

GUIDE TO FINANCE INFRASTRUCTURE AND BASIC SERVICES



GUIDE TO FINANCE **INFRASTRUCTURE AND BASIC SERVICES**

United Nations Human Settlements Programme
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The Global Urban Economic Dialogue Series

Guide to Finance Infrastructure and Basic Services

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FOREWORD



Urbanization is one of the most powerful, irreversible forces in the world. It is estimated that 93 percent of the future urban population growth will occur in the cities of Asia and

Africa, and to a lesser extent, Latin America and the Caribbean.

We live in a new urban era with most of humanity now living in towns and cities. Global poverty is moving into cities, mostly in developing countries, in a process we call the *urbanisation of poverty*.

The world's slums are growing and growing as are the global urban populations. Indeed, this is one of the greatest challenges we face in the new millennium.

The persistent problems of poverty and slums are in large part due to weak urban economies. Urban economic development is fundamental to UN-Habitat's mandate. Cities act as engines of national economic development. Strong urban economies are essential for poverty reduction and the provision of adequate housing, infrastructure, education, health, safety, and basic services.

The *Global Urban Economic Dialogue* series presented here is a platform for all sectors of the society to address urban economic development and particularly its contribution to addressing housing issues. This work carries many new ideas, solutions and innovative best practices from some of the world's leading urban thinkers and practitioners from international organisations, national governments, local authorities, the private sector, and civil society.

This series also gives us an interesting insight and deeper understanding of the wide range of urban economic development and human settlements development issues. It will serve UN member States well in their quest for better policies and strategies to address increasing global challenges in these areas

A handwritten signature in black ink, appearing to read 'Joan Clos', with a long horizontal flourish extending to the right.

Joan Clos

Under-Secretary-General of the United Nations, Executive Director, UN-Habitat

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ABBREVIATIONS AND ACRONYMS

AD	Anaerobic Digestion	MOs	Mutual Organisations
AIDS	Acquired Immune Deficiency Syndrome	NCDs	Non-Communicable Diseases
AMS	Asset Management System	NPD	Non-Profit Distributing
BIDs	Business Improvement Districts	OECD	Organisation for Economic Co-operation and Development
BRS	Business Rate Supplement	PBF	Prudential Borrowing Framework
CBOs	Community Buy-Outs	PFI	Private Finance Initiatives
CIL	Community Infrastructure Levy	PGS	Planning Gain Supplement
CFOs	Chief Finance Officers	Piigs	Portugal, Italy, Ireland, Greece and Spain
EU	European Union	PPPs	Public-Private Partnerships
FTT	Financial Transactions Tax	RAB	Regulatory Asset Base
GIB	Green Investment Bank	SCT	Social Cost Tariff
GDP	Gross Domestic Product	SIBs	Social Investment Bonds
GPS	Global Positioning Systems	SMEs	Small And Medium-Sized Enterprises
G20	The Group of 20 Finance Ministers and Central Bank Governors	SPC	Statutory Planning Charge
HIV	Human Immunodeficiency Virus	SPV	Special Purpose Vehicle
ICTs	Information and Communications Technologies	TB	Tuberculosis
IFRS	International Financial Reporting Standards	TIF	Tax Increment Financing
ISAs	Individual Savings Accounts	UK	United Kingdom
IT	Information Technology	USA	United States of America
LVT	Land Value Tax	VAT	Value Added Tax
MDGs	Millennium Development Goals	WHO	World Health Organisation
		WTO	World Trade Organisation

CHAPTER 1 INFRASTRUCTURE REQUIREMENTS IN DEVELOPING COUNTRIES

Global infrastructural investment needs are enormous, amounting to tens of trillions of American dollars. The OECD (2006 & 2007) estimates that some USD4 trillion are required for investment in electricity supply, USD5 trillion for roads, USD8 trillion for telecoms and USD18 trillion for water supply and sewerage systems. Because of their rapid population growth most of this investment is required in developing countries, population in most developed countries being largely static or even forecast to decline over the next few decades due to falling rates of female fertility.

Not only are the populations of developing countries fast growing, they are also becoming increasingly urbanised. In 2010 50.8% of the world's population lived in urban areas, higher (75.2%) in the more developed regions of Europe, North America, Australia, New Zealand and Japan and lower (45.5%) in the less developed regions of Africa, Asia (excluding Japan), Latin America and the Caribbean and Oceania (excluding Australia and New Zealand). However, the proportionate rate of urbanisation is expected to be more than twice as fast in less developed regions than in more developed regions between 2010 and 2030.

The world's population reached 7 billion at the end of October 2011 and, in its global population report (UN 2011), the UN Population Fund warned that the world is in danger of missing a golden opportunity for a 'demographic dividend' as the largest cohort of young people ever known see the potential of their most economically productive years wasted due to a lack of education, investment in infrastructure and job creation.

That fleeting opportunity for economic and social development is in danger of being missed because of the vicious cycle of poverty, food insecurity and inequality leading to high death rates that, in turn, encourages and sustains high birth rates amongst a largely illiterate and repressed female population, especially in African countries.

As the populations of developing countries increase so too does the incidence of disease and health inequalities which severely hinder economic growth in those countries. Solutions to health problems require environmental sustainability (especially to improve access to safe drinking water), improved access to affordable medicines and health workers and promotion of women's rights and education to reduce illiteracy and increase their employability. Moreover, millions of people still succumb to communicable diseases such as Aids, malaria (the geographic spread of which is expected to increase as a result of global warming) and tuberculosis (TB). The most cost effective way of dealing with these issues involves relatively small-scale community-level infrastructure including ill-health prevention services.

In particular, diarrhoea kills more children worldwide than HIV/Aids, TB and malaria combined. Caused by people ingesting water or food contaminated by human waste, it is easily prevented by installation of latrines and this very basic infrastructure would also reduce dysentery, cholera and other diseases associated with poor sanitation. This preventative measure would reduce the need for clinics and other medical infrastructures required to deal with these illnesses and reduce the loss of productive potential amongst people of working age.

However, according to the World Health Organisation (WHO 2011a), non-communicable diseases (NCDs) such as heart attacks, diabetes, alcoholism and respiratory problems accounted for over 63% of deaths across the world in 2008 and are increasing at unprecedented rates in developing countries as diets and lifestyles become increasingly like those in developed countries as urbanisation proceeds apace.

A UN summit in New York in September 2011 forecast that NCDs will be the cause of nearly five times as many deaths as the traditional communicable diseases by 2030 as people increasingly move to townships, cities and megacities. Already some 80% of NCD-related deaths occur in the developing world where live 9 out of 10 people who die before the age of 60. Moreover, the NCD epidemic is increasing in Africa, South-East Asia and the Eastern Mediterranean at a faster rate than in developed countries.

Migrants to urban areas change their previously rural diets in favour of fatty and sugary foods with high salt content because it is cheap, convenient (requires little or no cooking, fuel for which is expensive), is safer to eat (in terms of not being contaminated) and can be bought on credit from street vendors. The adverse health effects of 'junk food' diets are compounded by high rates of crime in urban areas deterring exercise. In general, being increasingly overweight is more socially acceptable than losing weight to become healthily thin, the latter being associated with Aids and TB.

These worsening health conditions in urban areas are exacerbated by poor housing conditions, overcrowding in fast-growing slum (shanty town) areas forcing girls and boys (as well as men and women) to live and sleep in small spaces. Combined with female illiteracy and so lack of economic opportunities, vulnerability to exploitation, poor access to contraceptive methods and inadequate

healthcare facilities, overcrowding leads to higher rates of sexual activity (including rape) and so high female fertility rates.

In many developing countries, getting pregnant whilst still at school is common and often leads to girls being expelled, ending their education and so significantly restricting their employment opportunities, compounding poverty and consequently reinforcing the belief (especially in Africa) that 'your family is your wealth' and so the more children the better. This traditional belief has its origins in rural areas, especially where infant mortality is high and the potential for income from employment is minimal. However, having more children is also often regarded as a sign of prestige, even in urban areas. Moreover, pregnant girls may be forced into early marriage by poor parents seeking to avoid the costs of taking care of daughter and child precisely because pregnant girls are forced to leave school without basic educational qualifications and so are not able to gain employment to contribute to family finances.

Not surprisingly, almost half of the 40% of pregnancies which are unplanned end in abortion in developing countries. Most of these abortions are unsafe and medical complications kill an estimated 47,000 women each year, 13% of all deaths in pregnancy and childbirth. An estimated 21.6 million unsafe abortions took place worldwide in 2008, almost all in developing countries (WHO 2011b).

This narrative makes clear that infrastructure requirements in developing countries are very different from those of developed countries. However, the narrative is a gross generalisation and it has to be recognised that there are very considerable differences between less developed regions (e.g. Africa versus Asia) and within regions (e.g. Africa, Tanzania having one of the youngest demographic structures and one of the highest rates of illiteracy and poverty).

Nevertheless, it is clear that there is a very considerable immediate need for new infrastructure to improve access to *basic* education and health services, to provide safe drinking water (in part through better treatment of sewage) and to promote economic growth in developing countries. However, fast growing populations are serving to increase the funding gap for social, economic and environmental infrastructure. For example, in the poorest countries 1 billion people are without electricity and almost the same number is without water supply.

The question is how to pay for that infrastructure. The International Labour Office (ILO 2012) estimates that 900 million workers and their families, mostly in developing countries, live on less than the USD 2 per day global poverty line, half being below the USD1.25 per day extreme poverty line. They clearly are not able to pay for infrastructure and so other forms of funding and finance must be sought, these other sources being investigated in the following chapters.

CHAPTER 2 DOES INVESTMENT IN INFRASTRUCTURE PAY FOR ITSELF?

It is often argued that investment in infrastructure will ‘*pay for itself*’ in the long run because there is a strong positive correlation between growth of productivity and investment in infrastructure, the direction of causation generally being assumed to be from the latter to the former. Improvements in productivity arise not only from *economic infrastructure* (e.g. transport systems and utility networks) but also *social infrastructure* (e.g. education and health services) and *environmental infrastructure* (e.g. water and sewerage networks). Improved transport systems and better educated, better trained and healthier working populations are all prerequisites of economic growth.

These three categories of infrastructure are complementary and, in combination, can be expected to magnify improvements in productivity leading to increased competitiveness and so (it is hoped) to increased exports and/or reduced imports. This creates jobs and economic prosperity which, in turn, can be expected to lead to higher revenues from national, local and regional taxes as incomes and wealth increase, as do the increased expenditures they finance. Those revenues can be used not only to provide the urgently required basic public services but also to repay the debt associated with government borrowing money from the financial markets to fund investment in their infrastructures.

The same self-sustaining circle occurs in the private sector as increased profits arising from improved productivity and competitiveness are used to fund further investments in private sector infrastructure. Hence, investment in both public and private sector infrastructure can create a virtuous circle of economic and

social development lifting populations out of poverty through self-sustaining and resilient economic growth and shared prosperity.

This highly desirable development outcome will not occur if government borrowing is used for consumption, such as payment of wages and salaries of government employees, purchase of energy supply for government buildings and welfare payments for those in poverty because these current expenditures will not generate the future tax revenues that can be used to finance the associated debt (i.e. pay interest and amortisation charges). Borrowing to fund current expenditures year after year will ultimately make the public finances unsustainable.

Borrowing to finance welfare payments to unemployed people can only be justified (for both economic and social reasons) during relatively short periods of economic downturn which can be expected soon to turn to economic recovery as a country progresses through the phases of the trade cycle. If, however, recession becomes prolonged and turns into depression then borrowing for such current expenditures will lead to crisis in the public finances. Rating agencies will downgrade government debt due to fears of increased risk of default and interest rates will rise as a consequence.

As a rule of thumb, the public finances become unsustainable once it costs more for a government to borrow than the interest rate paid by its citizens on mortgages or other such borrowing from banks. An interest rate equal to or greater than 8% on government debt is generally regarded as unsustainable over the long term because government bonds will have to be refinanced at those unsustainably high rates when they become due for repayment.

This scenario is amply illustrated by the current crisis (2012) in the public finances of some EU member states, particularly Portugal, Italy, Ireland, Greece and Spain. These so-called *Piigs* countries demonstrate what can happen when borrowing is used to finance current expenditures year after year – in good as well as bad times for the economy. Their persistent budget deficits became unsustainable and they are being bailed-out by other members of the EU in an attempt to safeguard the euro currency and prevent implosion of the European single market should one or more of the *Piigs* countries default on payment of their debt.

The possibility of adverse social and economic outcomes arising from a *structural gap* in the public finances has long been recognised (Bailey 2004). To minimise the risk of such outcomes, the *golden rule* of public finance is that long term borrowing should only be used to finance capital expenditures on infrastructure. As long as this prudential practice is adhered to, it is generally accepted that governments can be reasonably sure that the higher tax revenues resulting the economic growth fostered by that investment will be sufficient to repay the related public sector debt.

This *golden rule* is based on the widely accepted belief that investment in infrastructure will pay for itself. However, to say that investment in infrastructure is a prerequisite of economic growth is not to say that prosperity will necessarily result and generate the tax revenues required to pay off the debt used to fund that investment. As was made clear above, prosperity requires infrastructural investments to lead to increased exports, higher domestic production also replacing imports. This requires the terms of international trade not to be biased against developing countries in having their access to export markets in developed countries restricted whilst simultaneously being required by those developed countries

to open their economies to imports from them as a condition of receiving aid from the development agencies underwritten by those very same developed countries.

In fact, developing countries have long argued that the terms of trade are set against them by the World Trade Organisation (WTO). In this case, their investment in economic, social and environmental infrastructure will not lead to sufficiently large increases in Gross Domestic Product (GDP) through increased exports and substitution of domestic production for imports and so will not generate enough tax revenues to pay off the debt used to fund those infrastructures. Even where GDP does increase, there may be systemic failures in tax collection leading to tax revenues being insufficient to repay debt (see Chapter 5).

Hence, rather than rely on hoped for future economic prosperity to repay the debt incurred in funding infrastructure, developing countries must consider not only from where to get funds for infrastructure but also how to finance repayment of the associated debt. Funding and financing infrastructure must be considered simultaneously if infrastructure is to be provided and maintained and upgraded on a sustainable and resilient basis over its lifetime.

At a much more mundane level, infrastructure will only pay for itself if the output it is used to produce can be sold so as to fully cover costs, for example tariffs for consumption of energy, tolls for use of roads and rents for occupation of housing. Traded output can also take the form of ‘sweating the assets’ (see Chapter 5) and include revenues earned by communities and households from their own renewable energy infrastructures. Here, after communities have reduced their costs by generating their own electricity, revenues are generated from ‘feed-in tariffs’ payable on their surplus electricity being fed into the national grid. The time it takes for

such infrastructure to pay for itself depends on the original cost, the volume of output generated and the market price of that output. In the case of feed-in tariffs, the payback period is estimated to be about 15 years in developed countries such as the UK. Depending on costs and markets, payback periods will be shorter or longer in other countries.

Another way of making infrastructure 'pay for itself' is to adopt a spend-to-save approach. In this case cost savings (e.g. from reduced energy consumption in more thermally-efficient buildings) arising from new infrastructure replacing old infrastructure can be used to (realistically only partially) finance the new infrastructure (see the discussion of prudential borrowing in Chapter 4). In general, however, other means must be found to fund and finance infrastructure, the subject of the following chapters.

CHAPTER 3 FUNDING AND FINANCING INFRASTRUCTURE

The enormous global infrastructure investment needs identified in Chapter 1 are often referred to as ‘the infrastructure *funding* gap’. However, that term is inadequate for proper consideration of policies and priorities for infrastructure because it does not refer to *financing*. The distinction between the *funding* and *financing* of infrastructure is required to help understand not only how the infrastructure funding gap can be filled but also how it can subsequently be financed. Despite these terms being used interchangeably, funding and financing are not the same.

Funding refers to the money required to pay for infrastructure *upfront*. That money can be raised by either the public or private sectors. Funds have conventionally been raised by governments borrowing from financial markets to pay for infrastructure which they then operate to provide services. However, funding for infrastructure is increasingly coming directly from private sector organisations building and then operating that infrastructure to provide public services under contract with the public sector.

Financing refers to how the upfront cost of infrastructure is repaid *over time*. Where the public sector raises funds from financial markets, financing is concerned with repayment of the debt related to government borrowing for provision of specific infrastructure programmes and projects. Where private sector organisations provide and operate infrastructure to provide public services, financing is concerned with how they are remunerated during the contract period.

Failure to recognise the distinction between funding and financing has led many

governments to borrow funds to pay for infrastructure upfront but subsequently be unable to find the finance not only for paying the associated debt charges (i.e. interest and amortisation payments) but also for maintaining that infrastructure in a satisfactory condition. As a result, very substantial backlogs of repairs and maintenance expenditures have built up and public services infrastructures have become increasingly unfit for purpose in many countries.

This situation was exacerbated by the easy availability of credit during the global banking boom years prior to the 2007-09 credit crunch. Governments, as well as individuals and companies, found it much easier to borrow money than earn it and calling on taxpayers to repay debt could be postponed almost indefinitely by continual refinancing of maturing debt with newly borrowed funds. The global banking crisis, recession, falling or lower than expected tax receipts and sharply rising interest rates on some governments’ bonds demonstrated the dangers of being over-leveraged (i.e. where debt is too high as a proportion of revenues). Severe austerity measures are now being imposed on public services in many countries, much of which could have been avoided if public and private sector organisations had paid more attention to both the funding and financing of their balance sheets. More specifically, governments should have looked beyond filling the infrastructure funding gap to its subsequent financing, the latter being more difficult than the former during credit booms. Hence, the funding and financing of infrastructure are considered separately in the following chapters.

