UK model stresses the aim of risk transfer and efficiency in service delivery in securing benefits as compared to traditional public provision of services and infrastructure.

PFI proponents have sometimes highlighted the potential benefits of capital attraction and off balance sheet financing to mitigate borrowing constraints that the public sector might face. We see two key issues here. First, the capital attraction brought about PFIs is sometimes driven by the unique tax implications of the project at hand. Where part of the value of PFI rests in tax efficiencies one would want to examine the overall cost and benefit taking into consideration forgone tax revenues where this is the case.

Secondly, even if off balance sheet reporting is allowed in relevant statutory accounts,<sup>9</sup> credit ratings agencies and lenders typically look through such financing arrangements and consider the underlying cash flows that repayment of debt is based on. We do note that in some jurisdictions there are statutory constraints on public sector borrowings and in this case PFI solutions might provide an option depending on how they are defined under jurisdictional accounting standards.

On the other hand, PFI skeptics often cite the higher cost of debt that the private sector faces as compared to government. This issue was discussed in the House of Commons paper cited above:

*“David Currie of the London Business School has challenged the proposition that private sector borrowing costs are higher, calling proponents “naïve”.<sup>10</sup> He has suggested that when evaluating projects: [...] efficiency savings are the significant factor in any decision between the two options as adopting a more appropriate approach to the evaluation of the costs of a project shows that the differences between the costs of borrowing are illusory.*

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<sup>9</sup> Jurisdictional accounting standards will determine if such projects are to be defined as operational leases or finance leases and thereby expensed or depreciated for accounting purposes.

<sup>10</sup> David Currie, *Funding the London Underground*, London Business School, March 2000



*One of the most fundamental points in using cost benefit analysis to evaluate projects is to account for their impact on all individuals in a community [...] in the private sector, investors carry the risk of default and are rewarded accordingly but in the private sector, taxpayers carry the risk but receive no commensurate reward. In other words, although the public sector can borrow at the risk-free rate to finance investment, this imposes a residual risk on taxpayers in much the same way as private sector investors but without a reward. Clearly the contingent liability being imposed on taxpayers is a cost that ought to be accounted for in any cost–benefit analysis. Unfortunately it is not normal practice to quantify in the public balance sheet these contingent liabilities faced by the public. Once taken into account, the true cost of borrowing is the same for the public and private sector if the underlying risk of the projects is the same.”*

In this regard, we note the considerable work carried out by South African Treasury on PPP guidelines and methodologies to identify and measure such risks.<sup>11</sup> National Treasury sets out guidelines to be followed in quantifying such risks to government and how it should be accounted for in assessing PPPs.<sup>12</sup>

#### 2.5.2 Risk and public sector procurement (National Treasury)

*“In conventional public sector procurement, risk is the potential for additional costs above the base PSC model. Historically, conventional public sector procurement has tended not to take risk into account adequately. Budgets for major procurement projects have been prone to optimism bias – a tendency to budget for the best possible (often lowest cost) outcome rather than the most likely. This has led to frequent cost overruns. Optimism bias has also meant that inaccurate prices have been used to assess options. Using biased price information early in the budget process can result in real economic costs resulting from an inefficient allocation of resources.*

*Much of the public sector does not use commercial insurers, nor does it self-insure (through a captive insurance company). Commercial insurance would not provide value for money for government, because the size and range of its business is so large that it does not need to spread its risk, and the value of claims is unlikely to exceed its premium payments. However, government still bears the costs arising from uninsured risks and there are many examples of projects where the public sector has been poor at managing insurable (but uninsured) risk.”*

*Source: op cit*

A risk adjusted Public Sector Comparator (PSC) model is built to assess the relative cost of the proposed PPP model against the public sector option. National Treasury sets out a detailed guide on how to do so, with key aspects summarised below.

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<sup>11</sup> National Treasury (Republic of South Africa), *Public Private Partnership Manual*.

<sup>12</sup> We note that National Treasury takes a more direct approach to quantifying risk in regard to using risk adjusted cash flow, rather than adjusting the discount rate as implied by Currie, but that the two approaches are similar in principle.



### ***Construct the risk-adjusted PSC model***

*Step 1: Identify the risks*

*Step 2: Identify the impacts of each risk*

*Step 3: Estimate the likelihood of the risks occurring*

*Step 4: Estimate the cost of each risk*

*Step 5: Identify strategies for mitigating the risks*

*Step 6: Allocate risk*

*Step 7: Construct the risk matrix*

*Step 8: Construct the risk-adjusted PSC model*

*Step 9: Preliminary analysis to test affordability*

The debate on the benefits of PFI from the pure financing perspective is in any case rich and ongoing. We do think that it is perhaps reasonable to start with the assumption that the real advantages of PFI will be related to potential risk transfer and operational efficiencies that might be obtained from this model, rather than (pure) financing advantages. Still, financing efficiencies at the margin might be obtainable from PFI due to innovative use of financial instruments by the private sector, although this could be the case for public sector borrowings as well. Our view is that each case will need to be judged on its specific merits.

#### *2.5.2.1 PPP roads programmes in developing countries*

As reported in a study by the World Bank, private activity in road projects in developing countries has been rather extensive in recent years, although investment was concentrated in a few countries such as Brazil, Mexico, and India. In all three countries new models and frameworks for private participation helped attract investment in road infrastructure. A snapshot of India's experience is taken from the World Bank study as provided below.

