



Infrastructure Expenditure Tracker

August 2010





The Business Trust Support Programme for Accelerated Infrastructure Development (SPAID)

SPAID is a partnership between the Business Trust and the Presidency of the South African Government. SPAID works to combine the resources of business and government to accelerate the achievement of the Government's infrastructure development targets.

SPAID's objectives are that:

- Private Sector support accelerates public sector delivery by mobilising:
 - private sector initiative;
 - private sector systems and delivery approaches; and
 - focused strategic support.
- Dialogue and understanding between senior public and private sector stakeholders in the infrastructure sector improves.

Please visit the website for more information: www.spaid.co.za.



The Presidency

Strategic objectives defined by South Africa's Presidency include:

- Co-ordination, monitoring and communication of government policies and programmes;
- fostering nation building;
- enhancing an integrated approach to governance for accelerated service delivery and supporting and consolidating initiatives for building a better Africa and a better world;
- bringing government closer to the people; and
- facilitating a Developmental State through accelerating economic growth, interventions in the second economy, elimination of poverty and fostering nation building.

Initiatives being undertaken by AsgiSA fall into six broad categories; a massive investment in infrastructure, targeting economic sectors with good growth potential, developing the skills of South Africans and harnessing the skills already there, building up small businesses to bridge the gap between the formal and informal economies, beefing up public administration and creating a macroeconomic environment more conducive to economic growth.

For more information on The Presidency and AsgiSA, go to: www.thepresidency.gov.za



The Business Trust

The Business Trust combines the resources of business and government in areas of common interest to accelerate the achievement of national objectives. It focuses on creating jobs, building capacity and combating poverty.

The partnerships of the Business Trust are structured through:

- The corporate partners who fund the Business Trust. Over 140 of South Africa's leading companies have committed over R1billion to the Business Trust since 1999.
- The board of the organization, made up of cabinet ministers and the heads of the major corporations who support the Business Trust.
- Sector specific partnership committees made up of business and government leaders, who oversee project implementation.
- A series of implementing partnerships with the agencies that implement Business Trust programmes.

Please visit the website for more information www.btrust.org.za.

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List of acronyms used in this document

AIDS	Acquired Immunodeficiency Syndrome
ASGISA	Accelerated Shared Growth Initiative for South Africa
FIFA	Fédération Internationale de Football Association
GDP	Gross Domestic Product
GEC	Global Economic Crisis
HIV	Human Immunodeficiency Virus
MIG	Municipal Infrastructure Grant
NERSA	National Energy Regulator of South Africa
PIG	Provincial Infrastructure Grant
SOEs	State-owned Enterprises
SPAID	Support Programme for Accelerated Infrastructure Development

Executive Summary

Infrastructure has traditionally referred to the physical assets - such as roads, utilities, water and sewage systems - needed by industrial economies. However, in the post-industrial “information age”, definitions have been broadened to include communications networks such as the internet, and distinctions have been drawn between economic infrastructure (the physical assets that provide services used in production and final consumption), social infrastructure (assets that support a healthy workforce with adequate skills) and institutional infrastructure (such as the legal system, culture and capital markets). Whatever the definition that is adopted, it is fair to say that the quantity and quality of a country's infrastructure has a direct impact on its economy's ability to operate and to expand over time.

In recent years the South African public sector's infrastructure spending programme has formed the centrepiece of government plans to support and facilitate economic growth and development, and to thereby help to achieve the targets set in the Accelerated Shared Growth Initiative for South Africa (ASGISA). In addition to contributing directly to economic growth, the public sector infrastructure programme is also supposed to support other ASGISA objectives by contributing to job creation, reducing poverty and assisting in developing competitive local industry.

The sheer scale of this public infrastructure development programme, together with the fact that rolling annual budgets have continually been supplemented and adjusted, and that so many different parties are actually involved in the delivery of the associated projects, has meant that it has been difficult to track the spending. In recognition of this, the Support Programme for Accelerated Infrastructure Development (SPAID) commissioned this study.

The demand for infrastructure is derived from the demand for the output of the industries that the infrastructure serves. This implies that as the GDP of an economy increases, so too does its need for infrastructure. However, the characteristic “lumpiness” of infrastructure assets, and the fact that the pace of technological change is accelerating, means that the ratio of output change to infrastructure change is not constant. While infrastructure can theoretically be supplied publicly or privately, its inherent characteristics mean that spending on it is usually accompanied by significant regulation – which impacts directly on aspects such as ownership structure, financing, pricing and demand growth, and thereby on the supply decisions of the market. Investment decisions are made more complex by considerations around the quality of the infrastructure supplied, as well as the timing and quantity.

Trends in public sector fixed capital formation and fixed capital stock

An economy's real fixed capital stock represents the replacement value of all previous gross fixed capital formation spending, less the value of all fixed capital consumed. It is also the quantity and quality of the fixed capital stock (and the infrastructure portion of it) that determines the maximum potential output of the economy – given the quantity and quality of other available factor inputs. In analysing trends in infrastructure spending it is important to distinguish between the stock of infrastructure (represented by the fixed capital stock), the flow of new additions to the capital stock

(represented by certain types of gross fixed capital formation), and the consumption of the existing stock of infrastructure.

The levels of real public sector gross fixed capital formation in South Africa – which is assumed to represent the flow of new additions to public infrastructure - increased relatively rapidly between 1963 and 1976. This was followed by a sharp dip and short-lived recovery between 1976 and 1980, and then an extended – and quite dramatic – fall for the following seven years. A nascent recovery - driven by increased spending on non-residential buildings and construction works between 1987 and 1989 - could not be sustained, and the levels of spending then slid further till 1994. By this stage real public sector capital formation was at the same levels as seen in 1965. In the democratic era, real public sector fixed capital formation spending gained momentum in the years following the 1994 elections until the brakes were firmly applied in response to fall-out from the 1998 Asian Crisis. Spending then declined in real terms till 2001, but in the years since then there has been almost exponential growth in public sector fixed capital formation – driven by dramatically higher construction works activity, and increases in investment in most other asset types.

South Africa experienced a progressive and accelerating increase in the public sector's real fixed capital stock between 1960 and 1981 and then further, smaller increases for the following four years. Between 1986 and 2002 there was a marginal decline, but in the post-2002 period it increased at a faster rate than at any other time for which figures are available. The replacement value of the public sector fixed capital stock in 2009 stood at R1 556 billion in constant 2005 price terms – compared with R1 286 billion in 2002.

However, when the real value of the country's public sector infrastructure is divided by the prevailing population, a somewhat different picture emerges. It shows a significant and steady increase in the quantity of infrastructure available per person between 1960 and the early 1980s – with real per capita values rising from R18 360 in 1960 to a peak of R41 055 in 1985. However, these averages do not reflect apartheid-era racial inequalities which significantly distorted the access of large portions of the population to such infrastructure, and the benefit they were able to derive from it. Factors such as increasing urbanisation would also have influenced the growth in, and level of, public fixed capital stock per capita over this period. Unless the “depreciation” of the capital stock is fully offset by gross new fixed capital formation, the real quantity of the public sector capital stock will decline – as it did between 1985 and 1995. The resulting period of static and marginally-declining fixed capital stock translates into a pronounced fall in the per capita value of real public sector capital stock – which declined by almost one third from its 1985 high to R27 906.

On the basis of the depreciation rates applied to different asset types, just over R60 billion (in R2005 price terms) of fixed capital formation was required in 2009 simply to maintain the real fixed capital stock of the public sector at the same level as it was at the end of 2008. This translates into average life spans ranging from 2.5 years in the case of computers and related equipment to 36.8 years for construction works. The weighted average annual depreciation rate for public sector capital assets is 4.1%, with an implied average life span of assets of 24.3 years.

Actual and projected spending by different tiers of government and state-owned enterprises

National Treasury estimates of actual and projected spending on infrastructure by the diverse elements of the public sector indicate a quite dramatic rise in expenditure between fiscal 2006/07 and 2009/10, but anticipate slower growth in the coming three fiscal years. Total nominal public sector spending on infrastructure rose by an average of 41% per year between fiscal 2006/07 and fiscal 2009/10 – from R84 billion to R235 billion. This growth was driven by average annual growth in infrastructure spending by non-financial public enterprises of close to 70% per year. The value of public-private partnerships also grew rapidly over the period – increasing by an average 117% per year.