CHAPTER 4 FILLING THE INFRASTRUCTURE FUNDING GAP

In general, **funding** for infrastructure can come from the following sources:

- Borrowing
- Commercial banks
- Multilateral funds
- Sovereign wealth funds
- Infrastructure banks
- PFIs, PPPs
- Privatisation
- Insurance and Pension funds
- Retail Infrastructure Products
- Corporate Investment
- Foundations

Borrowing

Borrowing can be categorised as short-term (for less than a year) or long-term (for more longer periods of time). The following discussion and analysis focuses on long-term borrowing undertaken by national, regional and local governments issuing bonds.

TERMS OF BONDS

- **Short-term bonds**
 - repayable within 12 months
 - used to cover temporary cash shortfalls
 - i.e. mismatch between spending & receipts
- **Long-term bonds**
 - repayable after as much as 30 years
 - typically dominate municipal bond markets
 - used to finance capital expenditures

- **Interest Rates**

- government bonds tend to pay the lowest interest rates
 - default is deemed less likely than for private sector organizations
 - but recent problems for Greece and other Eurozone countries
- national government bonds pay the lowest rates on bonds
- joint government & revenue-backed organizations pay intermediate rates
- regional & local governments pay higher rates

Long-term borrowing is the conventional way to fund long-lived infrastructure. In general, however, borrowing instruments (i.e. government bonds) have to be repaid after a period (typically between 5 and 15 years) shorter than the lifetime of that infrastructure (35 to 50 years) and so the debt has to be refinanced by further borrowing to repay the original loans. Refinancing debt exposes governments to the risk of rising interest rates. However, they would benefit if interest rates fall in the future and (even more so) if inflation significantly erodes the real value of debt used to fund pay-as-you-build infrastructure. Many OECD countries' governments benefited from erosion of the real value of their national debts as a result of relatively rapid inflation during the 1970s, 1980s and early 1990s (Bailey 2004).

BONDS

- interest-bearing certificates of debt
- often issued in series by public & private sector organizations
- oblige issuer to pay the principal amount at the specified maturity date
- subject to receivership on default
- do not have to be held for their full term (i.e. can be sold)
- rank equally with other debt for payment of principal & interest
- amount & duration negotiated between both parties to the bond
- term can be extended upon maturity if both parties agree
- can be repaid before maturity in an emergency (if they have a 'stress clause')
- security is all the revenues of the national/regional/local government

However, borrowing to pay for infrastructure may lead to higher rates of interest payable on government debt as ratings agencies become increasingly less certain that increasingly indebted governments have the financial and economic capacity to repay debt and so the increased risk of default has to be compensated by higher interest rates being offered on government debt, if only to cover insurance against default (Bailey, Asenova and Hood 2009).

In most countries local and regional governments are not allowed to incur budget deficits and their access to capital markets is often heavily restricted by national governments. This is because politicians' terms of office last only a few years whereas borrowing is typically over several decades and so political accountability for borrowing and debt is weak. Hence, local borrowing is usually through (and so controlled by) national government which borrow from markets and then on-

lend to local governments. Following the the *golden rule* (see Chapter 2) borrowed funds can only be used for capital expenditures on such infrastructure as school buildings, roads and water supply.

Most countries judge the sustainability of national government borrowing with reference to the ratios of public sector borrowing and debt to GDP. For example, the EU's Maastricht Criteria set a maximum limit of 3% for member states' general government borrowing to GDP ratios and 60 % for their debt to GDP ratios. However, those ratios are not the most appropriate indicator of the sustainability of a country's debt, even if they are readily understood by policy makers, because GDP is not an accounting component of public sector budgets. The ratios between GDP and borrowing and debt are only proxy indicators of the sustainability of a country's debt in terms of its ability to repay debt without any appreciable risk of default or other such adverse impact on the economy (see the discussion of taxation and GDP in Chapter 5).

More appropriate indicators are, first, the ratio of debt financing costs to net revenue stream and, second, net borrowing and the capital financing requirement. These two indicators make clear the financial burden imposed by debt. Furthermore, upper limits should also be set on the proportion of debt subject to fixed interest rates and, likewise, on the proportion of debt subject to variable interest rates. These limits avoid the bulk of a government's debt being locked long term into high fixed interest rates when interest rates are falling over prolonged periods and, likewise, having to refinance the bulk of its short-term debt when interest rates are rising. The optimal balance between short-term and long-term debt is a matter of professional and/or political judgment. Finally, upper and lower limits should be set for the maturity structure of borrowing so as to avoid a government

having a high proportion of debt that has to be refinanced in a very short period. In such circumstances, there is an increased likelihood that governments will have to offer higher interest rates to attract sufficient borrowable funds.

These treasury management indicators have their own qualifications, for example in accounting for depreciation of public sector assets. The rate at which such assets are written off should be based on their (shorter) economic lives rather than their (usually longer) physical lives. Moreover, assets should be valued in terms of current or resource (i.e. opportunity) costs rather than their historic costs. Additionally, the public sector should adopt 'whole of government' accounts based on a consistent accounting methodology (Bailey and McCabe 2010) and all liabilities should be recorded on public sector balance sheets in accordance with the International Financial Reporting Standards (IFRS). In fact, a relatively high proportion of liabilities have been hidden 'off balance sheet' in countries making substantial use of Private Finance Initiatives to provide public services and related infrastructure (see below and Chapter 6).

Bearing these caveats in mind, monitoring these multiple financial indicators is of crucial importance for effective treasury management of the budgets of public services, both individually and in aggregate. By such means, *prudential borrowing* is assured, this model being used for local government borrowing in the UK (Bailey et al 2010; Bailey and Asenova 2011, CIPFA 2003).

The UK's Prudential Borrowing Framework (PBF) makes local governments responsible for assessing the affordability, prudence and sustainability of their capital programmes and they are able to undertake additional borrowing on that basis. This requires highly trained Chief Finance Officers (CFOs) and other key finance officials to abide

by professional standards. The Prudential Code requires CFOs to establish reporting procedures to the capital finance decision-making body of the local authority and sets down short- and medium-term indicators. These Prudential Indicators contain both flow-based and stock-based controls which are intended to clarify the consequences of proposed investment policies, enhancing transparency and accountability. Using the Indicators, each local authority sets a limit on the amount of borrowing it can undertake. Estimates for 'capital expenditure un-financed' (defined as that capital expenditure which is not financed by capital receipts, grants or revenue contributions) results in local governments setting their own limits on the total amount of debt they can take on. This is intended to ensure that all external borrowing is within prudent and sustainable limits, that capital expenditure plans are affordable and that treasury management decisions correspond with certain accounting standards.

ACCOUNTING INDICES FOR CONTROL OF BORROWING

Stock-based accounting indices

- control the level of debt
- relative to net value of stock-based balance sheets
- that reflect fiscal conditions in each local authority

Flow-based accounting indices

- control the levels of borrowing
- relative to expected future revenues
- excluding bonds and liquidated funds

Indices should be designed, enforced & monitored

- by accounting bodies and finance professionals
- & Chief Finance Officers advise councils

- about affordability, prudence & sustainability of borrowing
- to ensure proper treasury management practice

Introduction of such a prudential borrowing framework in developing countries would require training of finance officers. It would represent a shift from the Centralised Discipline and Control model to the Professional Discipline and Control model for municipal borrowing (Bailey et al 2012).

PRUDENTIAL BORROWING INDICATORS

- **Prudential indicators for affordability**
 - Estimated & actual ratios of financing costs to net revenue stream (%)
- **Prudential indicators for prudence**
 - Net borrowing and the capital financing requirement
- **Prudential indicators for Capital Expenditure**
 - Estimated & actual total capital expenditure
 - Estimated & actual capital financing requirement
- **Prudential indicators for external debt**
 - Authorised limit for external debt
 - Operational boundary for external debt
 - Actual external debts as at end of previous year
- **Prudential indicators for Treasury Management**
 - Code of Practice for Treasury Management in the Public Services

- Upper limits on fixed & variable interest rate exposures
- Upper and lower limits for the maturity structure of borrowing
- Prudential limits for principal sums invested for longer than 364 days

Although the PBF increases local autonomy, it is tempered by professional financial advice from CFOs intended to ensure that all external borrowing is within prudent and sustainable limits, that capital expenditure plans are affordable and that treasury management decisions correspond with professional good practice.

The emphasis on affordability has resulted in local governments typically adopting a *spend-to-save* approach for new infrastructure whereby cost savings arising from dispensing with old infrastructure can be used to repay prudential borrowing. For example, old poorly insulated schools have higher heating costs than better-insulated new schools and those revenue budget savings can be used to service debt, as can capital receipts from the sale of surplus school sites resulting from renewal of school estates as school pupil numbers fall.

There is a risk that service levels will suffer if spend-to-save targets are not achieved (e.g. if interest rates rise significantly in the future) because constrained budgets will increasingly be diverted to servicing the debt remaining after savings shortfalls. This would result because of the need to balance budgets on an annual basis. Hence, measures must be adopted to safeguard the repayment of bonds used sensibly and with proper assessments of the financial risks they cause. Hence, safeguards for bonds must be put in place, including dedicated revenue sources for their repayment, appropriate skills for their issue and robust regulation.

SAFEGUARDS FOR BONDS

- **require earmarking of stable income sources**
 - for repayment of bonds
- **restrict bonds to simple ‘plain vanilla’ issues**
 - prohibit use of ‘financial engineering’
- **train treasurers to have expertise for bonds**
 - they may not have experience of financial markets
- **make bond rating agencies more proactive**
 - to properly assess risks of default
- **ensure rigorous regulation**
 - by a financial services authority
 - & require local referenda for large-scale bond issues?
- **insure project bonds**
 - development agencies could insure them if regulatory arrangements OK
 - & so reduce default risk
 - & so reduce the interest rate paid on debt
 - this could be more effective use of developmental assistance

In summary, there are four models for control of public sector borrowing. Besides markets controlling government borrowing via interest rates, control may be exercised by higher levels of governments for macroeconomic purposes, by local and regional government politicians themselves in reflection of voter preferences or by their finance officers according to their municipalities’ financial capacity to repay debt.

MODELS FOR CONTROL OF BONDS

- **market discipline & control**
 - capital markets control municipal borrowing
 - ratings agencies assess financial capacity of borrower to repay debt
 - interest rates are positively related to risk ratings
 - higher interest rates deter further borrowing
 - **centralised discipline & control**
 - municipalities require national government’s permission to borrow
 - they borrow from financial institutions directly or via central government
 - levels of borrowing have to be consistent with macroeconomic policy
 - highly autonomous municipalities weaken central government control
 - **political discipline & control**
 - local/regional politicians reluctant to raise taxes due to voter resistance
 - short term of office relative to debt term encourages excessive debt
 - & the same time-avoidance incentives face voter-taxpayers
 - so debt is passed on to future generations (intergenerational inequity)
 - **professional discipline & control**
 - requires observance of fiscal rules to assess sustainability of borrowing
 - fiscal rules set by national government
 - the equivalent of capital markets’ bond ratings
 - municipal chief finance officers control debt burdens using those rules
-

Borrowing from **commercial banks** seems to be more restricted as a result of the 2007-09 global credit crunch in the private sector which led to them becoming very unwilling to take the same risks as previously in their funding activities. Many banks have been bailed out by governments, the UK government for example having bought shares in major banks to prevent their bankruptcy and having bought from them (or guaranteed) their toxic bonds. Additionally, many major global banks have since either already lost money ('haircuts') on their holdings of sovereign debt issued by some heavily indebted European countries or expect to suffer losses if the Eurozone crisis is not resolved soon. Additionally, regulators now require them to be much less highly geared (i.e. adopt much lower loans to deposits ratios) and to hold much greater capital balances in order to make them more financially resilient and so avoid the need for them to again be bailed out by governments. Reductions in leverage and increased liquidity requirements are required by the international Financial Stability Board and the Basel Committee on Banking Supervision (Basel III). Tighter regulatory controls have been recommended for the UK banks to separate investment banking from retail banking (ICB 2011). Hence, as they gear down leveraged debt, increase their holdings of liquid assets and ring-fence retail deposits so as to prevent their use for investment banking they will be less able (as well as less willing) to invest in infrastructure projects, whether in developed or developing countries.

Multilateral funds could come via more proactive and interventionist development agencies taking control of infrastructure programmes from governments, perhaps with G7 countries guaranteeing investments at the riskier construction phases. The UN target is for these countries to contribute 0.7% of their national incomes to overseas aid by 2013. However, the 2007-09 credit crunch and subsequent public sector austerity measures

currently being implemented in developed countries have been associated with (if not actually caused) falling GDP, negative or near-zero economic growth being expected to continue beyond 2013 in many contributor countries. Before the end of 2011, the UK had already reduced the annual budgets planned for its Department for International Development between 2012 and 2015 because it was on course to overshoot the UN's 0.7% target.

Hence, multilateral funds look like becoming increasingly severely constrained or even reduced over the foreseeable future. Nevertheless, those funds could be used more effectively if the often substantial levels of inefficiency were addressed, for example by spending money for health services on nurses and middle tier staff instead of on upper tier doctors in order to strengthen ill-health prevention programmes and maternity services. Similarly, education expenditures could be made more effective by emphasising community-led programmes instead of spending money on top-down education initiatives. Distance learning/training packages could be used for community health workers, in this case ideally using funds from both health and education budgets in joint programmes for sex education and family planning services etc. Irrespective of the level of spending, improved outcomes could be achieved if fraud and embezzlement were reduced by establishment of improved governance mechanisms to increase transparency in the use of funds.

There are very considerable **sovereign wealth funds** in Asian (especially China) and oil-rich Arabian countries (e.g. Saudi Arabia) running current account surpluses in their balance of payments. They seem to be becoming increasingly averse to investing in EU member states' sovereign debt because of fears of default by some states, falling bond values (as interest rates rise) and depreciation of the euro. If so, they may be more attracted to developing countries' bond issues especially where there

is rapid economic growth. Africa has some of the fastest growing nations, including Zambia (with its copper mining, agriculture, chemicals and textiles), Egypt and Equatorial Guinea. Other fast growing developing countries include Indonesia, Azerbaijan and India (growing at 8% per annum in 2011). China has recently begun direct investments in African countries, including Zambia and has considerable potential as a funder of public service infrastructure.

Using **Infrastructure Banks** local governments could be much more innovative in developing joint funding mechanisms. Proposals for such mechanisms to be used in the UK have recently included: (i) creation of 'super councils' by the voluntary merger of neighbouring local governments (especially in big cities); (ii) pooling and sharing the financial reserves of separate local governments, those with financial surpluses lending to those experiencing a shortage of capital finance so that the latter avoids having to issue bonds paying higher rates of interest to lenders in the private sector; (iii) a municipal bank for all local governments that would dispense with the need for individual municipalities to negotiate with others the terms for the voluntary pooling and sharing of reserves. Financial surpluses would be paid into the municipal bank which would then lend them to other municipalities seeking capital finance for infrastructure. The Nordic Local Government Funding Agency model is such a bank and is considered in detail elsewhere (Anderson et al. 2010).

The UK central government is setting up a special infrastructure bank. Called the Green Investment Bank, it will support environmentally-friendly infrastructure projects such as for energy supply. This will help the UK meet its targets for reduction of greenhouse gases (i.e. carbon emissions). The same funding mechanisms could perhaps be established in developing countries with unused potential for 'green' energy supplies

utilising hydro, wind and solar sources plus waste processing and recycling including energy generated from waste.

Private Finance Initiatives (PFIs) and **Public-Private Partnerships (PPPs)** have been used in developed countries whereby private sector companies build and operate under contract infrastructures for public services. They have been used in the UK to build and operate transport systems, schools, hospitals, incinerators (of household waste), social care facilities, more detailed analysis being provided in Chapter 6.

PFI/PPPs entail use of the *pay-as-you-use* infrastructure financing model. This is distinct from the *pay-as-you-build* infrastructure financing model using government borrowing. Because of the high transaction costs relating to procurement and agreeing contracts, their use is most suited to large expensive long-term infrastructure projects, a minimum of £50 million or more having been advised for PPPs in the UK. They are also more suited to technical projects such as transport and waste management systems where the required quality of service is more easily written into contracts than is the case for education and some health and social care programmes where required outcomes are not easily specifiable in quantitative terms. The sharing of risk between the contracting parties within the PPP must also be capable of being identified, categorised and explicitly allocated to individual parties in legal and financial terms and must be enforceable in all foreseeable circumstances.

It is generally accepted that developing countries could make more use of partnerships to deliver better outcomes for health programmes and economic growth. The UN Global Fund To Fight AIDS, Tuberculosis and Malaria is delivered by a range of partners including not just governments, international development organisations (including UN agencies and donors) and the private sector (the normal form of PPPs in developed countries)

but also civil society and communities affected by the diseases. The private sector may have greatest expertise in logistics and delivery but still rely on civil organisations to improve facilities on the ground, for example getting medicines and pharmaceuticals to those most in need and at affordable prices. Patients and voluntary community groups could help distribute millions of medicinal preparations in order to increase value for money. However, procurement and supply chains also depend on government support, in this example funding community health centres, nurses and midwives and increasing investment in information and communications technology (ICT) to identify and evaluate improved outcomes.