#### *2.5.2.2 India's experience in PPP in road development*

In India private activity in roads rose steadily from 2002 on, with annual investment reaching levels of US\$3.2–4.8 billion in 2006–08, far higher than in previous years. India awarded 83 projects in 2006–08, involving investment of US\$12.6 billion and almost 6,100 kilometers. Of these projects, 74 are concessions (61 for federal roads and 13 for state roads). These involve investment of US\$11.6 billion, 80% of it for federal roads. The other nine projects are BOT (build, operate, and transfer) contracts (two for federal roads and seven for state roads), accounting for 290 kilometers and the remaining US\$1 billion in investment.

The Indian projects granted in 2008 differ in nature from those in 2006–07. The 75 projects (concessions and BOT contracts) implemented in 2006–07 averaged around US\$100 million in investment size, and around 80% were tendered using the lowest government contribution (lowest government payments or subsidies) as the main bidding criterion. In contrast, the eight projects implemented in 2008 averaged US\$570 million in size, and six used highest transfers

to the government (highest price paid to or highest percentage of revenue transfer to government) as the main bidding criterion. These data suggest that most Indian projects awarded in 2008 were expected to generate enough resources to be financially viable, requiring little or no government support.

The higher level of activity in India was made possible by an amendment to the National Highways Act of 1995 that allows private participation in roads and sets out three models for private participation in highways: BOT contracts on a toll basis, BOT contracts on an annuity basis, and special-purpose vehicles.<sup>3</sup>

In the BOT toll model the private concessionaire finances and undertakes the construction and maintenance of a highway and recovers its investment (plus a return) from toll revenues. For projects in which the traffic is expected to be insufficient to recover the expected investment, the government can provide a capital grant (up to 40% of the project cost). The BOT toll-based contracts are granted through a tender process in which the minimum capital grant requested is used as a bidding criterion. For projects expected to generate enough traffic to cover the project cost, the highest payment to the government is used as a bidding criterion.

In the BOT annuity model the private concessionaire finances and undertakes the construction and maintenance of the highway and recovers its investment (plus a predetermined rate of return from the annuity payments by the government (granting authority)). The BOT annuity-based contracts are granted through a tender process in which the lowest annuity requested is used as a bidding criterion. The granting authority retains the traffic risk, since it collects the toll revenues.

In the third model the National Highways Authority of India forms special-purpose vehicles, which are independent legal entities, for funding road projects. The highways authority provides limited equity or debt support, while financial institutions or beneficiary organizations supply the remaining funding.

### 3 Equity injection

The very nature of public infrastructure allows as an option funding of capital programmes by way of equity injections by government. In this sense, we wish to differentiate (for the purpose of discussion) the injection of equity as opposed to pure government grants from a conceptual and practical point of view.

- For *equity injections* we assume that there is the expectation of a stream of dividends to government as shareholder reflecting the long term return on equity to be provided for this component of public funding.
- Alternatively, for *government grants*, we assume that there is the policy choice made that public funds are essentially gifted to the public enterprise and a direct future return on that contribution is not expected. We would also like to highlight that while a *direct financial return* might not be expected – one would anticipate/expect a commensurate indirect return to the community from such social investments.

This is an important distinction as where there is the expectation of a direct financial return on equity by way of dividends, future revenues and tariffs will need to provide for these payments. In this case, equity injections can provide funding relief in the short term, but would be balanced against the long term impact of increasing tariffs to the degree that government as shareholder expects a return on investment. We will discuss a few key issues related to equity, and come back to the alternative option of government grants in a later section of this review.

#### **3.1 Centralised holdings and the Singapore model**

Similar to the centralised borrowing agencies discussed in the previous section on debt funding, governments sometime centralise their equity holding of public infrastructure. An example of this is Singapore's Temasek Holdings which owns and manages a portfolio of public investments with a net value of some US\$134 billion.

In regard to funding, this centralised holding company arrangement might allow for some flexibility in regard to the more diverse balance sheet, allowing for allocation of retained earnings from one area to another depending on the funding requirements at hand. We have provided a snapshot of Temasek Holdings below to highlight a few key aspects of that approach.

### **Temasek Holdings - Singapore**

*"We are an active shareholder and investor in diverse industries covering banking & financial services, real estate, transportation & logistics, infrastructure, telecommunications & media, bioscience & healthcare, education, consumer & lifestyle, energy & resources, engineering as well as technology.*

*Our total shareholder return since our inception is more than 18% compounded annually. We have a corporate credit rating of AAA/Aaa by Standard & Poor's and Moody's respectively. Our investments are funded through dividends we receive from our portfolio companies, our divestment proceeds, commercial borrowings, a maiden Yankee bond issue in 2005 and occasional asset injections from our shareholder, the Minister for Finance (Incorporated).*

*Temasek is an investment company that owns and manages its assets on a commercial basis.*

*We are an exempt private company<sup>1</sup> incorporated on 25 June 1974 to own and manage investments previously held by our shareholder, the Minister for Finance (Incorporated).*

*This represents a policy commitment for these investments to be managed by Temasek on a sound commercial basis, as distinct from the government's public interest role of policy-making and market regulation. This frees the government to act in the larger interests of the overall economy.*

*Temasek operates under the purview of the Singapore Companies Act and all other applicable laws and regulations governing companies incorporated in Singapore. Within this regulatory framework, Temasek operates with full commercial discretion and flexibility, under the direction of our Board of Directors.*

*Under the Singapore Companies Act (Chapter 50), an exempt private company has no more than 20 shareholders and no corporate shareholder, and is exempted from filing its audited financials with the public registry."*

*Source: from material provided on Temasek website.*

There are a number of interesting aspects of this model. It provides a platform for growth as it is based on obtaining a commercial rate of return and thereby is able to build a base of earnings in which to fund new projects. In this regard the view is also taken that investments in sectors such as infrastructure are to be managed on a sound commercial basis "as distinct from the government's role of policy making and market regulation." The reported compounded shareholder return since inception of 18% is also notable in this regard.