The projected outlook for total spending by the public sector for fiscal 2010/11 to 2012/13 is less stellar – with estimated average growth of only 8.5% a year. Spending growth is expected to be driven by extra-budgetary institutions (20% p.a.), national departments (19% p.a.) and local government (14% p.a.), but the value of public-private partnerships is expected to contract by an average of almost 24% a year over the period.

The table below summarises the budgeted and actual levels of spending on infrastructure by the various elements of the public sector, as well as annual changes and the cumulative total since the adoption of the ASGISA programme. Although there was initially a significant shortfall between what was budgeted and what was actually spent by the public sector as a whole, the variance between cumulative budgeted spending and cumulative actual spending has shrunk from more than 25% in 2006/07 to less than 2% in 2009/10.

Description	2006/07		2007/08		2008/09		2009/10	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
	R Billions	R Billions	R Billions	R Billions	R Billions	R Billions	R Billions	R Billions
National Departments	8.9	4.6	5.8	5.7	6.4	6.3	8.0	6.4
Provincial Departments	32.0	27.1	35.4	29.4	36.9	36.1	39.9	41.2
Local Government	26.0	21.1	28.2	30.7	31.2	39.6	49.5	37.5
Consolidated government	66.9	52.8	69.4	65.8	74.5	82.0	97.4	85.1
Extra-budgetary Institutions	4.1	3.7	5.3	3.7	4.5	6.2	7.0	10.9
Public-private Partnerships	3.8	1.3	3.5	3.9	8.5	4.9	13.9	13.8
General Government	74.8	57.8	78.2	73.4	87.5	93.1	118.3	109.8
Non-financial Public Enterprises	37.7	25.7	44.7	56.8	71.2	79.4	119.6	125.5
Annual Total - Public Sector	112.5	83.5	122.9	130.2	158.7	172.5	237.9	235.3
Cumulative Total – Public Sector	112.5	83.6	235.4	213.8	394.1	386.3	632.0	621.6
Annual % Increase in Budgeted and Actual Total Public Sector Infrastructure Spending	22.5%	-7.0%	9.2%	55.9%	29.1%	32.5%	49.9%	36.4%

Sources: 2005, 2006, 2007, 2008, 2009 and 2010 Budget Reviews

While there is a concern in some quarters about a rapid fall-off in the level of public sector infrastructure spending after the completion of 2010 FIFA World Cup-related projects, there are still a large number of major projects that are scheduled for completion in subsequent years. The most significant of these by value are the Kusile and Medupi power stations – which have a combined price ticket of more than R266 billion, and which should be completed by fiscal 2015/16 (in the case of Medupi) and 2018/19 (in the case of Kusile). Most of the stimulatory impact of these projects still has to flow into the economy.

By contrast, the scheduled completion dates for some of the large-scale projects in the transport sector (Gautrain and Gauteng Freeway Improvement Scheme) are more imminent, and a large portion of the costs have already been sunk.

The table below shows the actual levels of spending for 2009/10, as well as the National Treasury estimates for the next three fiscal years. Although the nominal value of spending is still expected to increase in coming years, the rate of increase slowed significantly in the 2009/10 fiscal year, and is projected to remain below 10% over the next three fiscal years. Whether these nominal increases translate into real increases will depend on the extent to which prices are adjusted over the period. Given current inflation trends and targets, some real growth still seems likely.

Description	2009/10	2010/11	2011/12	2012/13
	Actual	Estimate	Estimate	Estimate
	R Billions	R Billions	R Billions	R Billions
National Departments	6.4	6.8	7.8	10.7
Provincial Departments	41.2	45.6	50.0	50.8
Local Government	37.5	41.3	50.4	56.0
Consolidated government	85.1	93.7	108.2	117.5
Extra-budgetary Institutions	10.9	11.2	15.1	18.8
Public-private Partnerships	13.8	9.9	11.4	6.1
General Government	109.8	114.8	134.7	142.4
Non-financial Public Enterprises	125.5	147.0	148.7	158.0
Annual Total - Public Sector	235.3	261.8	283.4	300.4
Cumulative Total – Public Sector	621.6	883.4	1166.8	1467.2
Annual % Increase in Estimated Total Public Sector Infrastructure Spending		11.3%	8.3%	6.0%

Source: 2010 Budget Review

It is evident from the tables above that national government departments are responsible for a relatively small proportion of total spending on infrastructure assets. However, they have tended to under-spend their capital budgets in recent years, and the gap between budgeted figures and actual ones - while still inconsequential in the overall context - has been getting bigger.

Collectively, infrastructure spending by provincial governments accounts for around 17% of total public sector expenditure. Spending on capital assets by provincial governments rose strongly between fiscal 2005/06 and 2009/10 and was characterised by a general trend towards modest over-spending of capital asset budgets. Compositionally, capital expenditure by provinces is dominated by spending on buildings and other fixed structures – which has tended to account for around 80% of the total in recent years. The balance is made up almost exclusively of spending on machinery and equipment.

Local government in South Africa consists of 295 metros, municipalities and district councils and is an important government interface for delivery. However, it is also a tier of government that is faced with significant capacity constraints. This is illustrated by the fact that in 2007/08 95 local authorities spent less than 40% of their capital budgets, 44 spent between 40% and 60% of their budgets, 9 spent between 60% and 80% of their budgets, and 61 spent between 80% and 100% of their capital budgets. In the same fiscal year 44 authorities spent between 100% and 150% of their capital budgets, 19

overspent on budget by between 150% and 200%, 9 spent between 200% and 300% of their capital budgets, and 7 over-spent by more than 300%. Although there has been some improvement in budgeting accuracy and/or spending efficiency at the aggregate level for this tier of government, the proportion of local authorities that under-spent on their capital budgets in 2007/08 (71%) is largely unchanged from the proportion that under-spent in 2003/04 (72%). This tends to confirm the view that, while there has been an improvement in spending by metros and larger municipalities, the smaller, more numerous, municipalities and district councils continue to find it difficult to spend their capital budgets. This is despite the clear need to do so from a delivery perspective.

State-owned enterprises are responsible for more than half of the infrastructure spending of the public sector – with Eskom expected to account for at least half of the capital spending by non-financial SOEs in coming years. Spending by these institutions increased by around 70% per annum between 2006/07 and 2009/10, but the rate of growth is projected to slow in the years thereafter – averaging close to 8% a year between 2009/10 and 2011/12. Total spending by non-financial public enterprises is expected to increase to R149 billion in fiscal 2011/12 – up from R26 billion in 2006/07.

Funding of public sector infrastructure spending

The funding for public sector spending on infrastructure can essentially come from one or more of the following sources:

- Taxation
- Grants and transfers
- Loans
- User charges
- Private sector contributions to public-private partnerships

Transfers from national government to provincial government may be classified as equitable shares (which are based on formulas developed by the Financial and Fiscal Commission), or conditional grants. The most significant conditional grant for funding provincial infrastructure spending is the Provincial Infrastructure Grant (PIG). Provinces may supplement transfers from national government through own revenue sources – although these tend to constitute a relatively small proportion of total provincial spending.

Both national and provincial governments can transfer funds directly to local governments, or make indirect transfers by paying particular service providers or households on behalf of a local authority. In the case of national government these transfers to local authorities may take the form of equitable shares or conditional grants (of which the Municipal Infrastructure Grant or MIG is the most significant). South Africa's six metros also receive a portion of the fuel levy.

Public entities are generally responsible for funding their own capital expenditure. However, national government does – in many cases – either act as guarantor of loans accessed by these entities, or (less frequently) extend loans to such entities directly. There was a dramatic increase in the value of loans guaranteed in fiscal 2009/10 – more than doubling from just over R62 billion in 2008/09 to R137

billion in 2009/10, and accounting for almost 79% of all new fixed capital formation by public corporations in the most recent fiscal year. In addition to the changes in loan guarantees, government has also extended loans directly to Eskom (valued at R33 billion in 2009/10 and R20 billion in the current 2010/11 fiscal year) to fund the building of power stations. Together with the increase in loan guarantees in 2009/10, this points to a massive increase in the direct, and contingent liabilities of national government towards public entities.

There are indications that the public sector as a whole has cut back on infrastructure spending plans in response to the Global Economic Crisis and its aftermath – with planned capital spending by general government expected to be between R13 billion and R16 billion lower over the next three years than originally indicated in the Medium Term Budget Policy Statement released in October 2009. However, these cuts have been partially offset by increased spending plans by extra-budgetary institutions. Non-financial enterprises are expected to cut capital spending in 2011/12, but to then increase expenditure in the following fiscal year – suggesting deferment rather than cancellation.