Strategic partnerships may therefore help achieve the eight millennium development goals. However, their success requires a mutual understanding of each partner's culture, values and behaviours and, based upon that understanding, an agreed set of shared principles aimed at aligning management styles. Experience shows that partnerships fail more because of failures of governance than because of technical or contractual failures. Abiding by the spirit of a contract is at least as important as adhering to the letter of that contract underpinning the partnership.

PFI/PPPs utilise private funds to provide public services but do not entail full privatisation of the services they provide because policies and political accountability for those services remain within the public sector. However, full-scale **privatisation** has been used in some countries to provide energy, transport, telecoms and other 'public utility' services. Privatisation of the public utilities results in the private sector providing both the funding and financing of service infrastructure on a commercial basis. Although regulation is usually required to prevent abuse of monopoly power, regulators may require integrated utilities to unbundle their production and transmission infrastructures for gas, electricity

and railways to reduce monopoly power. Transmission networks (i.e. national grids) are natural monopolies but production of gas, electricity and rail services can be separated from national grids so as to facilitate development of competition in production via market entry (Bailey 2002). The development of privatised telecommunications services in developed countries has been greatly aided by the development of satellite-based mobile telephony dispensing with the need for installation of a national grid of cables and other land line infrastructure.

There is huge potential for funding infrastructure via **pension and insurance funds**. Some USD19.1 trillion of funds were managed by pension funds at the end of 2010, of which 96% was accounted for by OECD countries. In December 2010, OECD pension fund assets amounted to 71.6% of GDP on average (Inderst 2009, OECD 2011). Australia, Canada, the Netherlands, UK and USA have very large investment funds of between 60% and 135% of their GDP. Canadian pension funds have been investing heavily in infrastructure (including the UK-France Channel Tunnel rail link in November 2010). It can be expected that an increasing proportion of funding for infrastructure will come from pension funds for a number of reasons.

First, as a result of the 2007-09 credit crunch, pension and insurance funds are probably more wary of being overly dependent upon increasingly risky sovereign debt and highly volatile world stock markets, earnings from which may also be heavily dependent upon volatile exchange rates. In seeking portfolio diversification, such funds are increasingly looking for more stable long-term investments, including regulated utilities.

Second, the attraction for insurance and pension funds is that the regulated utility sectors tend to be insulated from the business cycle (unlike stock markets) and so have

relatively stable predictable cash flows. In general regulators ensure that the utilities whose operations they oversee can afford the weighted cost of capital to maintain infrastructure and so ensure stable returns are earned from it. Returns on capital employed by those utilities are often linked to inflation by regulatory pricing formulae and so cash flows are maintained in real terms. Some utilities are natural monopolies with high barriers to entry, water supply for example. Otherwise regulators effectively ensure the financial and economic sustainability of utilities that could be subject to more competition, for example energy supply. Such investments are still subject to regulatory and political risk in respect of retrospective legislation being enacted after investment has taken place (e.g. the forced unbundling referred to above). However, with slow growth of many economies, this risk should be much less than that for investments in stock markets and government bonds.

Third, this type of infrastructure is also compatible with the 50 years or so time horizon of pension and insurance funds whereas equity investments are short term, as well as inherently unstable. Investment in utilities is certainly more stable than investing in 'hit and run' private equity groups that buy up underperforming companies then sack managers, sell underused or redundant assets and restructure those companies prior to selling them at a profit that reflects their increased earnings potential. Economic theory emphasizes the efficiency benefits of directing economic resources to their most productive uses by such means, helping markets work better and so promoting economic growth and prosperity. However, such 'predatory capitalism' and 'asset stripping' may not be viewed favorably by members of pension and insurance funds and is inherently very risky, such that earnings for those funds may not result. Private equity investors typically seek very short payback periods of only a few

years whereas investments in wind farms and waste-to-energy schemes have longer payback periods of ten years or more.

The suitability of infrastructural investments for pension funds begs the question as to why they have not invested in them much more than has been the case in the past. One possible explanation is that, in countries such as the UK, pension funds tend to work through agents who are not interested in or knowledgeable of infrastructure investments. Both developed and developing countries must overcome this barrier if they are to promote investment in infrastructure by pension and insurance funds. Additionally, most pension funds have long had a fiduciary duty to maximise returns from their investments so as to maximise their members' pensions and this has tended to militate against infrastructure projects. More recently, however, many pension funds have become more value-based in seeking to invest within an ethical or sustainable development framework, this being the case especially for public sector pension funds, churches and charities (DEFRA 2010). They may therefore be more predisposed to invest in infrastructure projects avoiding negative environmental impacts and infrastructure promoting development.

Additionally, the provision of 21st century publicly-funded infrastructure is no longer prioritised in developed countries busy implementing public sector austerity measures focused on cuts in public spending to eliminate budget deficits and reduce high debt/GDP ratios. This creates an opportunity for developing countries to seek to persuade pension and insurance funds to invest in their infrastructures. To do so, they may have to establish their own 'pension infrastructure funds' into which would be paid funds raised by issuing long-term *project bonds*. The money from pension funds could also be used for (prudential) leverage of debt so as to increase their impact.

The UK coalition government plans to boost investment in UK infrastructure by such means, including private and social housing, power stations, super-fast broadband and motorways with tolls (Milmo 2012). By creating a multibillion-pound ‘pension infrastructure fund’ the UK government can facilitate provision of infrastructure without breaking its strict adherence to austerity rules requiring reduction of deficits in the public finances. The UK government may have to underwrite their investments and developing countries would have to do the same. In this case taxpayer support is used to guarantee returns on private sector investments in infrastructure. These liabilities would probably be ‘off balance sheet’ – as was previously the case for PFI/PPPs.

Pension and insurance funds do not necessarily have to be invested in mega projects. Instead, smaller scale projects may deliver more value for money and the consequentially smaller contracts would be more suited for developing countries’ own developers to bid for. Pension funds could invest in social housing via build-to-let, returns on their investments being financed by rents. This would be a return to how rental housing was financed in the UK a century ago, when its housing tenure was dominated by insurance funds and other such investors who developed and owned large swaths of Britain’s housing stock. This could be encouraged by cutting stamp duty.

Retail Infrastructure Products are non-bank lending instruments which could be used to fund public sector infrastructure and, in so doing, help build a country’s economic resilience by freeing it of overdependence on the currently rather unstable global banking system. They could be encouraged by tax breaks, especially for social investment products (Cabinet Office 2011). For example, Individual Savings Accounts (ISAs) could be established into which people, pension funds, charities and other depositors could

make payments knowing that their savings and deposits would be used by governments to finance socially desirable projects. This would provide an alternative to their deposits being paid into the commercial banks which would then use them to finance profit-seeking investments in the private sector, some of which may be ethically unacceptable to depositors. The interest paid on those ISAs could be made free of income tax to encourage the funding of socially desirable projects such as clinics and local health centres.

Social Investment Bonds (SIBs) could be issued by the various parts of the public sector to raise finance for social projects. Individuals and pension funds would invest in SIBs in order to make financial returns on ethical investments. Those financial returns (effectively payments of interest) may be less than depositors could expect to earn from deposits at the commercial banks but would be complemented by the satisfaction of knowing that their SIBs cash was being used for projects they consider socially or ethically worthwhile – effectively a combination of both financial and non-financial returns.

The payments to holders of SIBs would be financed by budget savings arising from the new projects funded by those SIBs. For example, a SIBs issue could be used to finance new ways of providing advice on family planning. Success would result in less money having to be spent from health service budgets dealing with medical complications arising from unplanned pregnancy and illegal abortions, money which would then be used to redeem that particular SIBs issue (referred to as ‘paying for success’). Clearly, holders of SIBs would be taking a risk that such budget savings would be forthcoming and sufficient for the issuers of SIBs to pay interest and, ultimately, to redeem those bonds. It may also prove difficult to identify those savings arising directly as a result of the SIB investment and with which to repay holders of SIBs.

Although they may raise relatively small shares of the money needed for services (around, say, 5%), SIBs are clearly much more innovative than conventional municipal bonds. They raise money for specific identified projects whose budgets will be used to relinquish that debt, whereas a municipality's general revenues are used to redeem its bonds irrespective of the performance of the services funded by those bonds. SIBs would be suitable for short-to-medium term investments, such as the family planning example just discussed plus investments in improved sanitation (see the latrines example in Chapter 1). They are also sometimes referred to as Social Impact Bonds, reflecting their intended beneficial outcomes.

Likewise, a Green Investment Bank (GIB), such as that being launched by the UK government for investment in clean energy (see above), could utilise retail infrastructure products to fund long-term infrastructural investments in low-carbon technology & infrastructure, such as wind farms and electric vehicles.

- for low-carbon technology & infrastructure

Corporate investments have been reduced in response to the very low rates of economic growth and fears of a double-dip recession in Europe and (now less so) North America. Corporations have generally become unwilling to invest in their own new business ventures because they believe sales will be insufficient to recover costs. Like banks, corporations are now holding large cash reserves and looking for safe havens. There is therefore the potential for those funds to be used to provide infrastructure.

Foundations also provide assistance to developing countries, some of which can fund infrastructure. For example, the Gates Foundation provides funding for birth control to cut maternal mortality in developing countries. Bill Gates (the founder of Microsoft) argues the case for the G20 group of developed and developing countries to use revenues from a small *Financial Transactions Tax* (FTT) on trading shares and bonds to fight global poverty. Also known as the Tobin Tax (after its proposer) and Robin Hood Tax (reflecting its potential for redistributing prosperity from rich to poor nations), it is estimated that the FTT could raise USD48 billion each year. The FTT could be introduced across most of Europe in 2012 but Germany and France want FTT revenues to help solve the Eurozone debt crisis. It has also been proposed that the FTT be complemented by small taxes on shipping (raising USD37 billion), aviation fuel (USD27 billion) and higher tobacco excise duties (USD11 billion) for health and development projects if levied by all G20 members (Gates 2011). Given the increasing incidence of NCDs noted in Chapter 1, perhaps a 'fat tax' should also be levied on junk foods containing high amounts of saturated fats, sugar and salt. The revenues from the FTT and 'fat tax' could be used to finance foundations, ideally with

INNOVATIVE BONDS & SAVINGS SCHEMES

- **Individual Savings Accounts**
 - used to finance socially desirable projects
 - rather than commercial banks' speculative activities
- **Social Investment Bonds**
 - returns on ethical investments
 - financed by budget savings
- **Green Investment Bank**
 - used to finance environmentally desirable projects

matching donations from benefactors and international development agencies.

There is no shortage of private capital and sovereign wealth funds seeking the sorts of investments that are urgently required in developing countries as a result of their growing populations. However, in some developing countries, lack of political and economic stability and cronyism, oligarchy and corruption (due to lack of a robust transparent system of governance) limit private sector investment in infrastructure because investors face unacceptable risks of loss of their investments. Even without such problems, developing countries mostly need new infrastructure for their fast-growing populations but the risks associated with financing first-time greenfield infrastructure

are greater than for financing replacement of technologically or economically obsolete 'brownfield' infrastructure because the latter has a track record of earnings capacity whereas the former has only an untested potential. It is instructive that most infrastructure investment in developed countries goes into brownfield infrastructures which have proven revenue flows and so are of less risk for their static populations.

As noted in Chapter 3, once funding for infrastructure has been secured attention has then to be paid to financing the repayment of debt and the on-going maintenance and upgrading of that infrastructure so that it remains fit for purpose in the long term. This is the subject of the next chapter.

CHAPTER 5 INFRASTRUCTURE FINANCING MODELS

Irrespective of which of the above methods is used to fund public sector infrastructure, governments have to finance the subsequent repayment of borrowed funds or finance payments to private operators of PFI/PPPs. **Financing** for infrastructure can come from the following sources:

- Taxes
- Tax Increment Financing
- User charges
- Asset sales
- Sweating the assets

Taxes are used to finance repayment of borrowed funds over extended periods of time (35 years or more) so as to spread the financing of infrastructure over the generations of population using it and so promote intergenerational equity. Completely upfront financing of infrastructure by the current generation of users is generally not affordable as well as unfair.

Taxes may be levied on incomes, expenditures, profits, dividends paid on shareholdings, interest payments received on savings and holdings of government and corporate bonds, capital gains on financial and physical assets, wealth (including property and land taxes) etc. Most tax powers are retained by central governments, regional governments sometimes sharing with central government the revenues arising from income and/or sales taxes. Local government taxes are normally restricted to the property tax, although local income taxes are levied in some Scandinavian countries and sales taxes elsewhere (Bailey 1999).

There are various forms of property tax, including those based on the rental or capital values of property and those based on property characteristics, such as numbers of rooms or floor area. Property characteristics are used as the tax base where rental and capital values are not available because of lack of functioning property markets. Property taxes are typically levied separately on business properties and residential properties so as to allow for different rates and bases of tax. The rate of property taxes generally covers all properties in the local government jurisdiction but supplementary rates of property tax may be levied in particular parts of a local government area in order to finance additional infrastructure specific to a (typically business) district, for example Business Improvement districts and supplementary business property taxes. Land value taxes and betterment taxes differ from property taxes in taxing rises in the market value of land, on an annual and periodic basis respectively. All of these taxes are discussed in Chapter 7.

Economic theory emphasises possibly large and distortionary disincentive effects on work effort and on company investments in productive resources, especially where high proportions of incremental incomes and profits are taken by taxation (i.e. personal income tax and corporation tax respectively). People may choose not to work as hard (or at all) and highly skilled groups may emigrate to lower tax regions, as may internationally mobile companies. In such cases, taxes reduce the potential for economic growth and prosperity and this opportunity cost should be accounted for in any cost-benefit analysis of potential infrastructure programmes.

Hence, high taxes should not be levied on economically and socially desirable activities (referred to as 'goods'), especially employment. Instead, taxes should be raised from economically and socially undesirable activities (referred to as 'bads'), such as pollution (to make polluters pay) and other activities or behaviours detrimental to health, including consumption of alcohol, cigarettes and tobacco and foodstuffs with high levels of (especially saturated) fat, salt and sugar. If they are not particularly effective in deterring consumption because demand is relatively insensitive to rising prices, these 'fat taxes' on 'junk foods' could be used along with taxes on cigarettes and alcohol to fund health services required to treat resulting illnesses. However, if they are effective the resulting tax revenues will fall and so funding for healthcare must be sought elsewhere even though there will be consequential falls in the incidence of medical conditions associated with those behaviours.

Besides paying attention to the *structure* of taxation, the possibility of disincentive effects suggests that tax revenues in *aggregate* should not be too high as a proportion of GDP and that the tax to GDP ratio should not increase inexorably over time.

However, GDP gives only a limited indication of the sufficiency of tax revenues to finance debt, especially in the countries where payment of taxes is reduced by evasion (i.e. non-declaration of taxable incomes, a criminal offence) and by avoidance (i.e. taking advantage of loopholes in tax laws to reduce one's liability to pay tax without breaking tax laws, for example reclassifying income as wealth so as to incur lower tax rates).

Tax evasion is referred to as the 'black economy' because its economic activities are hidden away from government information gathering. Of course, undeclared earnings are spent and this mismatch between earnings declared to the tax authorities and the expenditures they record in levying VAT and

other taxes on spending result in the income-based measure of national income being smaller than the expenditure-based measure. That gap is an indicator of the black economy. However, tax evasion may also reduce the recorded levels of expenditures, for example where traders take undeclared payments as cash to avoid liability for VAT.

National income statisticians can accommodate such data deficiencies by increasing their recorded measures of GDP in the transparent economy so as to incorporate the size of the black economy in the published figure of GDP. Whilst desirable for statistical purposes, the effect is to raise the absolute limits for government borrowing and debt because the GDP figure has been adjusted upwards to take account of the black economy. By definition, however, there is no corresponding equal proportionate increase in tax revenues because of tax evasion. Hence, the borrowing and debt to GDP ratios are inadequate for the purposes of budgetary control in countries where tax evasion (and avoidance) is rampant.

There are, of course, other well-rehearsed problems regarding calculation of GDP figures, for example that large scale expenditures dealing with pollution do not create prosperity or necessarily yield extra tax revenues. More relevant here, is that rising levels of obesity are leading to ever rising public expenditures dealing with consequential chronic health conditions which, in turn, inflate the GDP measure. However, many of those people being treated are unable to work and so there is unlikely to be an increase in tax revenues in direct proportion to the rise in GDP. Hence, if health conditions continue to worsen as a result of modern lifestyles then GDP becomes increasingly ill-suited as a proxy indicator of tax potential, including its financing of infrastructure.

Tax Increment Financing (TIF) is based on the reasonable assumption that new infrastructure will increase the values of

business properties in the area served by that infrastructure (e.g. a transport system) and those higher property values yield extra business property tax revenues which can be dedicated (earmarked) to repay the loans local governments use to finance that infrastructure. Funding may be raised by issuing TIF bonds rather than general obligation bonds. Use of TIF is widespread across the USA and is being adopted the UK (e.g. for Edinburgh's Waterfront redevelopment). Implementation of TIF is considered in more detail elsewhere (UN 2009a).