### **3.2 Private sector equity participation**

A hybrid of the public funding model is private sector equity participation. By this, we mean joint public / private shareholding of corporatised entities by way of a partial public offering of shares on a domestic or overseas stock exchange, or by way of partial trade sale of shares to a strategic equity partner. We stress the 'partial' offering aspect of this model as we do not mean

to examine the issue of full privatisation in this particular review – but rather the specific form of public/private sector equity funding of which South Africa also has recent experience with.

- The **partial listing of shares** (by otherwise government owned enterprises) has been used extensively in countries such as China, Thailand, South Korea, and Malaysia (to name but a few) to provide additional sources of equity funding within the broad context of public infrastructure.
- An example of **trade sale of shares to a strategic equity partner** can be found in the sale of a minority stake in Airports Corporation of South Africa to ADR (an Italian airports management firm) in 1998, although in that case ADR eventually sold its shares to South Africa's state owned Public Investment Corporation.

To illustrate some of the key features of this hybrid funding model we provide below a snapshot of Thailand's experience with private sector equity participation in the utility sector.

### 3.2.1 Thailand's experience with private sector equity participation in the electricity sector

During the late 1990's Thailand's ESI faced a severe funding gap driven by the Asian economic downturn during the construction of a major power station. The matter became critical when Thailand's state-owned utility EGAT faced delay in completion of Ratchaburi power station and potentially subject to take-or-pay provisions of the fuel supply contract for the power station. Moreover, without completion of Ratchaburi plant, Thailand's reserve capacity in 1999 was projected to drop to 10%.

#### **Ratchaburi Electricity Generating Company**

Ratchaburi Electricity Generating Holding Public Company Limited (RATCH), a leading investment company in power generation business, was founded on March 7, 2000, following cabinet's approval on November 30, 1999.

The Company is a listed company and being registered on the Stock Exchange of Thailand (SET) using the stock symbol as "RATCH". The Company's major shareholder is the Electricity Generating Authority of Thailand (EGAT) holding 45 percent of the Company.

At present, the Company has a total installed capacity of 3,995 MW deriving from its current commercial operating power plants. Moreover, the Company has many ongoing projects both in local and overseas, which can enhance its total installed capacity to 4,500.50 MW in the near future.

Ratchaburi Electricity Generating Company Limited has a policy to pay 100 percent of its net profits as dividend following the deduction of statutory reserves and other reserves after having complied with conditions in its loan agreements.

Ratchaburi Electricity Generating Holding Public Company Limited has changed its accounting records from Equity Method to Cost Method starting from 1 January 2007. As a result, the net profits stated in the Company's financial statements and the consolidated financial statements are different. The Board of Directors, at the meeting No.5/2007 dated

28 May 2007, approved a policy to pay no less than 40 percent of its net profits as dividend following the deduction of legal reserves and other reserves. However, dividend payment also depends on the Company's cash flow.

Net profits and dividend payment

Year	Dividend (% of net profit after legal and other reserves)
2001	49.9%
2002	48.4%
2003	49.2%
2004	47.0%
2005	50.3%
2006	51.1%
2007	52.2%

*(Source: compiled from material on company website)*

While there are a number of detailed matters involved, broadly speaking, the option taken was to incorporate a wholly owned subsidiary of EGAT which the soon to be completed Ratchaburi power station would be placed. The new subsidiary was formed as a publicly listed company with an Initial Public Offering (IPO) of shares listed in Stock Exchange of Thailand (SET). The public listing allowed for:

- EGAT retaining 45% ownership.
- No privatisation of existing assets or impact on employees.
- Direct equity injection by the public.
- Raising (or placing) debt in the stand-alone company.
- The ability to either buy back or decrease shareholding going forward.

EGAT and its related companies have since funded a number of power projects through this approach to private sector equity participation.

### **3.3 Rate of return on public funds**

We appreciate that there are divergent views on the appropriate rate of return (or equivalently referred to as the cost of capital) on public sector investment, and more specifically, whether or not public investment requires a commercial rate of return. To examine this important issue further we first think it helpful to set out a working definition of the cost of capital as “the expected rate of return on alternative investments of equivalent risk. It is the rate of return that

investors require based on the risk-return alternatives available in competitive capital markets”<sup>13</sup>.

There is an argument to be made that this fundamental relationship is equally well applied to competitive capital markets and public enterprises. In both market and regulatory environments scarce capital must be allocated to various investment options. The underlying opportunity cost of capital employed to each investment option (or business) is dependent on the risk characteristics of that investment (business). This is the case for privately held businesses and public enterprises. For this reason, the commercial rate of return provided for in the capital markets may be seen as the appropriate conceptual starting point in which to assess the appropriate rate of return on investment in public infrastructure.

As a practical illustration of this view, we note that the New South Wales State Government (as have other state governments in Australia) developed a policy framework in addressing the issue of appropriate returns for state owned enterprises. An important component of this policy framework is the concept of ‘competitive neutrality’.