The slowdown in the level of economic activity in the wake of the Global Economic Crisis, and resulting decline in tax collections has necessitated a significant increase in public sector borrowing. In fiscal 2008/09 the combined public sector borrowing requirement amounted to 4% of GDP. However, this increased dramatically to almost 12% of GDP in 2009/10 and is expected to remain at relatively high levels over the medium term. As a consequence debt service costs are expected to increase from around 8.9% of national government revenue in fiscal 2008/09 to 12.9% in 2012/13. This is still substantially lower than corresponding debt servicing costs that existed in 1994 and that currently prevail in many other economies, but does point towards an element of crowding out as in the future government will have around 4% less of revenue collected to fund service delivery. The gross total debt of government is expected to increase quite rapidly from 27% in 2008/09 to more than 43% of estimated GDP in 2012/13.

Another potential concern is that the ratio of debt service costs to net loan debt suggests that National Treasury believes that average interest rates on state debt will decline from around 8.3% per annum in 2009/10 to 7.9% in fiscal 2012/13. This may not be consistent with the view that capital market rates are likely to be structurally higher in coming years.

Employment trends in the construction sectors

There is an underlying assumption that the increase in public sector spending on infrastructure will lead to an expansion in the number of people employed – both directly in the construction sector, and indirectly through its facilitation of private sector investment and supply expansion. While employment trends in civil construction are more likely to reflect underlying trends in spending on power stations, soccer stadia, airports and roads, a significant portion of the investment by general government is into buildings – so trends in this sub-sector must also be taken into account. Employment in the construction sector as a whole initially increased quite strongly – rising by more than 100 000 jobs between 2005 and 2007. However, the global economic slowdown contributed towards a subsequent decline in total employment.

Employment in the civil construction sector increased by about 31% between 2000 and 2007 - but lost some of these gains in subsequent years so that it was around 20% above its 2000 levels in 2009. Building construction employment increased by close to 24% between 2000 and 2006 before commencing its decline back to its 2000 levels in 2009.

The impact of public sector infrastructure spending on the broader economy

Multiplier effects – particularly as they relate to fixed capital formation multipliers - are often misinterpreted. In assessing the impact of a R1 million investment in fixed capital in a particular sector, it is important to note that the resulting impact on that sector, and on the economy more generally, can vary substantially. This variation will be influenced by factors such as whether the investment in question constitutes net new investment in the sector, or merely contributes to the maintenance of the existing capital stock in that sector. The extent to which existing production capacity in a sector is currently being utilised will also influence the socio-economic impact of any new investment.

Average multipliers for both construction sub-sectors (civil and building) were applied to the estimated general government spending on construction-related infrastructure in fiscal 2009/10 in order to try to determine the impact on the broader economy. Spending of R51.3 billion is estimated to have directly and indirectly given rise to, or supported, economy-wide sales of around R194 billion, added R64 billion to South Africa's GDP, generated labour remuneration of around R28 billion, required additional fixed capital formation of R15 billion, and supported the employment of around 485 000 people.

The impact of infrastructure spending on competitiveness

It is ultimately firms – not countries - that compete with one another for shares of particular markets – so market share of local and global markets for particular products provides the best indication of microeconomic competitiveness. However, country competitiveness is critical to company competitiveness because the quality of institutions and infrastructure and the stability and appropriateness of macroeconomic policy have a profound impact on the level of transactions costs facing firms, and hence on their ability to compete in global markets.

Country competitiveness is a relative term. The mere fact that a country has improved in many (or even all) the diverse aspects that are said to influence competitiveness does not automatically imply that that country will be more competitive. If the rate of improvement, and their collective impact, is less than that of other competing countries, the competitiveness of the country in question might actually deteriorate in relative terms. This is probably particularly true in South Africa's case, where the country has slipped in competitiveness rankings, despite a perceived improvement in many areas regarded as relevant to national competitiveness.

According to the World Economic Forum's Global Competitiveness Report, South Africa's overall competitiveness ranking has been reasonably static since 2006/07, after slipping in 2005/06. The infrastructure ranking has been more volatile, improving from 49th to 43rd between 2006/07 and 2007/08, before deteriorating back to 48th. This deterioration may have been influenced by the

electricity blackouts and load-shedding in early 2008. The infrastructure ranking has since improved to 45th.

South Africa's rankings in respect of the various sub-components of the overall infrastructure assessment indicate a relatively positive assessment of air transport, and available seat kilometres, a reasonable – but deteriorating - assessment of road quality, and poor rankings in respect of electricity supply quality and the number of telephone lines. Although the effects of the recent surge in infrastructure spending have yet to be reflected in a significant improvement in South Africa's overall competitiveness ranking, it is expected to improve as a consequence of past, and planned, spending. However, this presupposes that other aspects of competitiveness are not allowed to deteriorate in relative terms.

The real benefits of this infrastructure spending will only be felt by businesses generally once the various projects are completed. Perversely, disruptions during the construction and implementation phases of the various infrastructure projects may actually have served to undermine the competitiveness of private businesses (and the economy more generally) in the short-to-medium term. This reality points to the need for more effective, and strategic, planning in respect of the future provision of public sector infrastructure – so that Eskom-type disruptions can be avoided.

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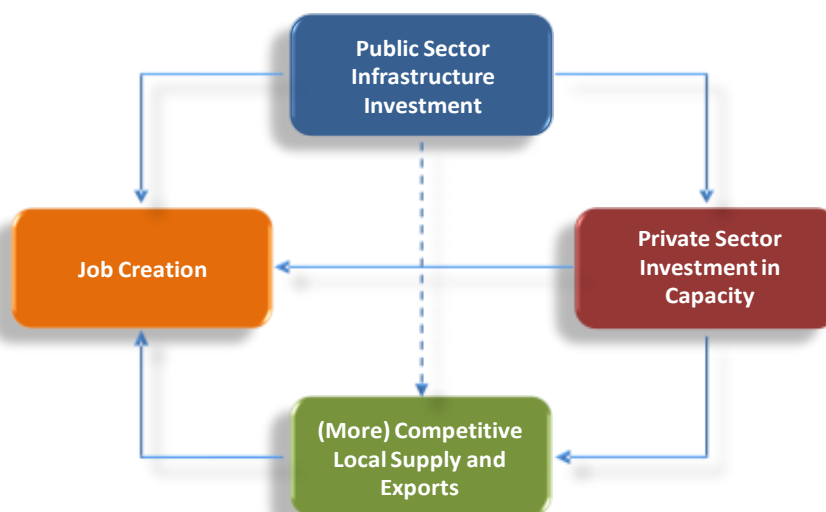
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1. Background

The term *infrastructure* has been used since 1927 to refer collectively to the roads, bridges, rail lines, and similar public works that are required for an industrial economy, or a portion of it, to function. This means that the quantity and quality of a country's infrastructure has a direct impact on its economy's ability to operate and to expand over time. Infrastructure is usually characterised by significant economies of scale in production that arise from high initial fixed costs and relatively low variable costs of operation. As a result, infrastructure projects tend to have the characteristics of natural monopolies¹, and are therefore either located in the public sector, or are heavily regulated.

In recent years the South African public sector's infrastructure spending programme has formed the centrepiece of government plans to support and facilitate economic growth and development, and to thereby help to achieve the targets set in the Accelerated Shared Growth Initiative for South Africa (ASGISA). In addition to contributing directly to economic growth, the public sector infrastructure programme is also supposed to support other ASGISA objectives by contributing to job creation, reducing poverty and assisting in developing competitive local industry. The underlying assumed causalities are as illustrated in Figure 1.

Figure 1: The relationships between infrastructure spending and other developmental objectives



The amount of money allocated for public infrastructure purposes has increased strongly since ASGISA was first conceived – rising from R372 billion for the three fiscal years following the 2006 Budget, to the R845 billion that was announced by finance minister Pravin Gordhan in the 2010 Budget and which is to be spent in fiscal 2010, 2011 and 2012.

¹ Defined in the Penguin Dictionary of Economics as “An industry in which technical factors preclude the efficient existence of more than one producer”. Natural monopolies are characterized by continually falling long-run average costs -making the entry of other producers impossible under normal market conditions.