TAX INCREMENT FINANCING

- **Local governments provide debt-financed infrastructure**
 - using TIF to repay debt
- **TIF assumes new infrastructure will generate extra revenues**
 - by increasing the values of properties served by new infrastructure
 - and those higher values yield extra property tax revenues
 - those extra revenues are earmarked to repay the loans
- **TIF is already widespread across USA**
 - & is being used in UK since 2011

Although property taxes are relatively stable, there is a risk that TIF may not yield the extra revenues required to repay borrowing. This would be the case if business premises served by the new infrastructure become vacant.

User charges for grid-based infrastructure transmitting electricity, gas and water supplies from the point of production (e.g. power stations) to the point of consumption (e.g. residential and business properties) typically comprise *two-part tariffs* comprising standing

and volumetric charges paid by users of those public utility services. The standing charge is used to finance the fixed capital cost of the energy grid infrastructure whilst the volumetric charge (per kilowatt hour of electricity and per cubic meter of gas) is used to finance variable operating costs. In principle, the same two-part tariff should be adopted for water and sewerage systems, the variable volumetric charge being based on per litre of water consumed. The sewerage charge can be piggy-backed onto the water charge where waste water is piped into sewer systems, no separate billing being required. Given that treatment of waste water is typically more expensive than supply of potable water, sewerage charges are generally greater than water charges.

However, tariffs should reflect not only financial costs but also environmental and resource costs if they are to be effective in enhancing the sustainability of water and energy resources. This is especially pertinent to African countries already being badly affected by climate change (whether caused by man's activities or not) and which are less able to adapt than developed countries because of entrenched poverty. Food crops are being badly affected by more frequent extreme weather patterns (e.g. coffee beans, a major export crop for Uganda) and there is less water to power hydroelectric plants in countries such as Kenya (which generates almost 75% of its energy using flowing water).

Temperatures are forecast to rise by several degrees over the next 50 years with rainfall declining by 5% (UN 2009b). Wells are at increasing risk of drying up and coastal aquifers become saline as they are depleted. However, this growing crisis is caused as much by people and policies as it is by changing weather patterns and so adapting to it can be aided by appropriate infrastructure financing models, in this case by adopting a *multipart tariff* covering environmental and resource costs as well as financial costs.

These pricing principles can be illustrated for water supply. **Financial costs** include the costs of providing and administering water services (i.e. the collection, storage and distribution of water and the removal and treatment of wastewater). **Environmental costs** relate to the damage to ecosystems and to those who use the environment for business, recreational or other purposes (damage being caused by pollution, over-abstraction etc.). **Resource costs** relate to over-abstraction of water sources in rivers, lakes, wetlands and aquifers, leading to the depletion of water resources and so denial of those resources for other uses. Resource costs are imposed by current users on potential (current and future) users by depriving them of the opportunity to use water at all or water of an appropriate quality. This lost opportunity cost is an economic cost, sometimes also referred to as ‘*user cost*’.

As a matter of principle and to promote allocative efficiency in theory, each user should pay for these three constituent costs in direct proportion to both the volumetric amount of water used and the pollution produced (i.e. the *polluter-pays* principle). These three costs can be recovered via a charge made up of a fixed component to cover the fixed financial costs of supply, a charge per unit of water used, and a charge per unit of pollution produced.

However, most (including developed) countries have generally failed to consider environmental and resource costs in their pricing policies and failed to integrate economic and environmental efficiency objectives in water policies. Instead, they have given preference to affordability and social concerns, the resulting subsidies almost invariably contradicting economic and environmental objectives by encouraging the wasteful use of water. In many countries, water supply is financed by *flat-rate charges* based on occupation of property because water consumption is not metered. Where water charges are in direct proportion to property values they take the form of *property-related*

taxes rather than a user charge. Charges based on numbers of residents or on the numbers of (bed)rooms at each property are a *hybrid form of payment* having characteristics of both a flat-rate charge and a property-related tax, perhaps being more like a *poll tax*.

Balancing potentially conflicting economic, environmental and social objectives in the form of an optimal pricing regime will be difficult in both technical and political senses. Technical difficulties arise because of the lack of robust information about economic (including resource) and environmental costs and benefits in particular as well as because of the potentially high billing costs in reflecting these in water prices. Political difficulties arise because sharply increasing prices will almost certainly result from reflecting financial, environmental and resource costs in tariffs, higher prices being likely to generate considerable resistance amongst water and sewerage customers who will argue that water is essential to life and that poor large families cannot afford high charges. Hence, at the very least, the re-balancing of tariffs requires a phased implementation, giving water users time to adjust their consumption patterns to those rising prices. It will also be necessary to find some way of protecting low-income high-need households without resorting to costly bureaucratic means testing.

Although this financing model requires meters to accurately record quantities consumed, meters are universally used for energy supply because they are installed at the time of connection to the national grid. However, as already noted, in many countries meters are not installed for water and sewerage services. This leads to water being wasted because payment is not related to volumes consumed. In turn, this results in increased pressures on sewerage systems as the volume of polluted water requiring treatment rises, it already having been noted that sewerage treatment costs are typically greater than the costs of supplying water.

Retrospective fitting of water meters is much more expensive than fitting meters when supply networks are first built but capital costs can be recovered in both cases by adjusting the standing charge accordingly. There should then also be a small on-going charge to finance metering and billing costs.

So-called 'smart meters' can be used to facilitate a peak-load pricing model by recording consumption of energy and water by time of day (typically greatest in the early mornings and evenings as domestic demand rises), week (energy consumption typically lower at weekends as energy-intensive industries cease production) and year (energy consumption typically highest in winters in cold regions and water consumption highest in summers in hot regions). The peak-load pricing model charges users more during times of maximum demand on supply networks because it is peak load demand that determines the required system capacity and infrastructure, there being plenty of spare capacity during off-peak periods (e.g. during the night for energy supply).

In principle, this sophisticated financing model achieves equity by relating payment to cost incurred on the system. In theory, it also encourages users to be more economical in consuming energy and water and so reduces the amount (and therefore cost) of infrastructure required to meet demand by reducing peak demands. In practice, users have to be made fully aware of the impact of changes in their patterns of consumption on their utility bills and they have to be highly responsive to higher bills. However, patterns of use will be unresponsive to peak-load pricing where demand rises rapidly along with rising income (e.g. as a result of being able to afford purchases of domestic appliances using electricity) and where families with many children find it virtually impossible to change their pattern of consumption. Moreover, 'smart' metering systems require connection to an electronic billing infrastructure that will

not be available in many developing countries, especially outside urban areas.

Financing models for bridges and tunnels typically use tolls, flat-rate per vehicle type or class (i.e. cars, coaches and lorries) but typically rising in proportion to average weight per vehicle type or class to reflect the increased wear and tear on surfaces and their support structures. Road user charges are paid by drivers of vehicles to finance privately-funded roads and motorways. Payments rise in line with distance travelled and are usually also higher during peak periods (i.e. during rush hours as commuters travel to and from places of employment) than in off-peak periods (e.g. night time). As noted above in respect of energy supply, peak-load pricing depresses peak demand by encouraging use of roads to be more evenly distributed over the day and so reduces the amount (and cost) of infrastructure required to meet demand.

A range of payment (i.e. financing) technologies are currently in use. Car park technologies using physical barriers at payment stations are often used on bridges and tunnels. Transponders and electronic automated payment systems are more efficient in not impeding traffic flow and in avoiding the administrative costs of manual payments.

The increasingly widespread installation of satellite navigation (satnav) systems in vehicles facilitates adoption such financing models, payments being made during rather than before or after road use and so able to relate charges to capacity available at a particular point in time. These real-time charges are higher on heavily congested routes and lower elsewhere so as to encourage a more optimal pattern of road use by shifting use not only from peak to off-peak periods but also from congested to uncongested routes. Again, this will be more effective the greater the sensitivity of demand for road use to user charges which, in turn, will depend on the reasons for travel, whether for work or leisure. Travel for leisure

(including shopping) will generally be much more responsive to higher road user charges than travel for work purposes and so more likely to change to off-peak periods. Travel for work will be more responsive to levels of road user charges the greater the flexibility of working hours. Hence, another way for municipalities to reduce the amount of infrastructure required to meet peak demand is to encourage employers to adopt flexible working patterns aimed at reducing the need for their employees to travel at peak time, and so reducing the peak by spreading it over more hours.

Where tolls and road user charges paid directly by users of those transport infrastructures are not politically acceptable, shadow prices can be paid by governments in direct relation to the number of vehicles passing over them. However, governments then have to raise finance by other means and so shadow prices are not a direct means of either funding or financing those infrastructures.

Asset Sales can be used to help finance new infrastructure. Public sector organizations should consider whether they need to retain ownership of underused physical capital because the opportunity costs of the finance devoted to them (for repairs and maintenance and depreciation) can be high. In other words, better public policy outcomes could be achieved if the money released from their sale was used to provide more socially beneficial services and infrastructure.

Asset sales are fairly common in the private sector, for example when a poorly performing company is taken over by a 'predatory' private equity firm which then sacks managers, sells underused or redundant assets and restructures the company prior to selling it at a profit that reflects its increased earnings potential. Economic theory emphasizes the efficiency benefits of directing economic resources to their most productive uses by such means, helping markets work better and so promoting

economic growth and prosperity.

However, such 'asset stripping' is not viewed favorably either in principle or in practice when it is applied to public sector organizations. First, this 'predatory capitalism' is generally regarded as privatization of profits and nationalization of losses. Second, it can lead to severe disruption of the service and potentially disadvantage service users, some of whom may be very vulnerable (e.g. the UK case of private equity firms causing instability in residential care of elderly people in 2011).

Nevertheless, the potential benefits arising from sale of underused assets can be expected to rise in future in highly populous developing countries with very young demographic profiles, at least to the extent to which the resulting revenues are used to introduce successful family planning services and improved education for girls and young women, leading them to have fewer children as they pursue their careers. In such circumstances, which could arise within as little as five to ten years, the number of school pupils will fall: initially primary school ages then subsequently secondary school ages. Many developed countries took advantage of their ageing demographic profiles to sell surplus schools and the land upon which they were built so as to help finance improvements in education and other infrastructures, including not just standards of physical accommodation but also staffing and educational hardware utilising ICT.

In the much longer term, developing countries will have to reallocate human, physical and electronic resources to increase levels of service suited for an increasingly elderly demographic profile. Hence, although the revenues from asset sales are finite, those sales can be made to underpin a strategy for economically and socially efficient asset management.

Sweating the assets refers to infrastructure itself being used to raise income independently of charges paid by its users. The public sector has conventionally viewed physical capital as a cost in terms of the finance needed to procure it, the subsequent expenditures on repairs and maintenance required to maintain it 'fit for purpose' and the cost of depreciation entered in the annual accounts.

However, in sharp contrast with this 'financial liability' perspective, the private sector pays much more attention to the revenue earnings potential of capital assets. Referred to as 'sweating the assets' because they are worked harder (and so 'sweat'), the objective is to make more creative use of resources owned or otherwise utilized by an organization so as to derive additional value (revenue) from them.

Assets can also be 'sweated' whilst in public sector ownership to generate new sources of recurring income or to increase their capital value, or both. The additional income can be used to finance service improvements and new or improved infrastructure. The increased capital value of assets could be used as collateral against loans used to finance investment in services, provided such use is allowed by public law.

Assets which can be sweated are all the inputs and processes utilized by an organization, not just physical capital. Examples include:

- land and buildings previously used only for conventional business operations now being used to generate new sources of income from rents, leases, energy generation etc;
- human resources being used more effectively by increased specialization of labor, utilizing professional skills more fully by transferring routine lower-level tasks to lower-paid grades of staff;
- underutilized capacity within computing systems being used to store and process

data that has previously been recorded and processed manually;

- integrating IT systems so as to make more efficient use of data that has previously been stored in separate databases;
- selling raw data series for commercial applications by other organizations so that they can be linked in innovative ways .

The last example includes postcode, land ownership, meteorological and procurement data held by the public sector. However, it has been argued that making such data available free on websites accessible to all creates much greater public value. This 'creative commons' hypothesis argues that restricting access to raw data only to those willing and/or able to pay creates an economic and social loss many times greater than the potential revenue from charging for access.

Making assets work harder may not involve particularly innovative uses of them. For example, an organization with a large amount of fixed assets in its production line may sweat them simply by introducing a shift system so as to utilize them 24/7, rather than just during week days. This will reduce the level of overhead costs per unit of output and so generate cost savings. The same result can be achieved by pooling capital assets with other organizations so as to share high fixed costs, for example vehicles and computer systems. Of course, regular repairs and maintenance programs sweat the assets by extending their lifespans.

Innovative ways of sweating the assets are generally referred to as 'thinking out of the box', for example regarding waste materials as a resource rather than a cost (e.g. generation of energy from municipal waste or selling that waste to resource-recovery companies recycling glass bottles, metal cans etc.).

Creation of asset registers and adoption of capital accounting methods may be a prerequisite if the full potential of sweating the

assets is to be achieved. First, many large organizations (especially those in the public sector) lack full knowledge of what assets and resources they own, this being more the case for equipment that can be moved (and so lost track of) than for land and buildings which, by their very nature, are immobile.

Second, it is difficult to sweat assets to their full potential unless their value is known. The accuracy of such value data can be improved by adoption of resource accounting and budgeting methods leading to more consistent and better costing than historic cash or current replacement cost accounting techniques (see Chapter 3). However, sweating the assets can still be pursued even if such value data is not available.

Sweating the assets can be further improved by adoption of a comprehensive asset management system (AMS) which ensures that ownership and use of assets is driven by changing service needs, rather than by previous needs and inertia. AMS takes account of the current condition of assets in determining their value and, thus, their potential for sweating. The often high legacy costs of assets can be offset by such means.

For example, in seeking to avoid high levels of water and sewerage charges and debt whilst continuing to invest in service improvements, a publicly-owned water company could develop additional uses for its assets that extend beyond their core service use. Its ownership of large tracts of land (i.e. its water catchment areas, distribution networks and water and sewerage treatment facilities) could enable it to develop sources of renewable energy. These include electricity generated by development of 'wind farms' (i.e. wind turbines) and hydroelectric power plants utilising rivers and outfalls from lakes. Use of electricity to power pumps for transport of water from source to point of use and for transport of sewerage from service user to treatment plants is a major operational cost. Hence, by generating its own electricity, the

water and sewerage organisation can reduce its energy costs. Electricity generated surplus to requirements could possibly be sold to the national grid through a feed-in tariff so as to generate additional revenue, as is the case in Germany and the UK.

A water organisation could perhaps also use its land to generate income from treatment of municipal waste, for example by using a redundant sewage treatment works as a commercial composting operation for processing green waste. This helps local governments achieve any recycling targets set by their governments and reduce any payments of landfill tax.

Anaerobic digestion (AD) can be used to process bio-mass waste materials such as food waste to generate electricity from burning biogas collected from decomposition of materials, pyrolysis (the application of heat) being used in order to speed up decomposition. Additionally, enclosed tunnels could be used to recycle aerobically food and green wastes via a sludge press and liquid organic reception.

The water organisation's land could perhaps also be used for siting radio masts, the transmission companies paying rent for the sites. Use of its land for film locations could also be used to generate income, as could sale of design and project management to developers of real estate in urban locations. Various property services could also be marketed. For example, its customer database could be made available for searches by commercial companies for marketing purposes (after personal data is made anonymous). More innovatively, cable television companies could pay to route their cables into dwellings via sewerage networks, saving them the cost of digging trenches and also avoiding disruption to traffic.

The organisation's human resources could also be used to provide international consultancy services to other developing countries, for example staff training, advice relating to

regulation of the industry, organisation and methods and asset management.

These examples demonstrate the benefits of developing a commercial arm dedicated to developing innovative ways of sweating the assets. They also demonstrate the benefits of networking with relevant organisations to develop commercially viable projects, some of which are clearly long term and require private sector partners sharing both costs and resources. The water organization should seek to minimise its financial exposure by dedicating assets it already owns, private sector partners covering upfront and operating costs where possible. Otherwise, costs are covered by the commercial arm so as to avoid risk to the water organisation's core water and sewerage service.

Although not without potential problems, sweating the assets owned by public sector organisations can be used to secure additional public value. However, the right to undertake these sweating activities should be earned progressively through successful operation of initial activities. In particular, they have to fit within the core culture and operations of the organisation and require attention to be paid to their governance and to risk management.

The pursuit of revenues and profits should not be allowed to take priority over core service operations. Hence, it would seem more appropriate for sweating assets activities to be undertaken by a commercial arm of the public organisation. That commercial arm should become not just wholly self-funding but also earn a surplus to invest in service improvements, both infrastructure and customer care in the case of water and sewerage companies.

The scope for sweating the assets can be expected to increase as new technologies develop, this having clearly been the case for the renewable forms of energy referred to above. That scope will also increase in line with development of organisational capacity in both the public and private sectors and as new forms of public-private organisations develop. One such example is the development of carbon trading schemes from which organisations can raise revenues through trading unused carbon-emission licenses (carbon credits) as new 'green energy' technologies are substituted for carbon-polluting fossil fuels to generate electricity. Income can also increasingly be raised from fast-developing markets trading in waste products. Care must be taken, however, to avoid revenue-raising potential distorting priorities for infrastructure, for example by drawing attention away from infrastructure needed to alleviate poverty and facilitate development.

Although the water organization example relates to a public sector trading body, there is no reason in either principle or practice why other forms of public sector organisations should not also be able to sweat their assets in utilising their land and buildings, human resources, computing and IT systems etc., so as to secure additional public value.