Competitive neutrality is relevant to markets where there is competition between a state owned enterprise and private enterprise, but is equally relevant to natural or statutory monopolies in regard to use of scarce capital vis-à-vis other socially beneficial investments. An excerpt from a guideline document sets out the key issues in regard to appropriate rate of return for a state owned enterprise<sup>14</sup>.

*“Competitive neutrality involves government enterprises not facing any special competitive advantages or disadvantages over their private sector counterparts because of their government ownership. Without a level playing field, inefficiencies in an organisation can survive more easily.*

*The existence or perception of a government guarantee of debt funding needs to be overcome by the application of an explicit fee by the government to eliminate the interest rate advantage associated with continuing government ownership. The fee should be commensurate with the credit risk the enterprise would face if it had no guarantee. Alternatively, where borrowings are undertaken on the enterprise's behalf by a central borrowing authority, any explicit guarantee should be removed and the enterprise charged full commercial rates of interest related to the credit risk of the enterprise in the absence of any guarantee.*

*Government equity needs to be costed on the same basis as that supplied by private investors to privately owned enterprises, by ensuring that the rate of return expected on government equity is equivalent to that expected in the private sector for an enterprise with a similar commercial (i.e. market) risk profile.”*

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13 See Brattle Group, “The Cost Of Capital For The Dampier To Bunbury Natural Gas Pipeline” October 1999

14 Characteristics of A Fully Corporatised Government Trading Enterprise And Checklist For National Stocktake of Gte Reforms, NSW Treasury 1991.



The key point we wish to draw from the NSW policy guideline is that the rate of return on government investment should be in line with its market and risk profile. This holds for both debt and equity financing. If services are provided and investments are made on a rate of return less than this (i.e. as a government grant) it should be examined in terms of a subsidy equivalent. The merits of a particular subsidy would need to be made on a case by case basis, but we suggest that a broad subsidy across the entire enterprise (in the form of its regulated rate of return, allowed revenue, and prices) may not provide a well targeted or effective subsidy in any case.

This is also highly relevant to *investment* decisions taken by the public sector. Where a lower rate of return is applied to investment decisions, they will be advantaged compared to private sector solutions. The question here is whether there is indeed a relative advantage in regard to the opportunity cost of capital? This in itself is a complex matter and we will only set out two counter points to motivate the issue at hand.

- There are scenarios in which it is feasible that public sector financing can be more efficient than that of the private sector. For example, a state owned enterprise funded by government might be able to manage sovereign risks (broadly defined) better than a private sector alternative and achieve a better outcome in regard to true risk adjusted return. In essence, the assumption here is that the state owned enterprise will be able to reduce (or perhaps just better estimate) these risks and thus require a lesser rate of return than would the private sector. In such cases there might be a true competitive advantage to state funding. We do not mean to suggest this is always the case – just to demonstrate that there are complex issues to examine on a case-by-case basis.
- Alternatively, un-costed government subsidies (e.g. stemming from government guarantees, or willingness to forego dividends at the expense of other socially beneficial investments) would not provide sound basis for setting the rate of return used in assessing alternative investment opportunities. This does not mean that the use of public funds is not appropriate for such investments – just that one would want to use the fully costed (i.e. risk adjusted) rate of return on that funding as the benchmark for comparison of alternative investments.

With these examples in mind we cannot make an overarching statement on which rate of return to apply in every conceivable case. We would, however, start with the working assumption that the appropriate rate of return is broadly equivalent between public and private investment, and (only) then adjust where clearly defined reasons for divergence between the two have been indentified and quantified.<sup>15</sup>

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<sup>15</sup> We again note National Treasury guidelines that recommend risk adjustments be accounted for by way of adjustments to projected revenue streams rather than the discount rate. We think the two methods are broadly similar in regard to pricing risk – and appropriate application of either methodology would lead to (in our view) a robust outcome.



## 4 Government grants

Government grants are an often relied on source of public infrastructure funding. This is particularly the case for sectors where there is a large ‘public goods’ aspect to the service being provided and/or where direct user charges are not seen as optimal perhaps, as often the case in the transport sector, due to network externalities and spill-over effects.

### 4.1 Sources of government funding for public infrastructure

Broadly speaking, government grants as related to public infrastructure projects are often funded in the following way:

**General taxation** — the general tax base which revenue is sourced and the expenditure of the revenue raised.

**General purpose public borrowing** — funds raised by issuing debt securities (e.g. government bonds) on domestic or international markets.

**Hypothecated taxes** — taxation revenue (usually from specific taxes or levies) directly assigned or ‘earmarked’ to fund designated expenditures.

**Intergovernmental transfers** - the transfer of finances between different levels of government (e.g. from national to state or municipal governments).

Each avenue of funding government grants has its own set of advantages and disadvantages. Some of the key issues at hand are briefly summarized below.

#### 4.1.1 General taxation

General taxation is perceived to be a relatively straightforward method of raising funds to finance infrastructure development. Further, the imposition of general taxation in some cases may be a relatively efficient way for spreading the costs of provision at a given point in time where the social benefits of public infrastructure are diffused throughout society and specific users cannot be identified.<sup>16</sup>

The use of general taxation to fund infrastructure does have its costs though in regard to economic efficiency and deadweight loss. The use of broad-based taxation tends to discourage mutually beneficial market exchanges by driving a wedge between the prices that suppliers want to receive for their output, and what consumers are willing to pay. By altering economic incentives at the margin, taxes can lead to a ‘deadweight loss’ that is borne by the wider community. Estimates vary on the deadweight cost of raising an extra dollar of funds by way of general taxes, but typically range between 20 cents for every dollar raised to more than 40 cents.