Public sector spending on infrastructure assumed additional importance in the wake of the Global Economic Crisis as it offers an established mechanism - with “shovel-ready” projects - for fiscal stabilisation. It is, however, not clear what the longer-term implications of slower economic growth, reduced tax collections, accumulated higher levels of government debt, and higher borrowing costs will be on the levels of infrastructure spending going forward.

In an effort to contribute towards the attainment of the public sector infrastructure programme’s objectives, the Business Trust – with the Presidency as a strategic partner - established the Support Programme for Accelerated Infrastructure Development (SPAID). SPAID’s goal is “to provide focused support to mobilise an increased private sector contribution to meeting of the ASGISA infrastructure targets”, while its developmental objective is to ensure that underserved communities have access to infrastructure.

However, the sheer scale of the public infrastructure development programme, together with the fact that rolling annual budgets have continually been supplemented and adjusted, and that so many different parties are actually involved in the delivery of the associated projects, has meant that it has been difficult to track the spending. Questions such as: “What was the money allocated for?” “Was the money spent as budgeted?” “Where did the funding for the projects come from?” and “Will the spending actually contribute towards increases in the fixed capital stock and the attainment of other ASGISA objectives?” need to be answered.

In recognition of this, SPAID commissioned this study, which aims to establish an *Infrastructure Expenditure Tracker*.

2. Objectives of the Infrastructure Expenditure Tracker

The objectives of the *Infrastructure Expenditure Tracker* are to:

- i) Provide an overview of the historical composition of the public infrastructure programme, with a specific focus on spending by different levels of government (national, provincial and local) and state-owned enterprises (SOEs), and on the type of assets purchased. Future iterations of this analysis would track changes in the composition of public infrastructure spending over time.
- ii) Examine budgeted and actual expenditure on an annual basis, identifying geographical and - where possible - asset-type, over- and under- spending. This should assist in the identification of current and potential bottlenecks and capacity constraints at an early stage.
- iii) Review the funding sources for infrastructure spending at each level of government, and by SOEs, and comment on potential funding shortfalls.
- iv) Assess, and track, the impact of public infrastructure expenditure on employment levels in the South African economy.
- v) Assess, and track, the impact of infrastructure spending on the international competitiveness of South Africa as a business and investment destination.

3. Study method

The approach adopted in this study was to try to obtain comprehensive data on the level and composition of infrastructure spending in South Africa. Unpublished data was obtained from the South African Reserve Bank that enabled the estimation of the effects of fixed capital spending on the real value of the fixed capital stock, and the quantification of the consumption of fixed capital.

The study used this data to provide a broad description of longer-term trends in gross fixed capital formation and the fixed capital stock both by type of organisation and by type of asset.

Diverse documents and sources from National Treasury were difficult to reconcile because of the tendency for figures to continually be revised. While aggregate estimates are available from National Treasury, it is difficult to assess the composition of infrastructure spending at local government level, and by state-owned enterprises because of delays in the auditing and consistent publication of actual spending. Nevertheless, it is hoped that a reasonably comprehensive picture of the nature and constraints facing infrastructure spending have emerged.

Standardised industry data was obtained from Quantec. This was used to assess trends in employment in the construction sectors, in terms of both number and skills level.

Multipliers – also obtained from Quantec – were used to estimate the impact of public infrastructure spending on the wider economy in respect of indicators such as value added, remuneration and employment.

Finally, country competitiveness rankings by the World Economic Forum were used to try to assess the impact of infrastructure spending on South Africa's competitiveness.

4. Definition of infrastructure

Since the focus of this study is on infrastructure, it is worthwhile unpacking what the term means. What distinguishes an infrastructure asset from other capital assets? Are there different types of infrastructure? And if so, are some types more important to the economic and social development objectives of South Africa than others?

It needs to be acknowledged up-front that there is no universally accepted definition of the term *infrastructure*. The bulk of the suggested definitions commonly refer to more traditional physical assets such as roads, utilities, water and sewage systems needed by industrial economies. However, in the post-industrial “information age”, definitions have been broadened to include communications networks such as the internet, and – in some cases – to everything that supports the flow and processing of information. In recent years, the word has been applied with increasing generality to suggest the internal framework discernible in any technology system or business organization.

According to Wikipedia, the word is:

“a combination of the Latin prefix “infra”, meaning “below” and “structure”. The military sense of the word was probably first used in France, and imported into English around the time of the First World War. The military use of the term achieved currency in the United States after the formation of NATO in the 1940s, and was then adopted by urban planners in its modern civilian sense by 1970.”

As a consequence of some confusion over what exactly the term meant, the National Research Council in the United States adopted the term “public works infrastructure” – which refers to:

“...both specific functional modes - highways, streets, roads, and bridges; mass transit; airports and airways; water supply and water resources; wastewater management; solid-waste treatment and disposal; electric power generation and transmission; telecommunications; and hazardous waste management - and the combined system these modal elements comprise. A comprehension of infrastructure spans not only these public works facilities, but also the operating procedures, management practices, and development policies that interact together with societal demand and the physical world to facilitate the transport of people and goods, provision of water for drinking and a variety of other uses, safe disposal of society's waste products, provision of energy where it is needed, and transmission of information within and between communities.”

Infrastructure for the 21st Century, Washington, D.C.: National Academy Press, 1987.

In a report titled “Sustainable infrastructure: A policy framework” submitted to New Zealand’s Ministry of Economic Development in 2004, the consultants² noted that distinctions can be drawn between economic infrastructure (the physical assets that provide services used in production and final

² NZIER. Authors: Peter Clough, Ian Duncan, Doug Steel and Joanna Smith and John Yeabsley. Reviewed by Brent Layton

consumption), social infrastructure (assets that support a healthy workforce with adequate skills) and institutional infrastructure (such as the legal system, culture and capital markets). In the context of modern economic infrastructure, they note that “the capability to respond to changes, both predicted and the unexpected, is an important characteristic of infrastructure”. This requirement of adaptability – together with the associated risks of not being able to adapt quickly enough to developments in the light of the long lead-times for infrastructure projects - is a key feature of modern economic infrastructure.

Other characteristics commonly associated with economic infrastructure are:

- Significant economies of scale in production, with high initial fixed costs and low marginal costs of supply that commonly manifest themselves in infrastructure that is a natural monopoly. This typically implies that capacity can only be adjusted in large, “lumpy” (and expensive) increments, and that assets may be “stranded” or become technologically-redundant if conditions change. At the same time, the size and lumpiness of infrastructure increments, and regulatory hurdles often create long lead times for installing new capacity.
- Common carrier/common supplier characteristics, with the result that there are also economies of scale to be enjoyed in supplying diverse consumers jointly rather than in addressing diverse consumer needs separately. This implies that consumers often have little choice as to how they access or receive infrastructure services.
- Because of its natural monopoly characteristics and the absence of easy entry/exit needed for contestable markets, it is difficult for new entrants to compete with an incumbent supplier.
- These natural monopoly characteristics have historically resulted in a high level of government intervention in infrastructure provision - either through direct provision or, more recently, through the regulation of prices and supply arrangements. These characteristics also imply that there are seldom readily accessible substitutes for specific infrastructure – which increases the risks (and potential economic and social damage) associated with its failure.

The extent to which different facilities comply with the above characteristics provides insight into whether they should be regarded as infrastructure, or not. Those facilities that are consistent with all, or at least most, of the listed characteristics can be regarded as “classic infrastructure”, while those that do not should not be classified as infrastructure. On this basis, Clough et al (2004) argue that:

“... tracks and modal interchange facilities exhibit most of the characteristics of infrastructure; but rolling stock and vehicle fleets do not, even on a rail system with a monopoly operator. Navigation and traffic control assets for air and maritime transport are borderline cases: the equipment itself does not have the high lumpiness and sunk costs of classic infrastructure, but as they are integral to operation of port facilities they could be included in the coverage of infrastructure.”

They similarly contend that *“electricity generation and delivery are infrastructure services down to the local network, but retailing appears as almost a tolling operation with little infrastructure characteristic.”*

It is important to note that technological advances may result in the need to reassess whether particular assets or facilities should be regarded as infrastructure. One example of this is the impact that accurate global positioning system (GPS) technology has had on collective navigation aids such as

lighthouses. By contrast, air traffic control systems and pilotage into harbours are not so easily substitutable, and may therefore be regarded as infrastructure.

A table highlighting different facilities and their adherence to the characteristics listed above is included in Annexure A.

Different categories of “classical economic infrastructure” – defined using the characteristics discussed above - are shown in Table 1.