In summary, taxes, tax increment financing, user charges, asset sales and sweating the assets are all ways in which the public sector can finance infrastructure independently of its procurement. The next chapter examines in more detail a way of financing infrastructure that integrates procurement, funding and financing, namely PFIs and PPPs

CHAPTER 6 FURTHER ANALYSIS OF PFIs AND PPPs

As noted in Chapter 4, PFI/PPPs utilize the *pay-as-you-use* infrastructure financing model. A PFI involves private sector companies in the design, construction, financing and operation of facilities used to provide public services under contract with the public sector. A PFI contract is a concession agreement between a government agency (client) and a special purpose vehicle (SPV) company created by the private sector sponsors to build and operate the facility. The SPV members usually provide the 'seed equity capital' and thus 'own' the project during the concession period. The SPV normally consists of a construction company, a facilities management company and a bank which provides **funding** for the project, often made-up of approximately 90% debt and 10% equity stake invested by the consortium members.

BENEFITS OF PFIs

- **Focus on outputs & outcomes when contracting out**
 - rather than on inputs & processes when contracting in
- **More rigorous analysis of costs by PFIs**
 - whole-life costing
- **More rigorous analysis of financial, operational and other risks**
 - & optimal allocation of risk between public & private sectors?
- **Synergies & integration**
 - of design, construction, operation & maintenance

- **Comprehensive competition across all elements of the project**
 - at least in theory
- **Long-term performance management**
 - whole-contract management (25-30 years)
 - end-of-contract transfer assets to public sector
 - in contractually-agreed condition

The SPV is a legal entity (i.e. company) in its own right, a purpose-built organization for one project that has a limited life span corresponding to the length of the concession or contract agreed with the public sector client (e.g. a local government). The client contracts for service delivery and so the payment to the SPV does not commence until service delivery has begun, and its continuation is conditional on the satisfactory quality of the service provided. Those pay-as-you-use payments **finance** both the recovery of funds invested by the SPV and the profits it earns.

PFIs/PPPs contracts therefore secure as legally-enforceable obligations **both** the funding and the financing of infrastructure used to provide public services over extended periods of time. In utilizing private funds for public services, PFIs/PPPs allow government agencies to conform to budgetary constraints by directing limited capital resources to other areas. Not surprisingly, they are being used in many countries for the provision of public sector infrastructure and related services (Bailey, Valkama and Anttiroiko 2010).

In the UK, for example, there are around 1,000 PFI/PPP projects with a total capital value in 2011 of over £60 billion, about 15% of infrastructure spending (HoC 2011). PFIs were introduced in the early 1990s for UK transport projects operated by private sector companies. They were later re-branded as PPPs as they began to involve a range of institutional arrangements designed to combine the expertise of the public and private sectors in new capital investment and procurement projects. Nevertheless, PFI is frequently used as the acronym for PPPs.

- banks limited finance up to £30-50m
- credit risk passed to service providers
- governments had to provide guarantees in case of financial difficulties

- **so many problems with PFIs since 2007**

- can PFIs now provide sufficient finance?

PROBLEMS WITH PFIs

- **reliance on PFIs facilitated by ‘easy money’**
 - from banks & capital markets in 1990s & early 2000s
- **2007-09 credit crunch caused problems**
 - as the finance system moved from highly speculative lending
 - to a drastic reduction of available finance
- **cheap corporate bond financing disappeared**
 - as construction companies became subject to higher risk of bankruptcy
- **drastic reduction of funding available from banks**
 - commercial lenders reduced their involvement in PFIs
 - banks’ appetite for PFI syndicated debt fell substantially
- **& banks require higher margins & tougher conditions**
 - multiple investors
 - contracts duration reduced to 7-10 years

However, the standard (i.e. original) PFI model raised a number of concerns, including the efficiency of risk transfer, quality of the services provided, poor value for money and insufficient stakeholder engagement (Foo et al 2011). The efficient distribution of project and service risk between the public and private sector partners for the duration of the contract was a key requirement and justification for selection of the PFI option. However, transfer of risk from the public to private sector was sometimes more apparent than real. For example, a waste-to-energy private finance initiative scheme in Greater Manchester had to be bailed out by the UK government in 2009. Hence, governments need to pay attention not only to risk sharing within contracts but also to default risk outside contracts where bankruptcy requires governments to assume responsibility for financing the failed service.

Moreover, ‘excessive’ costs were associated with unnecessarily high interest rates payable on private sector borrowing (via corporate bonds) compared with the lower interest rates generally payable on public sector borrowing. Additionally, rates of return (profits) have often been greater than those originally envisaged by public sector clients and even by members of SPVs. These ‘excessive’ profits have often been derived from debt restructuring (to take advantage of lower interest rates on offer subsequent to initial borrowing) and subcontracting service provision to take advantage of cheaper

contract prices subsequent to those written into PFI contracts.

Hence, recent PFI/PPP contracts in the UK have made provision for profit sharing between SPVs and public sector clients so as to avoid unforeseen (excessive) profits being earned by the private partner. However, existing contracts could not be rewritten, at least not without further payments to SPVs to compensate them for changes in terms and conditions. New contracts were still seen as too inflexible, being binding for 25 years or more and so lacking flexibility to deal with inevitable changes in service requirements over the long term. PFIs have also been seen as contrary to the public service ethos, seeking to promote profits rather than the welfares of service users. Although there have been many successes (at least as far as can be judged before 25-30 year contracts are completed), critics of PFIs highlighted contractual and service failures and the lack of significant risk transfer.

Not only have public sector organisations sometimes had to bail out failed projects but also the UK government had to bail out several of the major PFI-funding banks during the 2007-09 credit crunch (Bailey, Asenova and Beck 2009). Additionally, in early 2012 the UK government began to help seven hospital trusts whose PFI debts were too large to finance from their budgets. The Department of Health is providing emergency funding via a 'stability fund' so they can afford to pay the PFI unitary charges without having to divert budgets away from other medical expenditures. Whether because of badly negotiated contracts or not, the fact is that unsustainable PFI debts were endangering the financial and/or clinical capabilities of the hospital trusts.

Evolution of the PFI Model

These criticisms led to development of innovative variants of the standard PFI model,. While preserving the standard PFI model's key characteristics, innovative spin-

off procurement mechanisms include Local Improvement Finance Trusts (LIFT), Express LIFT and Procure 21 and programmes in health; Building Schools for the Future (BSF) in Education and, specifically in Scotland, various forms of non-profit PFI referred to as the Non-Profit Distributing (NPD) Model (Asenova et al 2010, Pautz and Bailey 2012). These variations of the standard PFI model are generally referred to as 'PFI-lite' models

The NPD model caps 'excessive' private sector profits, does not involve dividend-bearing equity and involves much wider participation of community stakeholders in the decision-making process and management of projects. Nevertheless, it still tries to maintain an optimum allocation of risk between the public and private sectors and retains the whole-life costing, life-cycle maintenance and facilities management, performance-based payments to the private sector and improved overall service provision of PFIs.

However, the innovative NPD model does not resolve the long-standing problems of the standard PFI such as high transaction costs, questionable risk transfer, insufficient market competition, and prolonged and expensive negotiations. Moreover, the recent financial crisis has affected the NPD model and the standard PFI in a similar way.

The flow of new PFIs and the various PFI-lites (including NPDs) has been adversely affected by the collapse of bank lending following the 2007-2009 credit crunch, which owes its origins to lax regulatory regimes for banks and weak central bank safety nets. Additionally, PFI has lost its major attraction for the public sector, namely that the PFI spending was 'off balance sheet' prior to introduction in the UK of the International Financial Reporting Standards (IFRS) in April 2009. This kept PFI transactions off government accounts and so relieved local governments, health boards and government departments from centrally-controlled budgetary allocations and cash

limits on public sector expenditure. The IFRS now brings the liabilities of PFIs onto public sector balance sheets.

In 2011, a report by the UK's House of Commons Treasury Select Committee (HoC 2011) highlighted the multiple failings of PFIs and said value for money could only be achieved if there was substantial reform of the PFI model. The Committee noted that the excess cost of PFI over government borrowing has increased sharply since the 2007-09 credit crunch, the cost of capital now being 8% for a typical PFI project compared with around 4% for long-term UK government bonds. Each one percentage point reduction in the interest paid on the estimated £40 billion of PFI debt would save £400 million each year.

More generally, the Committee argued that use of PFIs to fund public service infrastructure has not been based on robust analysis but, instead, on ill-founded comparisons with conventional public sector provision and on invalid assumptions. Moreover, the argument that taxes on profits would help recover any profits that are higher than expected has proved false because SPVs have used offshore arrangements to avoid paying taxes on those profits.

Hence, the UK Treasury wants to create a new model for delivering public service infrastructure. It wants a model that still takes advantage of private sector expertise but which strikes a better balance of risk between the public and private sectors and accesses a wider range of financing sources in the private sector, including pension funds. In this way, it hopes to commission services and infrastructure at a lower cost to the taxpayer by achieving a better balance between risk and reward to the private sector whilst increasing flexibility so as to be able to respond to public service needs that change over time.

As already noted, both standard PFIs and PFI-lites comprise a SPV of just several consortium members (a bank, a construction company and a facilities management company). However, PFI/PPPs could make use of a multiplicity of consortium members, this being enabled by moving away from a one-off 'big bang' contract to a series of phased contracts enabling their take-up by small and medium-sized enterprises (SMEs) in the private sector and by social enterprises. Use of small, sequentially-phased contracts for the provision of infrastructure and related services would provide local companies an opportunity to win contracts which have previously been much too big for them to be able to handle. Such an outcome would help maintain the viability of businesses in rural areas.

CHAPTER 7 FURTHER ANALYSIS OF TAXES TO FINANCE INFRASTRUCTURE

Taxes or Charges for Financing Infrastructure?

Local governments provide considerable inputs of infrastructure which adds to the value of a development site and so developers stand to benefit by making considerable profits. A part of these profits will be paid as tax revenues to central government but they provide little or no direct financial return to the local authority undertaking the expenditure on infrastructure. Increased intergovernmental grants may be financed by those extra national tax revenues but local government generally still lacks funds for provision of infrastructure required by development.

Hence, it would seem reasonable for municipalities to levy their own taxes and/or charges on developers to recover the costs they incur in providing infrastructure for the latter's housing, business and industrial developments.

Unlike a charge for which something is given directly in return for its payment, payment of tax is not directly reciprocated because it does not automatically lead to provision of a service to the taxpayer. This distinction between taxes (an unreciprocated payment) and charges (a reciprocated payment) should be borne in mind throughout the following analysis of options for financing infrastructure.

Property Taxes

As noted in Chapter 5, a property tax relates payment of local taxes to the capital or rental values of residential and industrial/commercial properties, these values forming the tax base. Relative capital and rental values relate, at least in part, to the levels and quality of infrastructure

provided by local government and the users of that infrastructure pay property taxes which help finance the payment of debt charges relating to it. The tax rates applied to those tax bases are a political decision and so rates vary from one local government to another.

In addition to the standard property tax just described, various innovative forms of property tax have been developed, some specifically to finance the interest and amortization payments on infrastructure-related debt.

Business Improvement Districts (BIDs)

BIDs are used by municipalities in the UK, Canada and the USA if, via a referendum, businesses agree to pay additional property taxes. Under this financing model, businesses volunteer to pay a levy to finance extra services of direct benefit to the area in which they are located. Improved public spaces within their trading environment make good business sense if they prevent a high street or other such shopping centre deteriorating due to poor security, poor physical appearance and poor business image.

Although based on the voluntary principle, 'free riding' by those who choose not to volunteer is avoided by making payment of the levy compulsory if a majority of businesses in the area vote for it. They take collective decisions for provision of services such as security, street cleaning and local economic development in city or town centres. Some of these additional services may require infrastructural expenditures (in addition to current spending) on town centre revival and renewal.

BUSINESS IMPROVEMENT DISTRICTS

- **used by municipalities in Canada, USA & UK**
 - if businesses agree via a referendum to pay a levy
 - to finance extra services of direct benefit to their area
- **makes good business sense**
 - if it prevents a shopping centre deteriorating
 - due to poor security, physical appearance & business image
- **more like a charge than a tax because**
 - voluntary payment
 - for a direct benefit
- **'free riding' is avoided**
 - by making payment of the levy compulsory
 - if a majority of businesses in the area vote for it
- **levies are based on the principle of additionality**
 - the finance they raise must not replace existing finance

Charges or property-based taxes are levied on BID members and collected by local government in addition to those property taxes paid in common with other businesses outside the BID. Hence, levies are based on the principle of additionality, their payment being conditional upon their local governments guaranteeing to maintain at existing levels their own funding for the area.

American BIDs are not-for-profit organisations whose boards are comprised of representatives of local businesses, local government and local residents. They

encourage self-help in small neighbourhoods by fostering local partnerships and complement 'city pride' initiatives. The greater segmentation of American cities makes BIDs more feasible there than in many European countries, as does the greater willingness in America to pay directly for service.

For these and other reasons, BIDs had to be remodeled before they could be used in the UK where around 50 have been established in Birmingham, Bristol, Coventry, central London, Kingston-upon-Thames, Plymouth and elsewhere to finance crime prevention (e.g. CCTV cameras), remedial measures (e.g. dealing with vandalism), more frequent bus services to shopping centres (especially if 'out of town'), local training and employment schemes etc., (Cumberbatch 2004, NBAS 2010, ODPM 2004a and 2005, POLP 2005, Scottish Executive 2003 and 2005,).

Generally, the areas covered by BIDs are those with identifiable business communities, not just town centres but also business parks and industrial centres. The first is likely to focus on the retail environment (e.g. litter collection and removal of chewing gum on pavements) while the last two are more likely to focus on safety and security (for staff and premises) and recruitment and training issues.

UK BIDs have to be approved by a majority (of both votes and rateable value) of businesses in the BID, payment of the resulting additional business property tax then being compulsory. The levy is only to be paid by businesses and organisations paying non-domestic (i.e. business) property tax. Hence, the BID payments cannot be levied on domestic properties in the BID areas, even though they are also expected to benefit. Moreover, the non-domestic property tax system is occupier based, with the result that the levy will not be payable by property owners outside the system – unless they volunteer to make such payment on behalf of their tenants.

A UK BID may last for no more than five years unless its continued existence is approved by a second ballot at the end of that period. Thus, BID partnerships must demonstrate that the levy is used to promote the successful operation of their stakeholders, for example creating a cleaner, safer, more desirable place to shop and work. It is expected that retail and leisure businesses will pay the larger part of levies and so they must be convinced that the payment of the BID levy is more than recovered by increased trade. Of course, offices and other businesses also pay the levy. In general, the BID levy is a matter for the council and local businesses to decide. It could be simply a percentage of rateable value, or of the property tax bill net of reliefs, or it could be of a fixed amount and could vary according to type of business.

The limitations of BIDs are as follows:

- they have a very limited purpose – generally marketing, safety and security and cleaning;
- they have a short life span – of five years or so in the first instance;
- they have relatively high costs of development and administration – reducing their effectiveness;
- they tend to focus on short-term issues rather than longer-term investments – because they can only compel contributions from occupiers of property, not owners.

A Supplementary Business Property Tax

Reflecting the limitations of BIDs, local authorities could be given powers to levy a supplementary business property tax to finance repayment of debt related to urban development projects (e.g. public transport schemes). Powers to determine the main rate of business property tax could remain with central government or a cap could be put on

that tax rate set by municipalities, either in absolute terms or as a percentage of the main business rate. Powers to levy a supplementary business rate were introduced in the UK in 2009, local authorities being required by law to consult with businesses and undertake a ballot before levying the Business Rate Supplement (BRS). The maximum supplement is 2 pence in the pound of rateable value but there is no limit on the duration of any BRS. Local authorities are allowed to use the proceeds to finance additional investment aimed at promoting the economic development of local areas, for example transport projects, skills training or place marketing (DCLG 2007 and 2010a).

A report by the Centre for Cities ‘thinktank’ (Harrison and Marshall 2007) lists a range of transport projects that could be financed in the UK by a supplementary business rate of between 2p and 4p. These include building London’s Crossrail, redeveloping Birmingham’s New Street Railway Station, providing a new bus network in Leeds and extending Metrolink in Manchester. The Centre for Cities estimates that loans of up to £10 billion could be financed nationally in this way for such projects.

Widespread use of a supplementary business rate would not necessarily reduce the need for BIDs, given its expected use for strategic transport projects. As made clear above, BIDs are being used to finance much more localised non-strategic service provision which benefit particular parts of the city rather than the city as a whole.

Betterment Taxes

The distinction between the costs incurred by local authorities in providing infrastructure to individuals and businesses and the benefits enjoyed by them is important. This is because the granting of planning permission by an authority can result in a huge increase in the market value of a piece of land that changes use

from agricultural to residential or commercial activities. More generally, land and property values rise as a result of growing urbanisation and economic development. Hence, land and property owners become richer through no effort on their part and so should be taxed accordingly (Prest 1981, George 2006).

The tax base is the rise in property value and this can be determined from data relating to property transactions. The tax rate applied to that tax base is determined by either national or local government (depending upon which tier of government levies it) and its level is a political decision and so will generally vary from one local or national government to another.

National Betterment Taxes in the UK

National betterment taxes were used spasmodically in the UK between 1910 and 1985 through betterment levies and development land taxes, tax revenues going to central (not local) government (Oxley 2004). They failed because they were not underpinned by political consensus and so developers anticipated that the tax would be abolished following a change of government. Together with legal challenge of valuations, this meant that the revenues raised by the various national betterment taxes were very much less than expected.