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<sup>16</sup> ACG, *Funding Urban Public Infrastructure — Approaches Compared*, Report to the Property Council of Australia. 2003

#### 4.1.2 General purpose borrowing

General purpose borrowing is a significant source of public sector debt financing generally, is one option to be considered in regard to large government infrastructure grants as opposed to pay-as-you-go appropriations. Of course, as a government grant (where there is not the expectation to recover funding from users) there will need to be the expectation of future revenue inflows from other areas of the tax base. Where there are large infrastructure needs to be funded in this way, the impact on general purpose borrowings can be significant, and where general purpose borrowings exceed government capital formation it would adversely affect government's long term ability to repay debt and have the associated adverse impact on credit ratings. This could in turn translate into generally higher financing costs of borrowings by government.

#### 4.1.3 Hypothecated taxes

Hypothecated taxes and levies are often employed in infrastructure funding – with notable examples in road use (e.g. petrol and licence charges). This might be thought of as a hybrid between pure user charges, and funding from a broad tax base.<sup>17</sup> In the case of transport sectors for example, specific taxes might be raised and then set aside for expenditure on maintenance and construction. The benefit of this approach is that it has the potential to provide a *relatively* more transparent and direct link between use of public infrastructure and taxes levied than would be the case for funding by way of the general tax base.

In the United States for example, all revenue from the federal fuel excise is dedicated to a highway trust fund for state and local government road infrastructure. Many state fuel taxes in the United States are also earmarked, at least in part, to fund road construction and maintenance.<sup>18</sup>

#### 4.1.4 Intergovernmental transfers

Intergovernmental transfers are perhaps a sub-set of the broader categorization of government funding we have in mind – but is nevertheless often an important source of public infrastructure funding at sub-national level. For example, in the United States, federal intergovernmental transfers for highway construction, transit system development, water services and public housing were estimated to total approximately US\$57 billion in 2003 (OMB 2003). The provision of capital grants to sub-national entities is mirrored in countries such as France, New Zealand, Sweden and the United Kingdom, noting that the UK national government provided over €7 billion in capital grants to local authorities in 2004, and a similar amount was provided in France. Local governments in Sweden received €718 million from the national government in 2004. In New Zealand, total central government assistance (operating and capital grants, as well as subsidies) accounted for over 10 per cent of local authority revenue in 2006.

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<sup>17</sup> We note the considerable research in regard to this particular example with respect to the correspondence of such charges to full cost of services provided. As such, we do consider this a hybrid of the user pays model – although an often used option in practice.

<sup>18</sup> We also note that specific taxes such as this are not always hypothecated and can flow into the general fund and appropriated across the wide range of government expenditures.

In its review of public sector financing, the Productively Commission (op cit) outlined some broad advantages and disadvantages of funding public infrastructure through intergovernmental transfers that perhaps provide some useful first questions to consider when deciding on the optimal approach for any particular case:

*“Intergovernmental transfer payments assist in alleviating fiscal imbalances at the sub-national government level. They can also close funding gaps where some state and local governments have inadequate revenues to meet their infrastructure and other expenditure needs, compared to wealthier regions of the country.*

*One criticism leveled at conditional intergovernmental transfers is that they can reduce the flexibility of sub-national jurisdictions to finance the public infrastructure projects that have the highest local priority (Walsh 1992). Further, conditional payments are ineffective unless they are tied to enforceable output-based performance criteria. Without such requirements, the grant receiving entity is not directly accountable for the effective and efficient use of the funds. Under these circumstances, the government making the transfer might not achieve its objectives, potentially with adverse consequences for efficient resource use.”*

The same report also notes intergovernmental transfers could lead to a confusion of objectives where different levels of governments are involved, and a shared responsibility for public infrastructure development could also weaken accountability since the community has greater difficulties in identifying which level of government is responsible for infrastructure investment.

#### 4.1.5 Case study – funding of Chubu Airport (Japan)

Central Japan International Airport Company (CJIAC) is Japan's third most important international airport after Tokyo's Narita Airport and Osaka's Kansai Airport. It is also known as Chubu Airport.

Constructed on a man made island in the Bay of Ise, CJAIC was opened in February 2005 in time for the Expo 2005 Aichi, taking over all international and most domestic air traffic, formerly handled by Nagoya's Komaki Airport

Japan utilised (what we have broadly called) airport improvement funds in development of CJIAC. More specifically, Japan's Fiscal Investment and Loan Program (FILP) funds were utilised in development of CJIAC with the aim to “facilitate air transportation and contribute to the overall development of civil aviation, basic airport facilities (runways, aprons, etc.) and air navigation facilities for aviation.”<sup>19</sup>

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19 Audit of FILP Funding, 2002

### **Japan's Fiscal Investment and Loan Program (FILP)**

Japan's Fiscal Investment and Loan Program (FILP) is a government-operated system for directing public savings into projects that are deemed to have one or more of three public purposes: (i) allocation of societal investments to priorities that might not otherwise be financed by the ordinary operations of the market; (ii)intermediating between the government's fund-collecting vehicles and various government projects; and (iii) countercyclical financial operations that would tend to stabilize the economy.

In Japan the assets of the social security funds are deposited with the Trust Fund Bureau of the Ministry of Finance, which uses them to help finance investment and lending operations, administered through the FILP system. The FILP also receives funds from other sources, the most important of which are savings through post offices, a very large amount in Japan.