Table 1: Types of economic infrastructure

Transport	Energy	Telecommunications	Water
• Road networks, bridges, lighting, etc. • Rail networks, electric power, signals. • Sea ports and airports	• Generation • Transmission/ Distribution ○ national ○ regional ○ local • Storage • Transformers	• Networks/distribution ○ International (cables, satellites) ○ national ○ regional ○ local • Switches/exchanges • Telephone equipment	• Development infrastructure ○ hydro storage ○ irrigation ○ water supply storage ○ treatment ○ pipelines • Defensive infrastructure ○ flood protection ○ sewerage networks ○ wastewater treatment

Source: Clough et al (2004)

5. Factors influencing the demand for, and supply of, infrastructure

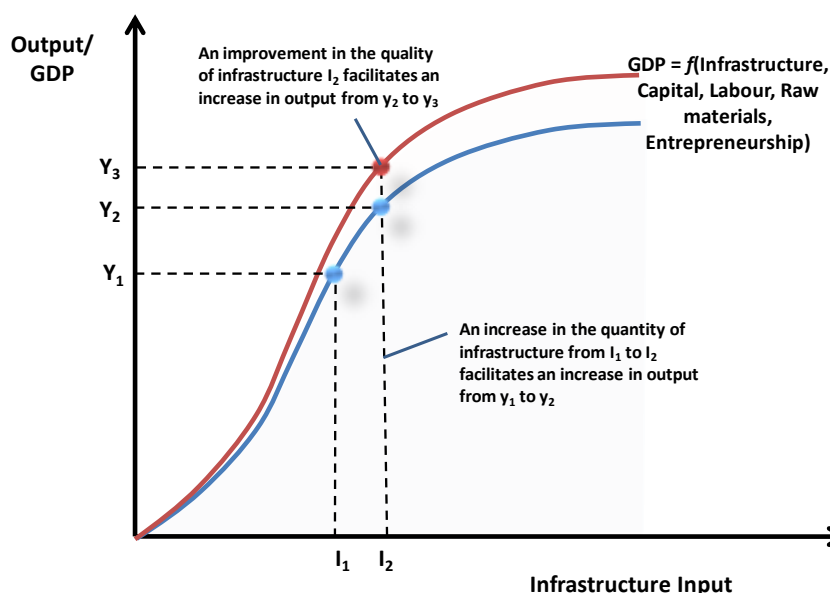
5.1 Demand for infrastructure

In one sense infrastructure is simply a factor input that is supplied to more than one industry. The demand for infrastructure is therefore derived from the demand for the output of the industries that the infrastructure serves. This implies that as the GDP of an economy increases, so too does its need for infrastructure. However, because of the characteristic “lumpiness” of infrastructure assets that was referred to in Section 4, and the fact that the pace of technological change is accelerating, the ratio of output change to infrastructure change is not constant.

Like other factor inputs, infrastructure also has substitutes and complements – although in the grand scheme of things the substitutes are likely to be weak (i.e. not able to replicate many of the characteristics of the product they are substituting) and few in number. As the example of affordable and accessible GPS systems attests, new substitute products can emerge over time as a result of technological progress. They can substantially reduce demand for the original infrastructure (lighthouses in this example).

The impact of changes in the quantity and/or quality of infrastructure on the output of the South African economy is schematically represented in Figure 2.

Figure 2: The impact of changes in the quantity and quality of infrastructure on output



The production function above indicates that an increase in the quantity of infrastructure inputs will facilitate higher levels of output. However, the ratio of increases in infrastructure to increases in output is not constant. At lower levels of output, small increases in the quantity of infrastructure inputs facilitate relatively large increases in output; but at higher levels of output the output gains from increases in infrastructure inputs become more and more muted. Highly developed economies that are operating close to notional/current limits of other factor inputs (such as labour and raw materials) may enjoy relatively little output gains from increases in the *quantity* of infrastructure inputs, and will therefore need to focus on improving the *quality* of the available infrastructure. This would effectively facilitate productivity gains for other factor inputs.

Clough et al (2004) identified a number of what they termed “mega-trends” that are likely to impact on the demand for infrastructure over time. The trends that are most relevant to South Africa are summarised in Table 2.

Table 2: Mega-trends impacting on the demand for infrastructure

Sector	Indicator	Relationships
Primary	National population (permanent, temporary)	
	Regional population (permanent, temporary)	
	Economic growth	

	Production structure	
	Number of occupied buildings	
Secondary	Labour force participation, especially the increase in female participation.	Secondary to economic growth
	A secular decline in the number of people per household.	Occupied buildings
	An increasing share of service sector value added in overall economic activity.	Structural change
Sector-specific	Increasing fuel efficiency of the transport fleet?	
	The move to wireless technology in telecommunications.	
	Household income elasticity of demand for transport (increase in car ownership rates).	
	Increasing international and domestic tourism	
	International trade growth, past and projections (consider Doha effects etc).	

Source: Clough et al (2004)

In addition, demand for infrastructure can also be influenced by a variety of “shocks”, that could include:

- Technological change
- Policy/political (such as dramatic shifts in policy)
- Natural disasters
- Outbreaks of disease (such as HIV/Aids, swine flu)
- War, terrorism, sabotage
- Technological risks (e.g. computer viruses, redundancy of key industries)
- Financial shocks (such as liquidity constraints in the wake of the Global Financial Crisis)
- Economic shocks (including the GEC and shocks to world energy markets)

5.2 Supply of infrastructure

Theoretically, infrastructure can be supplied publicly, or privately. However, the characteristics of these facilities mean that – in the case of private supply - some degree of market failure is possible, and indeed probable. So, even in those cases where provision is left to the market, investments are usually accompanied by significant regulation. Regulation impacts directly on aspects such as ownership structure, financing, pricing and demand growth, and thereby on the supply decisions of the market. Investment decisions are made more complex by considerations around the quality of the infrastructure supplied, as well as the timing and quantity.

Other factors that influence market supply decisions include:

- How regulations are designed, and the extent to which they impose additional explicit or implicit costs that impact on the returns to that investment;

- Who pays for the consumers' use of the infrastructure once it is supplied, and the kind of returns that such payments support.
- Where the funding for the infrastructure investment comes from.
- The timing and size of the investment.

6. Historical trends in public infrastructure spending in South Africa

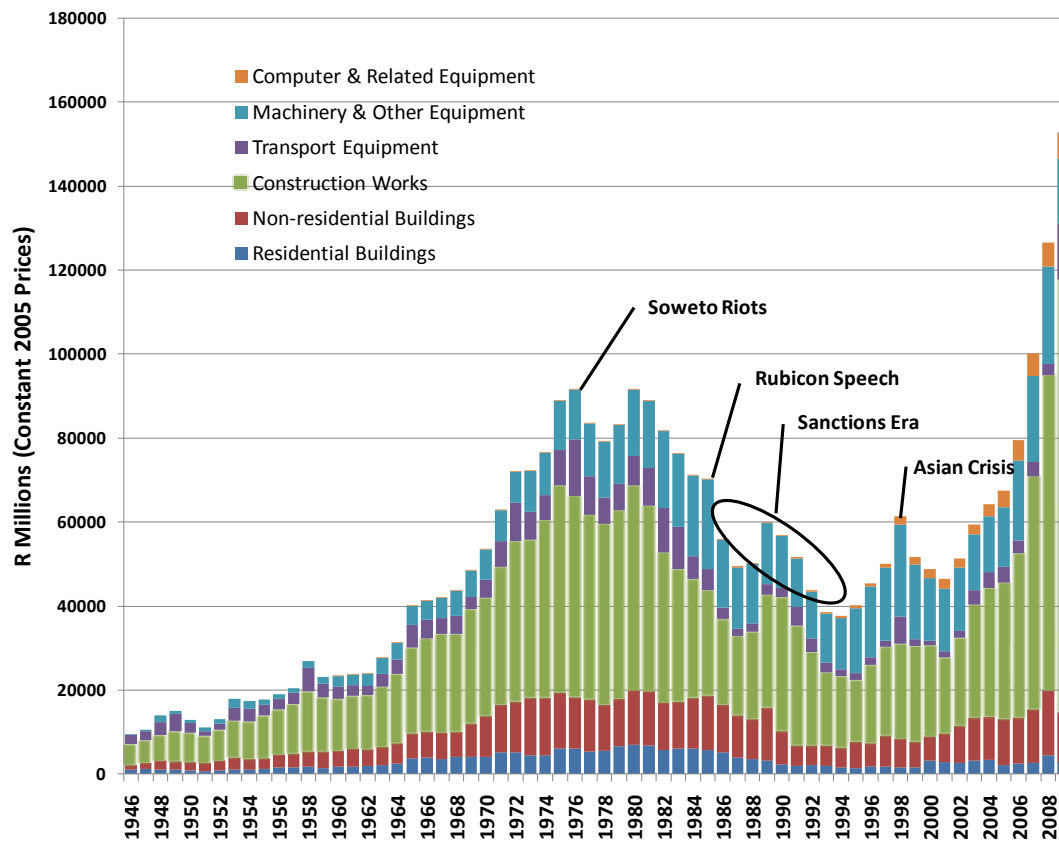
Public spending on infrastructure is not a new phenomenon. Although the alignment of government's infrastructure expenditure programme with ASGISA is predicated on higher levels of spending, this needs to be judged in the context of their historical levels – both at the incremental level of gross fixed capital formation, and in terms of the net effect of accumulated fixed capital formation in previous years and the consumption of fixed capital (the fixed capital stock).