Local Betterment Taxes in the UK

Introduced at around the same time, a discretionary local betterment tax faced problems even greater than the national tax. Besides court challenges and problems of valuation, local authorities found it difficult to prove that increases in land values were due to award of planning permissions. Hence, local governments preferred to use negotiation as the basis for agreeing betterment payments in the form of 'planning gain'.

Planning Gain

UK local authorities are able to negotiate 'planning gain' agreements on a site-by-site basis to levy what is effectively a hybrid local betterment tax in addition to recovering the costs of infrastructure they have to provide to service development.

Planning gain refers to a situation where local authorities secure benefits from developers that do not relate to the development itself. It takes the form of a payment in cash or in kind, the latter referring to a developer building a physical facility (such as a bypass road or community centre) and then donating it to the local authority. It combines an infrastructure charge with a local tax on the rise in land values arising from the granting of planning permission.

Planning Obligations

Planning obligations are the UK's statutory embodiment of planning gain, both terms being used interchangeably in the literature. Planning obligations are part of development controls. They are negotiated agreements between planning authorities and developers, the latter contributing to the cost of infrastructure or services the local authority considers necessary to facilitate a proposed development or offset any adverse impacts it causes.

Planning obligations are required to meet a five-pronged 'necessity test'. They have to be:

- necessary to make the proposal acceptable in planning terms,
- relevant to planning,
- directly related to the proposed development,
- fairly related in scale and in kind to the proposed development and
- reasonable in all other respects.

The vast majority of planning obligations relate to highways, sewerage and drainage, and landscaping and open space and they are more frequently associated with planning permissions in the faster growing regions of the UK and are of a much higher average value in those regions than in slower growing regions (Campbell et al. 2001). They can also contribute to a range of impacts, for example local public transport initiatives such as ‘green travel plans’, education, health services, flood defenses, open spaces and affordable housing. However, planning obligations are only large in financial terms for major developments (DCLG 2006).

Although planning obligations had been intended to mitigate the impact of development, UK local authorities have been using them as a mechanism for sharing development gain (i.e. betterment) more widely and they have been criticized as a vehicle for “helping shore up local authority finances... at the cost of further subverting the aims of the planning system” (Cornford 2002, p.802). By this is meant that local authorities permit development in order to secure planning gain, development which would not have been permitted without that gain. “Short-term planning gains are tending to override longer term planning concerns such as environmental quality. These trends challenge fundamentally our conception of the nature of planning.” (Campbell et al. 2000 p. 759)

Put simply, according to this line of criticism, the planning system is increasingly being used as a revenue-raising service rather than as a means of constraining the adverse impacts of further development. Additionally, it has been argued that planning gain is not the most appropriate way of providing affordable housing or for achieving social inclusion and urban renaissance. “A site-specific and de facto betterment tax is likely to be less efficient and equitable in achieving overall objectives than higher levels of grant funded from general

taxation” (Crook and Whitehead, 2002, p1277).

Land Value Tax (LVT)

LVT is a comprehensive reform of the taxation of land value. It would replace all other taxes on land, including property tax, stamp duty, inheritance tax and planning obligations/gain. As it is a revenue-neutral tax reform, it would not increase the total tax take. Many countries such as Australia and Denmark already have some form of LVT (Harrison 2006).

Unlike betterment (or an infrastructure charge – see Chapter 8), LVT is not a transaction tax and so does not deter market transactions. It taxes ownership of all land, not just sites at a particular stage of development. Moreover, it would tax the whole of the land value, unlike a betterment tax which only taxes the rise in value arising from the granting of planning permission. Only a very small proportion of land is subject to transactions each year: less than 1% of land in the UK in a given year. Whereas LVT is levied annually on each site, a betterment tax (or infrastructure charge) is levied only, say, once every 60 years or so when sites are redeveloped.

Unlike LVT, betterment (and infrastructure charges) do not capture any gains in land values as a result, say, of transport improvements (Price 2003). LVT would, for example, tax the massive rise in land values around London Underground’s Jubilee Line extension and, likewise, rising values following the successful 2012 London Olympics bid (Riley 2001). The value of land is assessed regularly (usually annually) for the calculation of tax liability, ignoring its current use for buildings etc. In taxing the value of land in its most profitable potential (rather than actual) use, LVT encourages the efficient use of land. Specifically, landowners would face incentives to release surplus holdings of land to avoid tax liability, which would increase the supply

of land for housing. In turn, this would put downward pressure on house prices.

Although taxes can be used to finance infrastructure, it was noted in Chapter 5 that they can distort economic activity in unintended and undesirable ways. Hence, consideration should also be given to charging directly for the infrastructure local governments provide to support directly or indirectly private sector developers. Infrastructure taxes and charges are not mutually exclusive and can complement each other, this being demonstrated in the next chapter.

LAND VALUE TAX

- **LVT replaces all other taxes on land**
 - & so is revenue-neutral
- **taxes ownership of all land**
 - not just sites at a particular stage of development
- **taxes the whole of the land value**
 - not just the rise due to planning permission
- **is levied annually on each site**
 - not just when sites are developed
- **captures all gains in land values**
 - e.g. as a result of transport improvements
- **taxes the value of land in its most profitable potential use**
 - encouraging the efficient use of land

CHAPTER 8 FURTHER ANALYSIS OF INFRASTRUCTURE CHARGES

Infrastructure charges are paid by individuals and businesses commensurate with the *benefit* received from local authorities' provision of infrastructure or with the *costs* incurred by them in providing that infrastructure. Infrastructure charges are increasingly being levied on UK property developers at the time planning permissions are granted for residential, commercial and industrial developments. Such charges are additional to revenues from the business property tax. In contrast, infrastructure charges very rarely accompany the granting of planning permission to private individuals (Campbell et al. 2001). Instead, householders pay their share of infrastructure costs through the local property tax.

Local Tariffs

The UK government prefers local authorities to use formulae and standard charges, where appropriate, of £18,500 per house in 2007 plus land for social infrastructure and affordable housing. This is equivalent to between 5% and 10% of the cost of an average house (ODPM 2004b). The tariff for commercial developments was set at £67 per square metre of commercial floorspace or £260,000 per hectare of employment provision.

The tariff is paid in phases, 25% upfront, 25% on completion of the building and 50% when it is occupied. Developers agree a 'promise to pay' contract with the local authority which then uses it as collateral to borrow funds from banks via the regeneration agency English Partnerships (acting as banker), the UK Treasury underwriting the spending. The money raised is used to fund community facilities and infrastructure needed to support expansion plans for the city.

A tariff-based approach is quicker and more certain for developers and councils than a traditional planning gain/obligation agreement, there being no need to negotiate on individual pieces of infrastructure (see Chapter 7). It is also more transparent, as the way in which cost figures are calculated is clearly set down (Coles 2007 page 134)

Local authorities in other less prosperous parts of the UK are unlikely to want to adopt standard charges in place of their existing use of planning obligations because of the fragility of their property markets. Where the charge is levied it is meant to cover a continuum of infrastructural needs, ranging from the direct consequences of development (need for schools, libraries, parking etc.) through affordable housing (between a quarter and a half) to community needs (arts, community forests etc.). Developers seem willing to pay extra through the charge in order to speed up the award of planning permission by avoiding tortuous planning obligation negotiations.

A Statutory Planning Charge

A Statutory Planning Charge (SPC) could be levied per housing unit or, alternatively, per liveable room or be based on total floor space. These different ways of levying the charge could lead to changes in the design of housing units as follows:

- A SPC per housing unit would discourage the building of smaller homes that are more suitable for small families and people living alone (e.g. single people and old-age pensioners).
- Levying the SPC per room would encourage building houses with

multiple use large rooms (i.e. kitchen-diner-living rooms).

- Basing the SPC on total floor space would avoid both of the above tendencies but councils could set the charge high in order to discourage development or divert it from, say, peripheral, out-of-town areas to more central down-town locations.

The key features of planning charges are that they can:

- be used by local authorities to supplement negotiated agreements still needed to secure affordable housing;
- be based on assessments of infrastructure requirements set down in development plans;
- include contributions towards the cost of sub-regional and regional infrastructure, again included in regional and local development plans;
- be made payable by residential and commercial developers only above a minimum threshold and only after a set number of houses are built;
- be tested by consultation with developers, the community and other stakeholders via the development plan process along with the charging policies on which they are based.

In general, the property industry prefers the standard tariff model because it is administered by local authorities and so the infrastructure for which the money is paid is more likely to be built than would have been the case for a centrally-collected tax or charge. Moreover, standard tariffs make clear what has to be paid, so helping developers deal with the associated financial costs.

The Community Infrastructure Levy (CIL)

Introduced in 2008, the CIL is a form of SPC that local authorities in England and Wales are empowered but not required to levy

on new development in their area (DCLG 2010b). The purpose of the CIL is to provide top-up financing for infrastructure in the form of roads, public transport, schools, health and social care facilities, flood defenses, sports, leisure and cultural facilities (including parks and green spaces), district heating schemes, police stations and other community safety facilities and other infrastructure required to facilitate economic growth and provision of housing. When it was introduced in 2008, the UK government believed it could raise an additional £700 million per year by 2016. The actual figure may prove to be lower as a result of the slowdown in development during the ongoing period of low to zero economic growth and so of development activity.

The CIL results in the costs of new infrastructure increasingly being transferred from property taxes to *pay-as-you-go* infrastructure charges levied on property developers. It will supposedly deliver the following benefits:

- much greater certainty about the legal basis for a charge;
- a broader range of developments contributing to infrastructure;
- greater transparency, certainty and predictability about the required levels of financial contributions from developers.

Although the CIL has to be based on per square metre of net additional floor space (in excess of the 100 square metres threshold), it is up to local authorities to themselves decide whether or not to introduce a CIL and, if so, determine the rates of CIL for their own areas. Hence, there is no single national rate of CIL, rates varying from one local government to another. Local authorities must publish those rates in a schedule of charges which has to be independently examined and approved before it can take part and must be open to consultation with the wider community and stakeholders. Approval will depend on

appropriate evidence being provided to justify charging levels appropriate to the local area. Once approved, those rates must be index-linked to inflation measured by the national All-In Tender Price Index of construction costs published by the Royal Institution of Chartered Surveyors.

Local authorities' charging schedules may contain differential rates of CIL in order to favor or discourage development in different parts of their area. Hence, the CIL does not fully match the standardized form of charge favored by the UK development industry. Moreover, the CIL is separate from planning gain/obligation agreements and there will again be a fear amongst developers that they may be subject to 'double liability' where the CIL is introduced in an area after the granting of planning permission with planning obligation. However, local authorities are not allowed to fund the same piece of infrastructure by both the CIL and planning obligations. Guidelines are published for the complementary use of planning obligations which must meet the following tests:

- be necessary to make the development acceptable in planning terms;
- be directly related to the development;
- be fairly and reasonably related in scale and kind to the development.

Local authorities are required to report on their use of CIL revenues, placing documents on their websites by the end of each calendar year, in order that their communities can see how those revenues are being spent. They may accept payments in-kind (i.e. the transfer of land they would use to support the development) instead of payments in cash. It is still too early to judge the success of the CIL but further analysis and interim findings are available elsewhere (Ashworth and Demetrius 2008; PWC 2008).

Social Cost Tariff (SCT)

The SCT is paid by developers as compensation for communities (via their local authorities) for wider development costs. SCTs are used in parts of Canada (Tomalty and Skaburskis 1997). Their adoption signified a shift from a marginal cost (site-specific) approach to the financing of infrastructure by developers to an average cost (municipality-wide) approach. The tariffs are based on formulaic charges, replacing the previously negotiated developer contributions. The level of the tariff is determined by dividing the total cost of the infrastructure by the total number of properties it serves so as to derive the average cost. This average is then multiplied by the number of new properties to be built by a developer so as to derive the total payment required. An average occupancy rate per property can be used for services related more to people than to property.

All new developments have to pay the average cost tariff, even infill developments using excess capacity within existing infrastructure because of the stress they place on that infrastructure. Adopting the user-pays principle means that growth pays for itself and tariffs are neutral with respect to the pattern of development. Average costs are easier to calculate and justify than marginal costs. Their calculation is based on municipal-wide capital plans and growth forecasts which developers can use to calculate what they would have to pay. Being based on those plans and forecasts, they are easy to justify and defend if developers challenge them in the courts.

Moreover, the revenues raised can be used flexibly in different parts of the municipality for both on-site 'hard' physical infrastructure (such as roads) and off-site 'soft' (environmental, social and community) infrastructure. This is justified on the grounds that major off-site infrastructure such as waste treatment facilities serves the whole municipal population irrespective of its

spatial distribution and most soft service infrastructure is organised on a catchment area basis. Even on-site infrastructure such as roads, water supply and sewers are networked into a wider system of infrastructure. The gradual evolution from a site-specific to municipality-wide approach in Ontario is comparable with what has happened in the UK, in particular through the CIL (see above).

If adopted in the UK, the SCT would replace all other payments, including planning gain/obligation agreements. It would be a flat-rate tariff applied to all development: residential, industrial and commercial, at a standard rate. Its revenues would not necessarily be used to finance infrastructure for particular sites, nor for affordable housing (Evans and Hartwich 2006).

Impact Fees

In the USA, the broader costs imposed upon municipalities by general urban development are increasingly financed by ‘impact fees’. While having to fulfil the ‘rational nexus’ criterion, impact fees are much more broadly based and formalised than the UK’s flexible and discretionary planning obligations or planning gain. The scope of impact fees in the USA is largely set by general legal principles relating to the rational nexus criterion.

Litigation by developers appealing against the impact fees imposed upon them by municipalities has largely determined how ‘rational nexus’ is defined in legal terms. Impact fees are therefore a site-specific (rather than predetermined flat-rate or planning project-based) charge. They are set consistent with legal (rather than planning) criteria which allow recovery of tangible (as distinct from intangible) costs.

The Urban Task Force suggested that impact fees could be used in the UK (DETR 1999). However, in its 2001 consultation paper *Reforming Planning Obligations* (DTLR 2001), the UK government rejected impact fees as a replacement for planning obligations,

believing they are not flexible enough, as do others (Evans and Bate 2000).

SOCIAL COST TARIFFS VERSUS IMPACT FEES

- **impact fees** (USA)
 - levied on ‘rational nexus’ legal criterion
 - to recover tangible (not intangible) on-site costs
- **social cost tariffs** (Canada)
 - flat-rate tariff to finance community infrastructure
 - recovers wider development costs (on+off site)

The USA’s system of land use is based on zoning which is intended to preserve the rights of owners of land and property. Constitutional protection of property rights has created a decentralised and fragmented system of property rights in the USA which precludes flexibility in the use of revenues from planning charges (Goodchild and Henneberry 1994). This is in sharp contrast to the hierarchical structure of planning systems across Europe which has created a comprehensive and coordinated approach to land-use planning. In the UK local plans have to be embedded in regional plans and be consistent with central guidance and reflect national policies. This followed the nationalisation of development rights in 1947 which brought about a considerable restriction on property rights in the UK. Hence, simple adoption of the USA system of impact fees in the UK would be highly problematic due to the radically different approach to protection of property rights. The same caveats may apply to many developing countries with planning regimes similar to those of the UK, including former British territories.

Summary of Betterment Taxes and Infrastructure Charges

The relevant policy distinction is whether to tax the increase in land values resulting from planning permission (a betterment tax) and/or to charge for the infrastructure costs incurred by local authorities consequent upon development (an infrastructure charge).

TAXES OR CHARGES?

- **tax rising value of land receiving planning permission**
 - betterment taxes (on both old & new sites)
 - tax increment financing (to redevelop old sites)
- **charge for infrastructure provided by local governments**
 - statutory national planning charge
 - or locally-variable community infrastructure levy
- **or both taxes and charges?**
 - taxes to capture betterment arising from granting planning permission
 - charges to recover costs of the related public sector infrastructure

Every attempt to introduce a national UK betterment tax during the 100 years between 1910 and 2010 failed. Instead, at the local level, planning controls and capture of betterment are pursued simultaneously. This effectively makes the level of betterment a planning consideration and so changes in land values may drive the planning system, consequently frustrating achievement of an optimal land use plan for a municipality.

Unlike betterment taxes, infrastructure charges (tariffs) are easy to formulate and implement and are generally widely accepted by the development industry. They can be

used on both greenfield and brownfield development sites, they can apply to both large and small schemes, they can allow for discretion to be exercised in their collection from barely profitable schemes and there is considerable experience of successful operation in the UK.

Although there are separate rationales for infrastructure taxes and charges to be paid by developers, their economic incidence (as distinct from legal liability) may not be on developers themselves. Both forms of developer contribution may be passed on to users of the new infrastructure and/or to the original owners of the land upon which that infrastructure is built. Whether paid as taxes or charges those payments may be passed forwards through higher prices paid by the purchasers of property and/or backwards in the form of lower prices paid to the original landowner (Arnold 1999).

WHO ULTIMATELY PAYS FOR INFRASTRUCTURE?

- **developers may pass the tax or charge**
 - **forwards** to purchasers of property
 - through higher prices for houses, offices, etc.
 - **backwards** to original landowners
 - through lower prices paid for land
 - **or both** backwards & forwards
 - so as to maintain profits
 - & to maintain payment of dividends to their shareholders
 - but development may be slower
 - if landowners are not unwilling to accept lower prices

The next chapter provides an overview of funding and financing models considered in this chapter and Chapter 7.