*Source: OECD Economic Surveys: Japan, OECD Publications.1993.*

As set out in an audit of FILP funds<sup>20</sup>, the CJIAC was established on May 1, 1998. The Minister of Transport designated CJIAC on July 1, 1998 as the body to construct and manage the new airport under "Chubu International Airport Construction and Administration Law."

For the project, the company received capital investment and interest-free loans from the government, capital investment and interest-free loans from local governments, and capital investment from the private sector. The company also used interest-bearing funds raised through the issuance of government guaranteed bonds and interest-bearing loans from the Development Bank of Japan and private financial institutions.

As role of government funding in support of regional development is noted in the audit report on FILP funding in that:

*"The following are the important roles of the new airport as the international hub airport in Chubu region, the third core following the Capital and Kinki regions.*

- to meet emerging demand for air transportation in the Chubu region in the 21st century*
- to be a base for air transportation networks which helps the domestic and international exchange.*
- to facilitate the development of Chubu region, which has a large population and a number of industrial complexes. The airport is expected to bring about various social and economic benefits, including promotion of domestic and international exchange, improvement of efficiency of cargo transportation, and industrial development."*

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<sup>20</sup> Op cit.

#### **4.2 Shadow tolls and government support for roads**

Shadow tolls are a mechanism seen in various countries as a means of providing government support to privately operated roads projects. In this case, tolls are not charged to road users, but instead shadow tolls are paid by government to the operator. The shadow toll might be based on traffic counts on the road and an agreed rate per vehicle/vehicle type, or on a notional value of similar basis, and perhaps provided on a lump sum basis to the operator.

The benefits of this system do not therefore stem from the development of a new source of funds, or from making users internalize the external costs of their travel that would be aimed for under a direct tolling model, but rather from:

- the Government commitment to continued financial support over several years
- the involvement of the private sector and their responsibility for efficient delivery of service.

#### **UK shadow tolls - A19 Dishforth - Tyne Tunnel**

The A19 Dishforth - Tyne Tunnel was part of Tranche 1A in the £1 billion Design, Build, Finance and Operate (DBFO) Programme. The contract was awarded to Autolink Concessionaries (A19) Ltd, a consortium of three companies comprising of Amey, Sir Robert McAlpine and Taylor Woodrow.

Autolink's concession will last for a period of 30 years and include the improvement of the A19 between Norton to Parkway and the operation and ongoing maintenance of the existing road. The payments are calculated on the number of vehicle kilometres travelled on the road, using "Shadow Tolls". There is no direct payment of tolls by road users.

The improvement (widening of the A19 between Norton and Parkway to reduce accidents, congestion, air pollution, noise and vibration) is approximately 7km long and required the construction of 18 major structures. The improvement is a dual 3 and 4 lane carriageway with marginal strips over the whole length.

Autolink are responsible for the operation and maintenance of the project road, they carry out all the routine cyclic and winter maintenance works and have delegated responsibilities for other functions i.e. Environmental Protection Act for litter clearance etc, though the Secretary of State remains the Highway Authority.

#### **4.3 User pays and role of subsidies**

As a policy choice government grants can be used to shield infrastructure users from the full direct cost of services provided. The user pays vs subsidy debate is complex and should be evaluated within the specific context at hand. In this regard we do not mean to imply there is a

one-size-fits-all solution. That said, we note the view provided in a report for National Treasury<sup>21</sup> in regard to pricing at long term cost of supply:

*“More generally, prices have an important role to play as signals to both the demand and the supply side of the market. In the utilities and transportations sectors, in particular, where planning cycles are relatively long, misleading price signals can lead both customers and service providers to make erroneous investment decisions at high cost to both themselves and to the economy. It is generally agreed, for example, that due to past over -investment in capacity electricity prices lie below the level that would reflect the long terms costs of maintaining supply. While the immediate consequence of this is that customers benefit from cheaper energy while the economy as a whole is likely to be boosted by low cost access to a key resource. The problem, however, is that low prices give conflicting messages to the demand and supply sides of the electricity market. Customers on the one hand are encouraged to invest in energy intensive appliances and equipment, while there is no corresponding incentive on the supply side to invest in increased capacity on the other. Security of supply will necessarily be put at risk if prices do not give broadly the right signals to both the demand and supply side of the market.”*

There is clearly a balance of costs and benefits that one should weigh up in deciding the optimal balance of either user charges or government grants in the provision of public infrastructure. Perhaps the fundamental issue at hand is the efficiency in which various components of major capital programmes can be funded. At one end of the spectrum is a pure ‘user pays’ model. In this case, government might provide financing support by way of debt facilities, loan guarantees, or equity injections – but there would be the expectation of a return on capital provided.

Alternatively, governments often choose to support major capital programmes by providing government grants to fund infrastructure development as part of its broader social objectives. This is clearly an important policy choice in allocating government resources across the various needs of its constituents. Where subsidy is seen as an appropriate policy objective, the trend that we see across a number of jurisdictions is to apply well defined and targeted grants based on clear policy objectives.

Moreover, the issues of sustainability and efficiency come to play, as the sheer quantum of infrastructure costs often limits government’s ability to provide funds on an ongoing basis sufficient to build new capacity in major public works and in such cases hybrid model may need to be considered.

We review the important role of administered pricing and regulation of tariffs and charges within the context of enabling investment in public infrastructure in the section that follows.

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<sup>21</sup> Storer, D, and E Teljeur, *Administered Prices Executive Report*, A report for National Treasury.