6.1 Historical levels of public infrastructure spending, fixed capital stock, and consumption of fixed capital

As was noted in Section 4, not all fixed capital formation by the public sector can necessarily be regarded as infrastructure. However, available data is not sufficiently disaggregated to differentiate between infrastructure spending and other forms of fixed capital formation.

Figure 3 indicates the real levels of public sector (general government and public corporations) gross fixed capital formation - by type of asset - between 1946 and 2009. It is apparent that fixed investment increased relatively rapidly between 1963 and 1976, most notably in respect of construction works and non-residential buildings. This was followed by a sharp dip and short-lived recovery between 1976 and 1980, and then an extended – and quite dramatic – fall in real public sector fixed capital formation for the following seven years. A nascent recovery - driven by increased spending on non-residential buildings and construction works between 1987 and 1989 - could not be sustained, and the levels of spending then slid further till 1994. By this stage real public sector capital formation was at the same levels as seen in 1965.

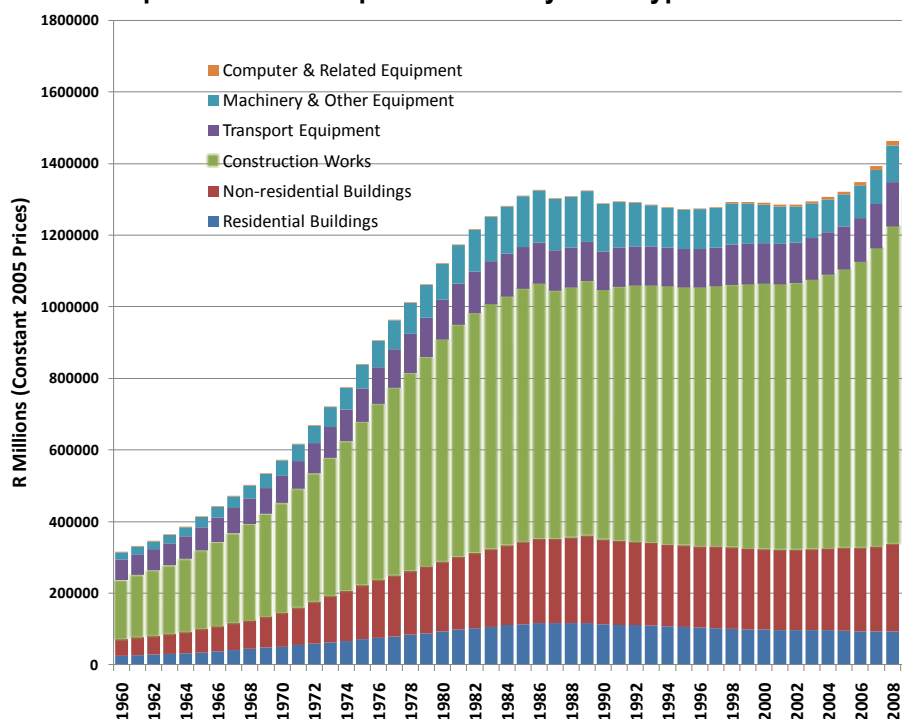
The recovery in spending gained momentum in the years following South Africa's first democratic elections until the brakes were firmly applied in response to fall-out from the 1998 Asian Crisis. Real spending then slid back till 2001, but in the years since then there has been almost exponential growth in public sector fixed capital formation – driven by dramatically higher construction works activity, and increases in investment in most other asset types.

Figure 3: Levels of real fixed capital formation by the public sector by asset type

Source of data: South African Reserve Bank

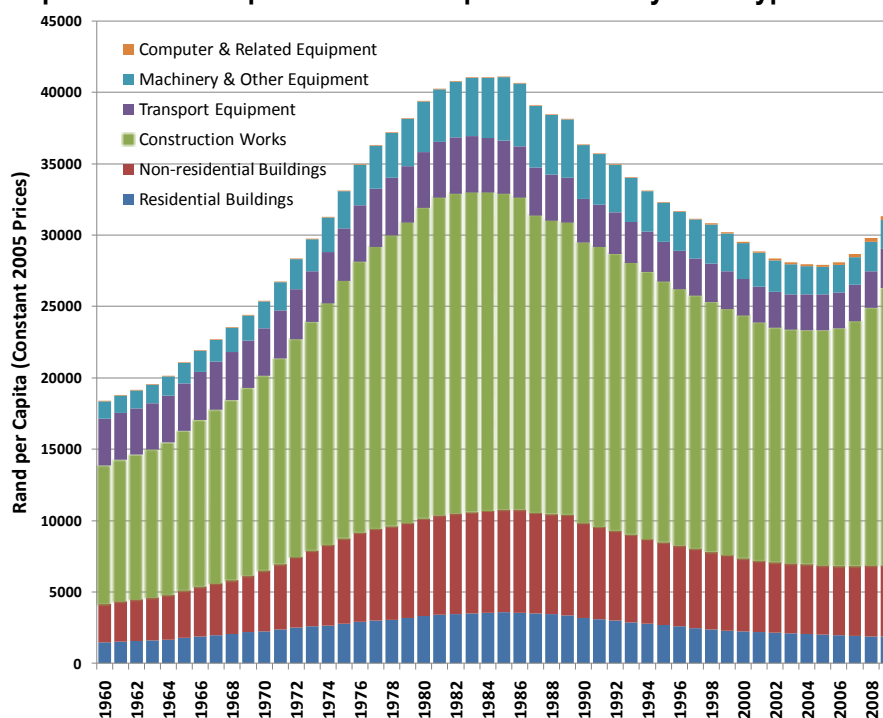
An economy's real fixed capital stock represents the replacement value of all previous gross fixed capital formation spending, less the value of all fixed capital consumed. It is also the quantity and quality of the fixed capital stock (and the infrastructure portion of it) that determines the maximum potential output of the economy – given the quantity and quality of other available factor inputs.

Figure 4 indicates the level of South Africa's public sector's real fixed capital stock by asset type between 1960 and 2009. It shows a progressive and accelerating increase in the public sector's capital stock between 1960 and 1981 and then further, smaller increases for the following four years. Between 1986 and 2002 there was a marginal decline in the real value of the public sector capital stock, but in the post-2002 period it has increased at a faster rate than at any other time for which figures are available. The replacement value of the public sector fixed capital stock in 2005 price terms stood at R1 556 billion in 2009 – compared with R1 286 billion in 2002. This represents a net addition to the real fixed capital stock of the public sector of R270 billion over the period.

Figure 4: Real fixed capital stock of the public sector by asset type

Source of basic data: South African Reserve Bank

However, when the stock values shown in Figure 4 are expressed on a per capita basis, a very different picture emerges. This is shown in Figure 5.

Figure 5: Per capita real fixed capital stock of the public sector by asset type

Source of basic data: South African Reserve Bank

The figure indicates a significant and steady increase in the amount of infrastructure available per person between 1960 and the early 1980s. In constant 2005 price terms, the value of the fixed capital stock per capita rose from R18 360 in 1960 to a peak of R41 055 in 1985. It should, however, be noted that apartheid-era racial inequalities are not reflected in these averages. Factors such as increasing urbanisation would also have influenced the growth in, and level of, public fixed capital stock per capita over this period.