CHAPTER 9 OVERVIEW OF FUNDING AND FINANCING MODELS

The following summary tabulation of funding and financing models is for purely illustrative purposes. Their assessed revenue potential and ease of management within the table are based on the foregoing analysis

and depend upon many factors that can be expected to vary from country to country at any one point in time and also to vary over time for any one country.

FUNDING AND FINANCING MODELS FOR DEVELOPING COUNTRIES

	REVENUE POTENTIAL	EASE OF MANAGEMENT
FUNDING MODELS		
Borrowing		
Commercial banks	LOW	EASY
Multilateral funds	LOW	NOT SO EASY
Sovereign wealth funds	LOW	NOT SO EASY
Infrastructure banks	LOW	DIFFICULT
Insurance and Pension funds	MODERATE	FAIRLY EASY
Retail Infrastructure Products	LOW	EASY
Corporate Finance		
PFI/PPPs	HIGH	DIFFICULT
Privatisation	HIGH	DIFFICULT
Donations		
Overseas Aid	LOW	EASY
Foundations	LOW	NOT SO EASY
FINANCING MODELS		
Property Taxes		
Standard Property Tax	FAIRLY HIGH	VERY EASY
Tax-Increment Financing	MODERATE	FAIRLY EASY
Business Improvement Districts	VERY LOW	FAIRLY EASY
Land Taxes		
Land Value Tax	VERY HIGH	NOT SO EASY
Betterment Tax	HIGH	VERY DIFFICULT

Infrastructure Charges		
Social Cost Tariffs	MODERATE	EASY
Community Infrastructure Levy	MODERATE	EASY
Impact Fees	LOW	DIFFICULT
Other Sources of Finance		
User Charges	LOW	DIFFICULT
Asset Sales	LOW	EASY
Sweating the Assets	LOW	EASY

Own (indigenous) sources of funds are generally easier to manage and have higher revenue potential than external (overseas) sources simply because the latter typically have many conditions attached to them which must be fulfilled both before their receipt and over the subsequent financing period.

In particular, the availability of borrowed funds is heavily dependent on rating agencies' assessments of the sustainability of a nation's public finances and the existence of sufficiently developed domestic financial markets. Developing countries generally do not have high ratings and so face high interest rates on borrowed funds, if global financial markets are willing to advance loans. Corporate funding (involving multinational companies' foreign direct investment) is generally only applicable for large-scale highly-profitable infrastructure projects generating their own revenues by charging for outputs. Low incomes in developing countries limit market potential for such projects. Donations usually come with high conditionality and are generally for highly-specific welfare and medical operations, rather than for big physical infrastructures.

High revenue potential and fairly easy management of taxes on land and property presupposes a monetary (rather than subsistence) economy, a highly effective tax-collection authority, a culture that accepts payment (rather than avoidance and evasion)

of taxes and so an absence of corruption. Bearing this caveat in mind, nationwide uniform taxes are generally easier to justify and collect than taxes that relate to individual development sites or infrastructure projects. The same applies to infrastructure charges based on average costs of infrastructure rather than on marginal (incremental) costs. Greater use of charges for services is limited by widespread poverty and revenues from asset sales are finite. Revenues from sweating the assets can only be built incrementally over time.

Conclusions on Funding and Financing Infrastructure

In summary, there are various local and national government models for funding and financing public sector infrastructure. Pay-as-you-build infrastructure funding models require use of borrowing. Pay-as-you-use infrastructure financing models are short term (charges and BIDs) or long term (property tax and LVT). Some are only for on-site infrastructure based on marginal costs (impact fees) whilst others are for soft as well as hard infrastructure offsite based on average costs (social cost tariffs). Some are standardized (tariffs/charges, impact fees and social cost tariffs), others require negotiation (planning gain/obligations). Some are generally seen as legitimate by developers (cost-recovery charges), others not (betterment tax). Some

may be supported by all political parties (charges), others not (national betterment tax). Some require payment in cash, others may allow in-kind payments and/or cash. Some require payment before development, others at the start, during or end of development. Hence, some can speed up land development (up-front payments) but others may slow it down (phased or post-development payments). Some are based only on land transactions (SPC), others not (LVT). Finally, some are hybrid payments combining both charges and a (disguised or commercially confidential) local betterment tax (planning gain/obligations).

Some infrastructure financing models have been tried but failed in some countries (e.g. the UK) due to practical problems of implementation (e.g. the valuation of betterment to be subject to tax), made worse by a lack of political consensus. Others have been successful in raising finance in areas facing pressure for development but not in economically depressed areas (planning gain/obligations).

It has to be emphasized that there is a clear and widely accepted rationale for the debt financing of capital expenditures based on both equity and efficiency grounds. However, the associated debt has ultimately to be repaid and so the relevant policy question concerns the appropriate mix between:

- a betterment tax (whether national or local);
- local business property taxes; and
- charges for provision of local public sector infrastructure.

While infrastructure charges are a *cost-related* payment, the property tax is more closely related to the *benefits received* from local infrastructure as reflected in property values. Furthermore, the local property tax finances both new and existing infrastructure, whereas development charges and a national betterment tax finance only the former. A workable and sustainable infrastructure financing model can be devised if the planning system is limited to the recovery of infrastructure costs through charges rather than attempting to capture betterment, the latter best being sought through a land value tax.

CHAPTER 10 THE BROADER CONTEXT OF INFRASTRUCTURE INNOVATIONS

As noted at the outset of this report, alternative means of funding and financing public sector infrastructure cannot be considered in isolation of innovations in its planning, procurement, delivery, definition and form. Hence, this chapter considers how developing countries can be innovative in the **planning, procurement, delivery, definition and form** of infrastructure so as to reduce the levels of funding and financing required to provide it.

The **planning** of infrastructure has conventionally been in the form of strategic & operational planning by individual local authorities or by joint planning (for regional services) with neighbouring authorities. However, planning via the PFI/PPP model requires local authorities only to set strategic plans, leaving PFI/PPP consortiums to plan operations consistent with fulfilling those strategic objectives. For example, many cities have to consider introducing or expanding incinerators to deal with the commercial and household waste they collect and it is now generally accepted that incinerators are best financed and operated as PFI projects. It is also generally accepted that large-scale incinerators are the best way of recovering energy from waste, sale of that energy helping finance the project.

Planning permissions for incinerators could possibly require benefits to be offered to the communities in which they would be located. Local residents could be offered subsidised energy bills for their homes and community buildings (e.g. clinics and schools) and/or profit sharing from energy sales to encourage the granting of planning permission. Alternatively, instead of large-scale

incinerators, some Scandinavian countries have successful experience of small-scale power generation from waste processed locally. This option could possibly be implemented with community enterprises going into partnership with private firms to build and run incinerators. These examples show that public sector infrastructure can be made much more open and adaptive in order to achieve community benefits as well as economic efficiency.

Innovative public **procurement** models focus on higher service quality at lower financial costs by reducing costs of duplication and bureaucracy. To achieve 'better for less', 'Total Service' studies in the UK aim to identify and account for all public spending in each selected geographic area and determine if that spending can be better managed (HM Treasury 2010). For example, the various public sector bodies could form partnerships with each other so as to avoid duplication of services and replication of buildings.

- I. Joint procurement models can be created within the local government sector in order to achieve cost savings, for example from the bulk buying of information technology (IT), vehicles and other infrastructure-related expenditures.
- II. Joint procurement programmes can be developed across the wider public sector to share services, for example social and medical care services for elderly people, previously provided separately by municipal and health authorities respectively. Shared services can achieve not just economies

of scale (to reduce procurement costs of infrastructure for both up-front and facilities management costs) but also for economies of scope (to improve quality of infrastructure and related services).

For significant sums of money to be saved by such means public procurement has to become increasingly multifunctional and multi-agency. This requires a change in culture and behaviour of public bodies so as to facilitate adoption of radically different ways of working together in a particular neighbourhood. Local authorities could be given powers to scrutinise all spending on public services within their jurisdictions, irrespective of whether it is their own spending or not. However, their geographical boundaries may not coincide with those of other government bodies and departments, this being particularly problematic for joint working in respect of roads, public transport and other public services that extend beyond existing jurisdictions. Some joint working will have to be at regional rather than local level and so involve more than one municipality.

PFI/PPPs are the main example of innovations in **delivering** infrastructure (see Chapter 6). However, smaller scale delivery options are available, including mutual organisations, and community buyouts.

Mutual Organisations (MOs) could be used where suitable and sufficient infrastructure already exists but needs ongoing maintenance without substantial upgrading. MOs would take ownership of 'locked assets' whereby ownership of formerly public sector assets is vested in them but those assets cannot be sold. Hence, MOs cannot be formed simply to engage in asset stripping, selling their 'inherited' infrastructure (including land) for their own benefit. Various forms of MOs could be created to implement this model of facilities management, in generally ascending order of size being: employee mutuals,

combined employee and 'customer' mutuals, neighbourhood mutuals, community mutuals.

Whereas MOs are specifically established to take over assets transferred to them from public sector organisations, *Community Buy-Outs* (CBOs) typically enable communities to buy assets previously owned by private sector organisations and individuals. Communities could be given a legal right to exercise an option to buy, say, privately owned land being put up for sale. The property would only remain in private ownership if the community chooses not to exercise its 'first option' right to buy or is otherwise unable to raise sufficient finance. There are many examples of CBOs in the UK, including the Island of Eigg and also Assynt in the north-west highlands, their legal status being based on *community land trusts*. Having typically been badly neglected by previous owners, community infrastructure is generally rapidly developed once residents have secured community ownership and so have a direct stake in the returns to investment of their time and effort as well as of their money in that infrastructure, community wind farms for example.

Communities could also be given the right to buy local government buildings within their neighbourhoods and given the right to build new homes and modify or convert existing buildings and homes so long as a simple majority of population in the area votes in favour. Such *Right-to-Buy* and *Right-to-Build* powers could be complemented by a *Right to Challenge* whereby local government services such as children's centres, social care services and transport could ultimately be taken over by communities.

Development of mutual organisations and community buyouts can potentially be facilitated by innovations in the **form** of infrastructure, in particular a move away from large scale (macro) infrastructure facilities towards small scale (micro) infrastructure.

Establishing small-scale private or community ownership of infrastructure financed internally through microcredit schemes would seem to be particularly suitable for buildings and other fixed assets used for primary education, preventative health care, water supply, green energy and waste treatment projects. Many assets could have multiple uses, for example a range of decentralized health and social care campuses as a viable community alternative to a centralized high-cost hospital providing some services that could be better provided by other means.

Such ‘inverse’ modularized semi-autonomous infrastructures contrast sharply with conventional large scale centralized infrastructures. They are more evolutionary, spontaneous and non-planned and can be owned and operated by user cooperatives (Künneke 2012).

Such new forms of infrastructure in the energy sector include the development of small scale renewable energy infrastructures, including solar (photovoltaic and thermal), wind, wave, tidal and hydro electricity generation systems, ground-source heat pumps, and collection of methane gas from municipal land-fill sites and municipal compost heaps. These technologies could be utilised by local authorities and by mutual and community organisations formed specifically for that purpose. In the UK for example wind turbines and other forms of renewable energy are owned by large companies whereas in Germany most are owned by individuals and communities. Community ownership seems to change the dynamics of people’s attitudes towards energy infrastructure, leading to less local opposition towards siting them in the locality, especially where feed-in-tariffs can be used to raise revenue for communities (see below).

Besides generating energy, municipal composting of waste vegetation from municipal parks and gardens of houses can

raise revenue by selling the resulting peat-free (and so doubly-environmentally friendly) compost to householders as fertilizer, further reducing disposal costs. Improved insulation of municipal buildings can be combined with use of renewable energy and glass walls to capture heat from the sun, saving as well as generating energy. This spend-to-save approach to upgrading infrastructure can be funded by prudential borrowing (see Chapter 4).

These micro forms of energy infrastructure can be used to complement, if not replace, large scale fossil fuel and nuclear power infrastructures. Ultimately, each dwelling, school, hospital, leisure centre, office block, factory and retail outlet could generate its own electricity (e.g. from solar panels and small wind turbines on their roofs), not just saving the costs of purchasing it from the national grid but also selling any surplus to the grid via the ‘feed in tariffs’ already in existence in some countries, including Germany and the UK (see Chapter 5).

In the waste sector, innovative infrastructure includes incinerators with higher emissions standards being established to burn municipal waste for energy recovery and other recycling and reuse technologies that treat waste as a valuable resource rather than a problematic cost. Likewise, biomass fuels technology is being developed to recover energy from human (and farm animal waste), the revenues from which can be used to finance new infrastructure for sewage treatment.

In the water and sewerage sector innovative infrastructure includes rainwater collection systems being developed for the roofs of municipal buildings and for municipal car parks. The water is not used for drinking but, instead, is used for cleaning, flushing and irrigation purposes. This saves costs of water supply and separate treatment of water from drainage systems. Supermarkets and shopping malls in the private sector are doing likewise.

Conversely, for drainage, permeable pavements let water seep through into the ground below and so help to prevent overloading drains and thus reduce the prevalence of urban flooding and so the need for expansion of infrastructural capacity. Separation of storm water and sewerage systems infrastructures helps prevent overflows of untreated sewage into rivers, lakes and coastlines, the incidence of which is rising as weather patterns become more unstable and extreme due to global warming.

Innovative electronic infrastructures are based on fast-developing information and communications technologies (ICTs) and come in many forms:

- I. Electronic care technologies ('telecare') are being established in the homes of elderly and disabled people living on their own to monitor unusual patterns of movement in order to alert remote carers and relatives to, say, a possible fall or collapse.
- II. Electronic payment technologies are being developed for municipal services (e.g. payment for car parking via mobile phones).
- III. User identification technologies using eye recognition (i.e. the retina at the back of the eye) software are being developed for library, leisure centre and other memberships and for provision of free school meals etc.
- IV. Electronic library resources lead to changed space requirements, increased remote use of libraries' electronic networks possibly reducing the need for physical space in the library itself and so economizing on physical infrastructure requirements.
- V. Web technologies utilized to widen (remote) access to collections at museums and galleries, similar to (iv) above.
- VI. Road charging technologies are moving from use of cameras in London and car-parking technologies elsewhere (i.e. physical barrier systems or booms) to use of global positioning systems (GPS) on vehicle satellite-assisted navigation (satnav) systems.
- VII. Public transport technologies based on Satnav systems may also lead to the development of electronically self-guiding trams and buses which can be tracked in real time (possibly on mobile phone applications) so that intending passengers can see if they are running to schedule.
- VIII. Private transport technologies may likewise allow intending travelers to monitor traffic jams in order to plan their journeys using less congested routes.

Clearly, new forms of public and private transport infrastructure will be required. Electronic systems for payments for and use of municipal services, for care technologies, for library and information and cultural services and for public and private transport will result in public service infrastructure becoming more virtual than real. Virtual electronic infrastructures could potentially reduce the need for real physical infrastructures, as indicated above for libraries and museums but also by dispensing with the need for residential care establishments as elderly people can be better supported in their own homes via telecare.

More generally, networked but separate electronic infrastructures can potentially be used to facilitate development of electronic governance. For example, rather than being undertaken by the conventional manual completion of paper forms every ten years, a networked electronic information infrastructure could be used to undertake the UK's population census on an annual (if not rolling) basis. It would draw the necessary

information from data bases held by family doctors (GPs' medical records), National Insurance Contributions, credit cards, the electoral register, the Royal Mail postal service, tax returns and phone companies.

Even more ambitiously, the above examples are being combined with other such innovations in networked electronic ICT systems to develop so-called 'Smart City' infrastructure. In sharp contrast with the predominantly closed and static infrastructure of central government, this new model of Smart City infrastructure is open and adaptive. At least initially, it focuses on re-engineering (retrofitting) service provision to make use of new 'smart' infrastructure technologies, leading to adoption of new infrastructure models and processes based on networked infrastructure and relational infrastructure.

Networked infrastructure is based on connectivity and a presumption in favour of open data so that *technical* capability can be enhanced. Relational infrastructure is based on voluntary proactive community action and so requires *behavioural* capability to be enhanced. Relational infrastructure is aided first by prior and then by simultaneous development of networked infrastructure, ultimately creating a virtuous circle of feedback and evolution of multifaceted forms of infrastructure whose real, virtual and behavioural forms create a holistic vision of infrastructure. The evolution of such infrastructure will then become as much conceptual and virtual as real, promoting sustainable ecologies, environments, communities, households and families through behavioural changes and enhanced behavioural capacities.

Hence, over time, the Smart City will become increasingly less focused on technical and physical infrastructure increasing the connectivity of systems, devices and data and more focussed on connectivity of people, organisations and communities. The technical challenge is the digitisation of everyday

life, integrating the physical and digital infrastructures to provide seamless multi-channel public services accessible to more people more effectively.

However, the biggest challenges in delivering networked infrastructure are social rather than technical. A critical mass of people is required to generate ideas and solutions and communities have to be proactive and engaged to create a sustainable Smart City infrastructure. The Smart City is about attitude, ethos and approach, combining technology with a vision for creating a better city. This requires 'smart thinking', cross-sector fertilisation of ideas and learning, spanning boundaries to develop smart technologies and smart social solutions. This will create new markets via 'elegant partnerships' between the public, private, charitable and voluntary sectors to create better urban environments for citizens. These partnerships go far beyond PFI/PPP and require removal of 'silo mentality' barriers between roles and responsibilities of their members. A 'one size fits all' approach is untenable for creation of smart cities because of the diversity of their urban populations and landscapes.