## 5 Tariffs and charges

### 5.1 Overview of regulatory approaches for funding investment

Tariffs and charges typically provide the foundation of the various funding approaches applied to airports given the overarching assumption that capital investment in this sector is ultimately recovered through tariffs and charges. Given that airports charges are often regulated there is a direct relationship between regulatory approach and impact on investment. There are numerous models approaches to setting regulated tariffs and charges for airports, but financing large new projects from user charges often places additional pressures on these models and often requires specialised treatment in order to meet funding constraints.

The essence of more traditional regulatory models is that capital expenditure is meant to be recovered over the life of the asset and the annual revenue allowance is built up accordingly – with borrowings (and perhaps equity injections) filling the short and medium term gap in cash flows. While there are number of options available in recovering capital expenditure within the cost of service model, perhaps the most typical way to do so is through the *return on assets* and *depreciation* components of the building blocks.

Through the return on assets. This component of the regulatory building blocks is the return on assets as measured by the Regulatory Asset Base (RAB). This is often calculated as the product of the RAB and the weighted average cost of capital (i.e. RAB x WACC).

Through regulatory depreciation. This component of the regulatory building blocks is most often applied by way of the annualised straight line depreciation charge that forms part of the annual revenue requirement and regulated charges. (i.e. for a 25 year asset =  $1/25 \times$  asset cost recovered in tariffs each year).

### 5.2 Timing of capex recovery

Where capital expenditure is remunerated under the broad approach set out above, there is the issue of timing and recognition of assets in the Regulatory Asset Base (RAB). The key issue here is in regard to when capex is to be rolled in (recognised) as part the RAB. Broadly put - the question is whether capex should be rolled in to the RAB and started to be remunerated 'as spent' so as to assist with the immediate funding of capital requirements through tariffs, or 'as commissioned' whereby the regulated utility provides/obtains the upfront funding for the project – perhaps through retained earnings, free cash flow, or borrowings - and only starts to recover those costs through tariffs once the project has been commissioned. To help illustrate the broad concepts here it may be helpful to work through these two stylized models of capex recovery.

#### 5.2.1 'As commissioned'

Where the regulated entity is expected to provide for upfront funding (prior to commissioning) capital expenditure is rolled into the RAB on completion of construction, thereby adding the return on assets and depreciation amounts into the annual revenue requirement from that time forward.



Key aspects of this approach are that:

- Interest During Construction (IDC) is capitalised into the RAB on commissioning of the asset; and
- regulatory depreciation starts on commissioning of the asset.

In this case, the regulated entity only starts to recover capital expenditures on commissioning of an asset, and would need to fund project costs from retained earnings, free cash flows, or by other means of financing (typically by way of a range of debt instruments) during the construction phase of the project. Financing would typically be sourced on a long terms basis – and these costs recovered over the life of the asset through regulated revenues and tariffs.

#### 5.2.2 'As spent'

An alternative approach often seen in regulatory practice where there are major capital programmes underway is based on the 'as spent' approach, whereby allowed capex is rolled in to the RAB and some proportion of these costs start to be recovered prior to commissioning.

In this case, the regulated entity starts to recover portion of capital expenditures during construction thereby lessening financing constraints that might exist during this time. Similar to the as commissioned approach, financing would still typically be sourced on a long terms basis – and these costs recovered over the life of the asset through regulated revenues and tariffs.

There are also examples where pre-commissioning costs are fully recovered in the year incurred, and in some cases an early and/or accelerated form of depreciation on the total (planned) cost of the project is allowed for. Where there is the aim to provide additional cash flow for capital projects to ease financing constraints, the advantage of this approach (relying on transparent regulatory accounting principles for depreciation) is that it can be applied in a 'NPV equivalent' manner (i.e. no wind-fall gain or loss to the utility) is transparent, and rather easy to monitor from the perspective the regulator.

#### 5.2.3 Pre-funding of investment through charges

There is a rather large body of literature and experience of regulatory approaches that allow capital costs to be recovered prior to commissioning of the asset. This is particularly true for airports where the term 'pre-funding' is often used – which can be defined as remuneration to the airport owner/operator of some part of planned capital expenditure by way of charges in advance of completion and operation of the capital project.

The International Civil Aviation Organization (ICAO) has set out in its *Airports Economics Manual*<sup>22</sup> the circumstances whereby pre-funding of capital works is deemed appropriate and the broad scope for application. Conditions for pre-funding (as paraphrased for this report) include:

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<sup>22</sup> International Civil Aviation Organization, *Airports Economics Manual*, 2<sup>nd</sup> edition 2006.



- Aircraft operators will benefit by the provision of services which could not otherwise be provided because regular sources of financing are insufficient and it is not possible or is too costly to access capital markets.
- Charges should not be set at levels that would generate revenues that exceed cost-based funding requirements.
- Pre-funding should be considered only for capital expansion projects that have reached a substantial level of maturity in the capital planning process.
- Stakeholder consultation is to be undertaken setting out to users the financial benefits derived through pre-funding, the respective share on a multi-year basis of each of the financing methods planned for the project, and allow for the opportunity to explore other financing solutions.

Under these circumstances, ICAO policy is that pre-funding may be used to pay capital related development and implementation costs including preparation of final engineering project plans, contracting and administration costs, construction, equipment purchases, and environmental costs.

The ICAO policy further provides flexibility in the way that charge might be applied, including a surcharge on existing aviation charges or through the introduction of a new project specific aviation charge. There is also the allowance for a mix of charges to be applied commensurate to the costs and benefits assumed by the respective users upon completion of the project. The guiding principle is that charges should not be set at levels that would generate revenues that exceed cost-based funding requirements.