The period of static and marginally-declining fixed capital stock between 1985 and 2002, translates into a pronounced fall once the size of the population is taken into account – with the per capita value of real public sector capital stock declining to R27 906. This is equivalent to a fall of almost one third from the 1985 high. Table 3 summarises these per capita values for selected years, and shows how the percentage composition of the per capita fixed capital stock has changed over time.

This analysis highlights some of the challenges that South African society is currently grappling with. For example, real public sector spending per capita on residential buildings in 2009 was 48% lower than in 1985, and its share of total per capita public fixed capital stock had declined from 8.7% to less than 6%. This reflects a change in the approach towards funding of residential housing stock – with a switch to subsidies and guarantees, rather than direct public provision.

The corresponding changes between 1985 and 2009 for other asset types were as follows:

Non-residential buildings:	-31%
Construction works:	-12%
Transport equipment:	-26%
Machinery & other equipment:	-54%
Computer & related equipment:	+22%

Table 3: Real public sector fixed capital stock per capita by asset type and composition

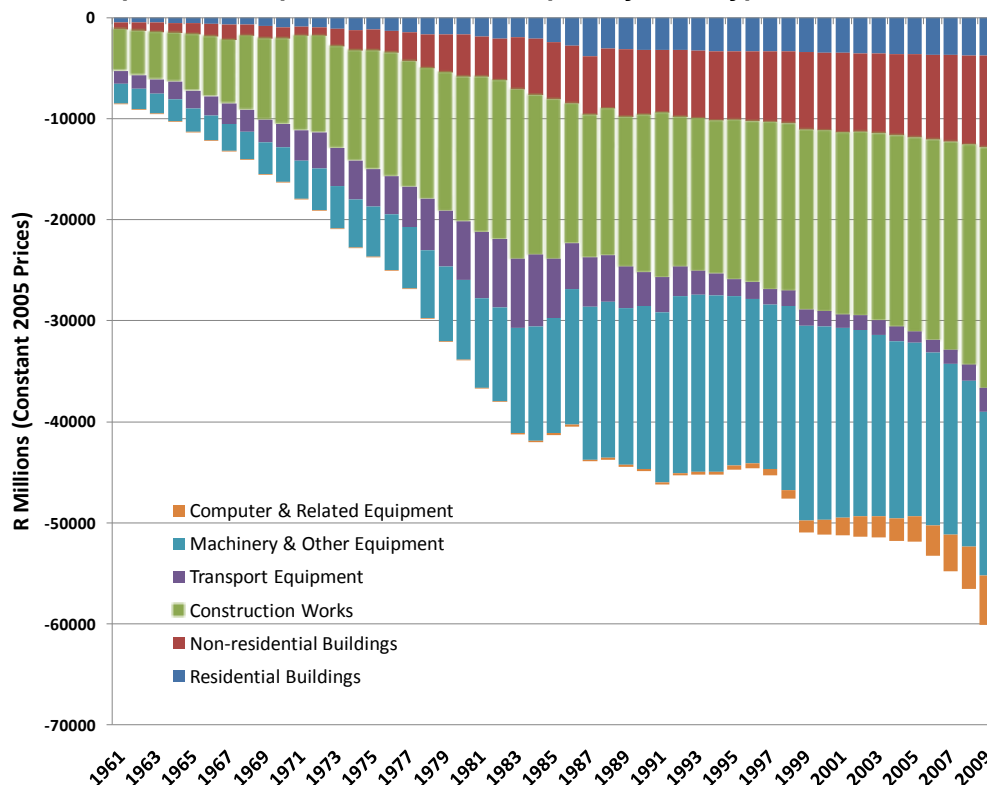
Type of Asset	1960		1985		2002		2009	
	Constant 2005 Rand per Capita	% of Total	Constant 2005 Rand per Capita	% of Total	Constant 2005 Rand per Capita	% of Total	Constant 2005 Rand per Capita	% of Total
Residential Buildings	R 1,469	8.0%	R 3,564	8.7%	R 2,130	7.5%	R 1,857	5.9%
Non-residential Buildings	R 2,702	14.7%	R 7,208	17.6%	R 4,942	17.4%	R 4,985	15.9%
Construction Works	R 9,670	52.7%	R 22,136	53.9%	R 16,430	57.9%	R 19,441	62.0%
Transport Equipment	R 3,316	18.1%	R 3,702	9.0%	R 2,501	8.8%	R 2,744	8.8%
Machinery & Other Equipment	R 1,203	6.6%	R 4,434	10.8%	R 2,241	7.9%	R 2,044	6.5%
Computer & Related Equipment	R 1	0.0%	R 12	0.0%	R 112	0.4%	R 272	0.9%
Total	R 18,360	100.0%	R 41,055	100.0%	R 28,357	100.0%	R 31,342	100.0%

Source of basic data: South African Reserve Bank

The distinguishing characteristic of capital goods – including infrastructure – is that they are consumed indirectly in the production of other goods and services. The fixed capital stock therefore gets used-up or consumed in the process of facilitating production by the rest of the economy. Unless this “depreciation” of the capital stock is fully offset by gross new fixed capital formation, the real quantity of the public sector capital stock will decline – as it did between 1985 and 1995.

The extent to which the capital stock was consumed or depreciated between 1961 and 2009 is shown in Figure 6. It indicates that simply to maintain the real fixed capital stock of the public sector at the same level as it was at the end of 2008 required fixed capital formation of just over R60 billion (in R2005 price terms) in 2009.

Figure 6: Consumption of real public sector fixed capital by asset type



Source of basic data: South African Reserve Bank

Table 4 indicates the real public sector consumption of fixed capital in 2009, the corresponding nominal values, the implicit depreciation rates, and the corresponding average life span of each asset type. The depreciation charge at current prices was almost R87 billion. The implicit annual depreciation rates range from 2.7% in the case of construction works, to 40.5% in the case of computer and related equipment. This translates into average life spans ranging from 2.5 years in the case of computers and related equipment to 36.8 years for construction works. The weighted average annual depreciation rate for public sector capital assets is 4.1%, with an implied average life span of assets of 24.3 years.

Table 4: Nominal and real consumption of public sector fixed capital, depreciation rates and life spans

Type of Asset	Real Value of Depreciation in 2009 (R millions)	Nominal Value of Depreciation in 2009 (R millions)	Implicit Annual Depreciation Rate (%)	Implied Average Lifespan of Assets (Years)
Residential Buildings	3,775	5,824	3.9%	25.6
Non-residential Buildings	9,035	13,502	3.6%	26.6
Construction Works	23,851	35,619	2.7%	36.8
Transport Equipment	2,336	2,721	14.6%	6.9
Machinery & Other Equipment	16,194	24,099	16.8%	6.0
Computer & Related Equipment	4,930	5,052	40.5%	2.5
Total - All Asset Types	60,121	86,817	4.1%	24.3

Source of basic data: South African Reserve Bank

6.2 Analysis of fixed capital formation, fixed capital stocks, and consumption of fixed capital by asset type and organisation

6.2.1 Residential buildings

Not surprisingly, residential building capital formation is dominated by the private sector. Although the share of this type of investment contributed by the public sector increased during the 1960s and 1970s, the contribution of general government - and public corporations in particular - declined between 1980 and 1994. Since then there has been a small rise in investment by general government, but almost no contribution by public corporations. Table 5 indicates the percentage contributions to total real residential building fixed capital formation by the different types of organisation for different years.