These innovations in delivering and operating public service infrastructure break away from the conventional thinking that if service infrastructure is not run by the state it is not a public service. Clearly, a new **definition** of infrastructure is required.

Infrastructure has conventionally been defined in narrow *physical* terms as buildings and the land upon which they are based: schools and hospitals for example. The term 'service infrastructure' adopts a broader view including not just those physical assets but also the public services they are used to provide, this being the case for PFI/PPPs.

However, as is typically the case for services themselves, there has typically been a 'bunker' or 'silo' mentality whereby public

sector organisations thought only of their own requirements when seeking to finance and procure service infrastructure. This organisational and jurisdictional isolation often leads to unnecessary duplication of infrastructure (e.g. offices) in government departments whose work is complementary and also in neighbouring local governments who could share assets they cannot fully utilise (e.g. vehicles for collection of household waste).

Hence, innovations in defining infrastructure are going beyond both physical and fragmented service-based views of infrastructure towards integrated infrastructures developed and utilised by:

- I. joined-up central government departments: such as transport and industry;
- II. joined-up local governments: for example, providing integrated city-wide public transport and cultural services;
- III. joined-up public sector: for example, health authorities working with local authorities to provide integrated medical and social care services to elderly people and central government job centres (for the unemployed) working with self-governing colleges and local government youth services to provide integrated job-search, training and employment support;
- IV. cross-sectoral provision joining up the public, private and voluntary sectors: for example, local governments taking account of voluntary sports clubs and private sector leisure facilities (open to all paying membership fees or provided by large employers only for their workers) when planning leisure facilities across their jurisdictions.

Thus, the definition of infrastructure can be broadened to mean any arrangement intended to deliver, enable or facilitate services essential for sustainable and holistic community development. As well as physical assets, ‘infrastructure’ also includes legal, institutional, cultural, technological and connectivity infrastructures permeating government and governance, business and markets, voluntary, charitable and community organisations, dwellings, households and families. All of these dimensions of infrastructure are brought together by the Smart City initiative.

CHAPTER 11 OVERVIEW AND CONCLUSIONS

Raising funds for infrastructure has become a moving target during economic recessions, global banking crises and tighter debt requirements on governments and banks in a more risk-averse financial climate. Consequently, infrastructure financing is fast evolving as assets become more varied as a result of introduction of new classes of asset such as retail infrastructure products .

There has been a long-term trend in many developed countries away from the public provision of infrastructure funded by borrowing to private sector funding and provision of both public sector infrastructure and related services. This has been made manifest not just by PFI/PPPs but also by requiring developers not just to finance on-site 'hard' infrastructure (water supply and sewer systems, roads, drains etc.) but also an increasingly wide range of off-site infrastructure, both hard and 'soft' (i.e. environmental, social and community infrastructure).

This long-term trend towards private funding and provision seems to have been driven by a combination of the rising costs of infrastructure, the unwillingness of national and local electorates to pay higher taxes, limitations on grants paid to municipalities by higher tiers of government and acceptance of the need to avoid cost overruns by transferring as much financial risk to the private sector as possible.

More recently, the very high public finance costs of economic recession and of bank bailouts by governments in the western world has severely restricted the availability of public finance to replace the apparently

much-diminished private finance for PFIs. A return to traditional procurement directly by the public sector itself is therefore not feasible. This simultaneous occurrence of capital rationing in both the private and public sectors has stimulated the search for new, ever more innovative, models for the financing and procurement of public service infrastructure.

However, notwithstanding the focus of attention on new methods of financing and procurement, innovations in public sector infrastructure are much more broadly based. There are also significant ongoing innovations in the planning, delivery, definition and form of infrastructure as well as in its financing. Moreover, these various aspects of innovation are interrelated, for example through PFI/PPP and mutual organisations.

Innovations in the planning, financing, procurement, delivery, definition and form of public service infrastructure can only be analysed and understood in the context of:

- the increasingly Neo-liberal political philosophy of governments seeking to involve the private sector in the provision of public services;
- the ever-rising expectations of citizens in general and users of public services in particular;
- the overall state of health of the public finances and of the wider economy;
- the evolution of the private sector's capacity to finance and provide the levels and standards of public services specified in extremely large and complex contracts over extended periods of time;

- the encouragement and evolution of the third sector's capacity to work independently of, or in collaboration with, the private and/or public sectors in delivering socially desirable services;
- the progressive development of micro-scale infrastructures to complement or ultimately replace macro-scale infrastructures;
- the consequential and complementary adaptation of the system of town and country planning;
- the metamorphosis of real physical infrastructures into ICT-based virtual infrastructures within the evolution of Smart-City integrated service models.

The perceived 'magic wand' of PFIs was and will remain largely illusory. PFIs have not been capable of delivering more than a small part of new public sector infrastructure in the countries in which they have been used. Their financial attraction was engineered by use of creative (off-balance sheet) accountancy practices that severely distorted the public finances and exaggerated their apparent health when, in fact, they were structurally imbalanced. PFIs were enabled by aggregating renewal of physically separated and separable infrastructure (such as schools) into huge 'big bang' very long-term service contracts that allowed for little operational flexibility to deal efficiently and effectively with the changing social, economic, demographic, medical, and technological contexts within which those services are provided. Finally, the viability of PFI financing was predicated on the credit boom that led to the overexpansion of banks heavily reliant on a refinancing pyramid built upon highly obscure financial derivatives, many of which entailed more risk than recognised by the ratings agencies, by the financial regulators and (perhaps) by the banks themselves. The result is a huge policy legacy for future governments and a huge burden of payments to PFIs for future generations of taxpayers.

Nevertheless, it is fair to say that PFIs are suitable for large-scale long-term investments with reasonably stable patterns of use and technologies and this is the reason that they were first used to finance, build and operate transport infrastructure, namely bridges and tunnels in the UK. They are, however, much less suitable for providing services and related infrastructures whose technologies can be expected to change radically and fundamentally during the period of PFI contracts. Moreover, there is no need to offer the private sector an unlimited profits potential via PFIs.

Other innovative means of providing such services must be employed that are more adaptable in the light of changing policies and service contexts. Just as interiors of municipal buildings should be made more open and adaptable to allow for changes in use and so avoid need for more expensive refurbishment or demolition and renewal, so must service infrastructures and technologies be made more capable of adapting to changing contexts and requirements. Long-term highly-specific legally-binding big-bang contracts are incapable of such flexibility.

Hence, innovations in the planning, financing, procurement, delivery, definition and form of public sector infrastructure must be combined as far as possible to enable the provision of public services to be sufficiently flexible to deal with as yet unforeseen eventualities. This means that Smart City initiatives need to be highly adaptive if they are to be sustainable and self-regenerating. Just as a single country or region should avoid its economic prosperity being overly dependent on a single industrial or commercial activity, so must cities seek a plurality of ways of ensuring public services continue to be provided on a sustainable basis, not always directly by themselves or by private sector contractors. By such means, risk can be reduced so much or spread so widely that the preoccupation with risk transfer via PFI contracts becomes unnecessary.

Such plurality can be delivered by the many and varied ways of planning, financing, procuring and delivering public sector infrastructure considered above and by actively promoting innovations in the definition and form of that infrastructure. Such promotion requires local governments and other parts of the public sector not just to identify best practice in promoting and adopting innovations in infrastructure but also, ideally, to become highly competent learning organizations, learning from their own successes and failures as well as those of others.

The contrast between this holistic view of innovative infrastructure and the conventional view of public infrastructure is profound. The conventional view is that infrastructure is required to provide services and, in times of recession, to provide a Keynesian boost to the economy. This conventional view is now much too narrow, being too focused on infrastructure's supply-side and demand-side characteristics respectively.

The supply-side characteristic reflects infrastructure's role as part of the apparently ever-expanding direct provider state. Alternatively, based on market fundamentalism, the role of public service infrastructure is to help markets work better (i.e. correcting 'market failure') so as to provide sufficient infrastructure to maximise economic growth and economic potential.

Neither of the direct provider (Big State) or market enabling (corrected markets) perspectives is appreciative of the newly-developing 'social state' trying to develop social and community capability that is self-sustainable and self-reinforcing, creating a virtuous circle of community creativity. This requires adopting a new perspective for the policy approach to the planning, financing, procurement, delivery, definition, form and focus of infrastructure. This new perspective and approach has to reflect the development potential created by new technologies and the

changing conception of the roles of both the state and market.

Adoption of PFI/PPPs as a way to bypass public funding constraints is still based on the conventional view of infrastructure within the market-enabling state. However, newly-developing technologies are progressively changing the potential forms and capabilities of infrastructure. The development of virtual electronic infrastructure increases its potential connectivity across the public, private, charitable and voluntary sectors. The resulting increased potential for economies of scope may be so large that economies of scale become much less important for commissioning infrastructure.

Whereas economies of scale create a presumption in favour of macro-scale infrastructures, development of virtual interconnected electronic infrastructures will facilitate micro-scale infrastructures that are more open and adaptive to fast-developing electronic technologies. Macro-scale infrastructures are commissioned via 'big bang' long-term PFI/PPP contracts between governments and large-scale consortiums of private sector companies.

In practice, both macro-scale and micro-scale infrastructures will most probably be complementary of each other within an ever-expanding range of infrastructures, rather than substitute forms of infrastructure with a largely fixed level of provision.

Innovations in infrastructure will still be driven by both demand-side and supply-side factors, for example ageing demography and market capability for health care. However, perhaps more significant is the changing ideology of policy makers, from direct provision by the public sector itself (Big State), through the market-enabling state contracting provision from the private sector (Big Market), to the community-based social state (Big Society) alongside new electronic applications that together create networked and relational infrastructures.

CHAPTER 12 RECOMMENDATIONS FOR DEVELOPING COUNTRIES

Developing countries should adopt a more holistic approach to innovation in infrastructure whose role is increasingly to create sustainable community development as distinct from build an ever-larger welfare state or strengthen market fundamentalism. Adoption of this more holistic approach to the planning, procurement, delivery, definition, form and financing of infrastructure fits within the increasingly pluralistic methods of service provision which it is intended to facilitate and the economic, social and environmental objectives it is intended to help deliver, including the 8 UN Millennium Development Goals outlined at the outset of this report.

Multilateral agencies need to provide much more advice on financing (as distinct from funding) infrastructure in order that developing countries build their financial capacity to pay off debt and to maintain and upgrade infrastructures so that they remain fit for purpose over the long term. They should consider more guaranteeing repayment of debt relating to infrastructure (rather than financing it directly) so as to improve the credit rating of projects and so make project bonds more attractive to potential investors. Underwriting debt across the developing world will spread risk and so encourage long-term investment by insurance and pension funds and by sovereign wealth funds. This would complement World Bank plans to use its International Finance Corporation (IFC) arm to strengthen banking systems in developing countries so as to make more capital available for SMEs in order that they can fund investments.

Developing countries need to pay more attention to micro funding and finance of

their infrastructures based on small-scale contracts suitable for their own SMEs, rather than macro funding and finance based on large scale big-bang contracts suitable for PFIs. They should install micro-scale community based infrastructures that can utilise micro-financing methods wherever possible. Such actions would reduce their external debt by making more use of internal sources of funding.

Much more attention should also be paid to preventative spending through spend-to-save initiatives for community infrastructures. In particular, these initiatives should be designed to reduce the incidence and growth of both communicable and non-communicable diseases and illnesses and the number of unplanned pregnancies and early motherhood. This approach utilizes lower levels of primary care infrastructure (clinics) rather than expensive secondary care infrastructures (hospitals) and can deliver much greater value for money. If successful, the demands on medical infrastructure can be much reduced and people of working age (including young women) will be able to be more economically active and so raise themselves out of poverty. Spend-to-save initiatives also apply more generally, including use of energy and water.

Similarly, much more attention needs to be paid to reducing the total amount of infrastructure required by using it more efficiently and effectively. Peak-load user charges can be used to spread use of infrastructure more evenly over time and so reduce the required capacity. Joint procurement and use of infrastructure by neighboring municipalities and by government departments with complementary functions

can achieve both economies of scale and scope, the latter being potentially much greater than the former. More community ownership, use and control of infrastructure can be expected to promote innovation in its use (e.g. by joining up education, health advice and social care in a single multi-functional community centre/school) and so create added public value. Sweating the assets can help develop added-value uses of infrastructure designed for other core functions. Comprehensive asset management systems (AMS) should be adopted in order to ensure ownership and use of assets is driven by changing service needs, rather than by previous needs and inertia. Sale of underused assets is integral to AMS.

In urban contexts, cities need to become much more 'smart' utilizing interconnected electronic networks so that virtual digital infrastructures can be developed to reduce the need for real physical infrastructures and enable them to become much more open and adaptive to changing service contexts, needs and technologies.

Irrespective of its form and function and of how it is funded, procured, provided and operated, very careful attention should be paid as to how infrastructure is financed over the decades it is in use. Secure financing via user charges, developer contributions, sweating the assets, tax increment financing and other earmarked taxes related to land and property values is essential because the ongoing pay-as-you-use (or benefit) financing of infrastructure is more difficult to ensure than borrowing for the upfront costs of a pay-as-you-build model of funding.

If taxation is to be used for financing infrastructure, government borrowing is almost certainly the cheapest method of funding infrastructure on a pay-as-you-build basis. This would seem to be the best option for social infrastructure such as schools and hospitals. However, governments must set out how they will repay that debt in the future,

for example via tax increment financing. In particular, it is not financially, economically or socially prudent simply to assume that revenues from the generality of taxes will be sufficient to repay that debt. Infrastructure does not automatically pay for itself by promoting economic growth and there are considerable risks related to refinancing debt over the lifetimes infrastructures are depreciated.

If infrastructure is provided on a pay-as-you-use basis, user charges and developer contributions are best used for financing. This would seem to be the best option for economic infrastructure such as water and sewerage and transport systems. However, PFIs should only be used in very specific circumstances (perhaps for environmental infrastructure) and, in general, full scale privatization would seem to be the best infrastructure funding option for energy supply and telecoms. A mixed utility model would seem to be more appropriate for rental housing where there is a mixture of private and public finance, namely where low-income households rents are subsidized by the state.

Whether pay-as-you-build or pay-as-you-use is adopted, the key means of securing sustainable infrastructure is to contract its maintenance over its lifetime. Lifecycle maintenance must be integrated into the design and construction of infrastructure. Public sectors seem to be inherently incapable of maintenance of physical assets and so contracts are essential to ensure that they remain fit for purpose. This requires whole-life costing of infrastructure, also essential for transparency and one of the major benefits of PFIs. Where utility infrastructure is privatized, the regulatory asset base (RAB) model achieves the same result.

More generally, there should be a proper comprehensive public sector balance sheet that accounts for all the liabilities created by borrowing, PFIs and any other form of funding

infrastructure. Governments typically do not compile public sector balance sheets, with the result that they are funding and financing their infrastructures blind to the burdens they place on the public finances and so on future generations of taxpayers and service users.

Whilst bearing in mind the caveat that infrastructure does not pay for itself, in deciding which infrastructures should be prioritized, governments should recognise that the economic returns are greater for investments in primary rather than tertiary education and in preventative health care than remedial care.

Governments should also realize that investment in long-lived fixed assets such as transport and telecommunications will create a fixed infrastructural network that will constrain development for many years. If that investment is publicly funded through borrowing it will also create a debt legacy for future generations, further constraining development. Hence, where possible, a mixture of financing methods should be sought to fund flexible forms of infrastructure so as to avoid being locked into one means of financing a non-adaptive infrastructure, both of which may become obstacles to development over time.

In principle, market mechanisms can help to develop infrastructure by pricing assets, establishing ownership, providing new forms of finance and managing risks in sustainable ways. However, financial markets are often poorly developed in developing countries because of high political and financial risks and high costs of insurance against those risks. Governments of such countries can facilitate development of financial markets through joint public-private ventures and by guaranteeing within limits loans but not equity finance. However, rather than seeking to attract external funding via globalized financial institutions they should focus more on developing sources from within their own

countries, for example microcredit through local financial intermediaries. Unlike the former, the latter is not subject to exchange rate risk.

It has to be recognized that there is no magic wand that can be waved to secure the funding and financing of infrastructure. In practice, developing countries will have to make use of a plurality of both funding sources (including non-bank sources such as retail infrastructure products, insurance and pension funds, project bonds and mutual municipal banks) and financing instruments (including user charges, developer contributions, sweating the assets and tax increment financing).

Globalized sources of finance (including equity) would seem to be more suitable for new technology infrastructures generating revenues from their users, for example in telecommunications. Default risk for new technology projects can be minimized by requiring them to have low debt-to-equity ratios so that shareholders bear most risk, meaning that use of corporate bonds and bank finance (a feature of PFIs) should be minimized as far as possible. In this way governments will be better protected from having to bail out projects failing as a result of cash flow problems where revenues are not sufficient to repay creditors.

Ultimately, developing countries must recognise that the only truly sustainable way of providing infrastructure is by adopting a pluralistic approach to the planning, financing, procurement, delivery, definition and form of infrastructure.

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This guide introduces the infrastructure development needs in developing countries. It introduces different models for infrastructure and basic services. It further analyses innovative financing approaches to infrastructure and basic services. It offers recommendations for infrastructure and basic services financing.

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