To illustrate how these approaches have been applied in practice, we set out below two case studies found in the air transport sector.

### **Revenue advancement and Heathrow T5**

The UK Civil Aviation Authority (CAA) has allowed for price smoothing and revenue advancement for major capital works programmes since its 1992 price cap decision. This is noted in a 1996 CAA document<sup>23 24</sup> whereby:

*“During the review leading up to the Q2 price cap airlines had been generally against prefunding of future investment but at the same time they were concerned that BAA should be able to invest in appropriate facilities to meet future needs.*

The Q2 price cap essentially provided for a smoothing of the price profile by way of an advance on future revenue allowances.

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23 Civil Aviation Authority. Airports Act 1986 Heathrow Airport Ltd, Gatwick Airport Ltd And Stansted Airport Ltd Conditions As To Airport Charges And Other Conditions Under Sections 40(4) and 46(2) of the ACT.

24 The expression “Q2” relates to the five years from 1 April 1992, “Q3” the five years from 1 April 1997 and “Q4” the five years from 1 April 2002.

The 2003 decision of CAA<sup>25</sup> continued the philosophy of supporting investment by way of revenue advancement and remuneration of capital expenditure during construction. In allowing a significant advancement of revenue of some £300 million<sup>26</sup> in net present value terms as of 2003 for the 2003-2007 price control the CAA<sup>27</sup> noted that:

*Not remunerating assets in the course of construction and not proceeding with profiling would result in a substantial lessening of the RPI+6.5% at Heathrow, pointing instead to substantial real price reductions in Q4 to be followed in Q5 with a much larger real increase than the 20% per annum identified by the Competition Commission. The CAA believes that this profile would be contrary to achievement of its statutory objectives, by providing for an inefficient profile of pricing, by diluting BAA's investment incentives since large price increases in 2008/9 would have a low probability of being seen as credible or deliverable, and by making the delivery of BAA's investment programme more difficult. Not allowing revenue advancement for this review would increase the likelihood that a much larger revenue advancement, in future, or higher cost of capital would have to be adopted, now or in future, to compensate. (sec. 4.27)*

In regard to the methodology applied here, we would like to note that while the terminology used by the CAA often focuses on “revenue advancement” it can equally be thought of in terms of the stylized building blocks models presented in the previous section, as it is essentially provides a return on work under construction and early and/or accelerated depreciation of assets. CAA notes this and also emphasizes the intent for revenue neutrality over the long term that would normally be associated with the application of transparent regulatory accounting approaches.

### **US Passenger Facility Charge**

A common source of airport capital financing in the US is the Passenger Facility Charge (PFC). The PFC was created by the Aviation Safety Capacity and Expansion Act (ASCEA) of 1990, which authorises a public agency controlling a commercial service airport to impose a fee for each paying passenger of an air carrier enplaned at the airport (or in other terms a levy).

PFCs may be used by the airport developer on either a pay-as-you-go basis or on a leveraged (PFC-supported) basis to finance FAA-approved airport planning and development projects.

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25 Economic Regulation of BAA London Airports (Heathrow, Gatwick and Stansted) 2003 – 2008 CAA Decision February 2003

26 This was in addition to the allowed return on the assets in the course of construction.

27 Op cit

### **Overview of PFC Program**

US regulations allow a commercial service airport (defined by the FAA as a public agency enplaning at least 2,500 passengers annually and having scheduled service) to impose PFCs to fund projects that: preserve or enhance safety, security, or capacity of the national air transportation system; reduce the impacts of noise; furnish opportunities for enhanced air carrier competition; and qualify, in most cases, for AIP grant funding (although PFC eligibility is somewhat broader than AIP eligibility).

The PFC charge historically equaled \$1.00, \$2.00, or \$3.00 per enplanement up to a maximum of \$12.00 per passenger per round trip. However, the passage of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Air 21) in 2000 enabled airports to levy a PFC equal to \$4.00 or \$4.50 (with a maximum of \$18.00 per round trip) to support certain eligible projects, including those where AIP grant funding proved insufficient.

*Source: Fitch ratings*

The PFC program thus essentially allows airports to levy surcharges in defined circumstances to fund specified capital projects. As noted above, the surcharge might be on a “pay-as-you-go” basis, whereby smaller capital projects would be paid for directly, or for larger projects where the PFC would support financing of major projects on a leveraged basis (e.g. loans might be raised on the basis of future PFC revenues).

Where utilised, there are (ideally) accounting and reporting requirements provided for so that collections of funds through these charges can be assessed against actual expenditures for approved projects. This can help to ensure that:

- There is no material over or under recovery on actual investment over the life of a project; and that
- ‘Leakage’ of funds is minimized where not formally hypothecated to capital projects.

#### 5.2.4 Supporting investment in major capital projects

There are a number of other regulatory approaches used in pre-funding major airports investments and other infrastructure sectors. The key point we would like to highlight here is that there is considerable experience with regulatory approaches that have the potential to provide support to the funding of capital programmes by;

- Supporting funding requirements during planning and construction.
- Smoothing price shocks stemming from large capital projects.
- Providing additional certainty to in recovery of capital expenditures.

There are numerous fine points to be added to the discussion of regulated charges and investment of major capital projects. As for the other sections of this study, we hope to have

illustrated some of the types of options at hand so as to provide a reference point in the detailed analysis that would be undertaken in applying local and global experience in this field.

\*\*\* End of document\*\*\*