Table 5: Contribution to real residential fixed capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	16.6%	25.4%	8.8%	6.6%	9.7%
Public Corporations	1.8%	7.6%	0.3%	0.0%	0.0%
Private Businesses	81.6%	67.0%	90.9%	93.4%	90.3%

Source of basic data: South African Reserve Bank

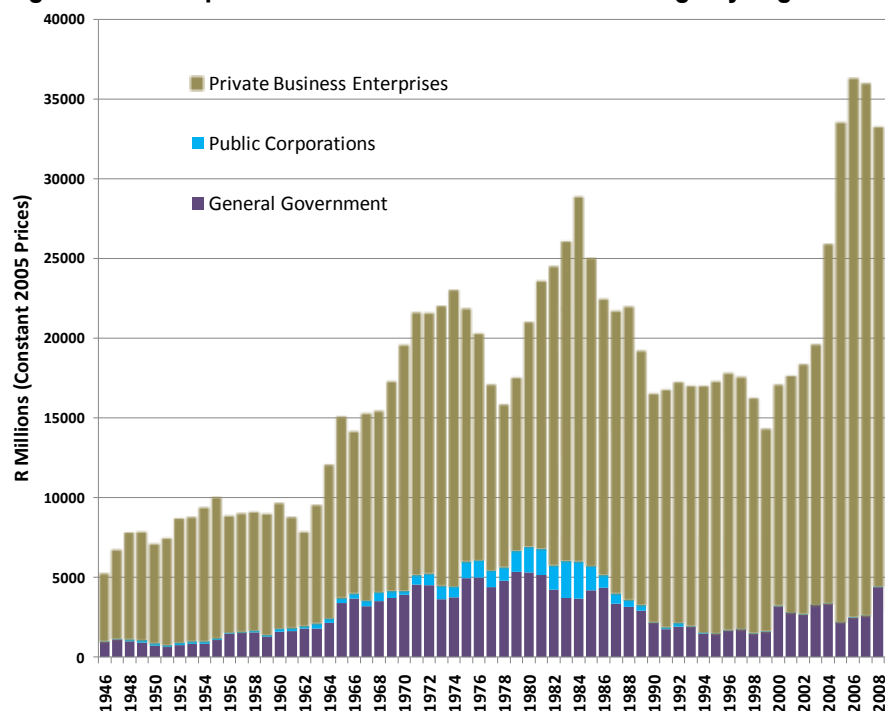
Intuitively, it is hard to reconcile the relatively low contribution of the public sector with the emphasis placed on human settlement by the present government and its predecessors, and the claims that millions of houses have been constructed since the first democratic elections in 1994. However, there have been significant shifts in the manner in which such interventions have occurred. Public corporations are more likely to pay employees a housing subsidy and leave them to choose their accommodation, or to expect employees to meet accommodation needs from their salary package. General government has shifted to a subsidy scheme for first time home buyers, which means that this

type of spending will not show up as capital formation by government. There are still government-funded investments in social housing for rental stock. The average annual growth in fixed capital spending by each type of organisation over the past five years (2004 to 2009) was:

General government:	-2.6% p.a.
Public corporations:	-10.2% p.a.
Private businesses:	+3.8% p.a.

Figure 7 indicates the relative levels and contributions to real residential building fixed capital formation.

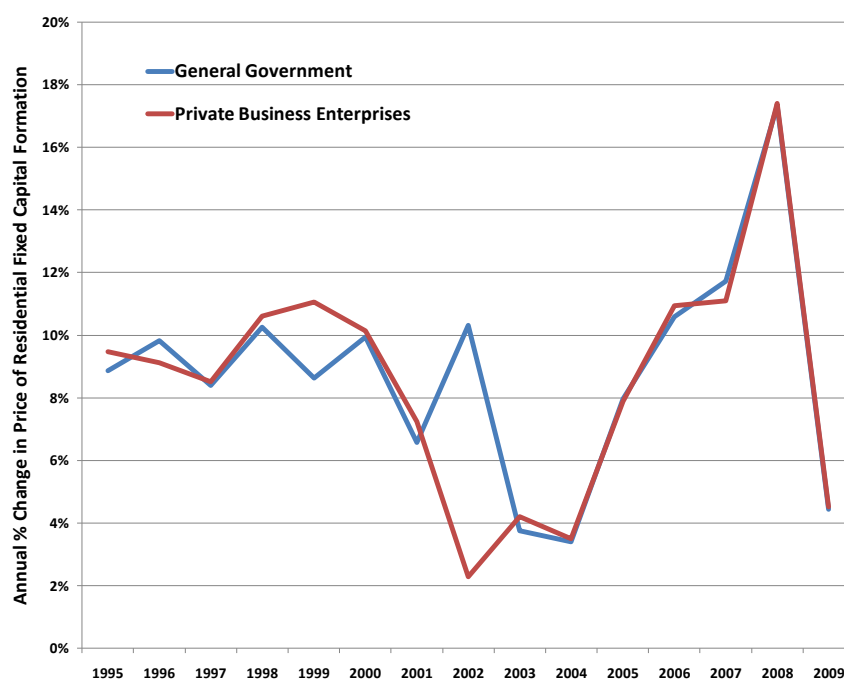
Figure 7: Real gross fixed capital formation into residential buildings by organisation



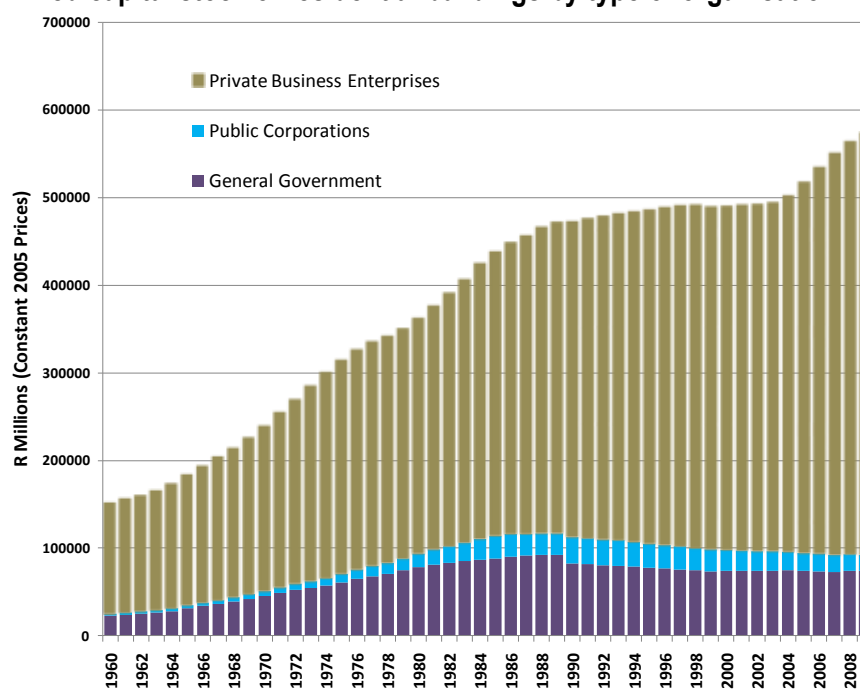
Source of basic data: South African Reserve Bank

Figure 8 indicates the annual increase in the cost of residential building capital formation. Although there were periods – such as in 2002 - when the rate of increase in prices for general government diverged from that of private businesses, there has been substantial alignment in price changes in recent years.

The cumulative impact of the capital formation referred to above and the consumption/depreciation of the housing stock is reflected in the real value of the residential building fixed capital stock. This is shown in Figure 9. It indicates a steady growth in the stock value between 1960 and 1987, followed by a period of much slower growth till 2002, and then a pronounced acceleration in the years since 2002. There is relatively little evidence of any significant negative impact of the Global Economic Crisis in 2008 or 2009. The stock value of general government has remained almost static since 1990, while that of public corporations has steadily declined.

Figure 8: Annual changes in the price of residential capital formation by organisation

Source of basic data: South African Reserve Bank

Figure 9: Real fixed capital stock of residential buildings by type of organisation

Source of basic data: South African Reserve Bank

The current and constant 2005 price values for the consumption of the residential building fixed capital stock in recent years is shown in Table 6. In 2009, the depreciation of the national housing stock was

estimated at almost R31 billion in current prices – of which more than R25 billion related to privately-owned residential buildings.

Table 6: Consumption of residential building fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	2,944	2,944	2,999	3,705	3,091	4,679
Public Corporations	694	694	687	1,099	684	1,075
Private Businesses	14,831	14,831	15,847	19,531	16,689	25,237
Total	18,469	18,469	19,533	24,081	20,464	30,949

Source of basic data: South African Reserve Bank

6.2.2 Non-residential buildings

There is a relatively greater contribution from the public sector to non-residential fixed capital formation than was the case for residential buildings – although the share of such investment by public corporations has tended to be quite volatile. For example, in 1980, investment in non-residential buildings by public corporations accounted for more than 20% of the total of this type of capital formation, but by 1994 it had dropped to less than 6%. This volatility would have been influenced by large, “lumpy” investments, as well as by factors such as privatisation. In recent years private business enterprises have tended to contribute more than two thirds of the value of this type of real fixed capital formation, while the contribution of general government investment has dropped to about 25%.

Table 7: Contribution to real non-residential fixed capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	36.2%	35.8%	18.6%	35.3%	25.1%
Public Corporations	7.3%	20.4%	5.8%	5.4%	6.7%
Private Businesses	56.5%	43.8%	75.6%	59.3%	68.1%

Source of basic data: South African Reserve Bank

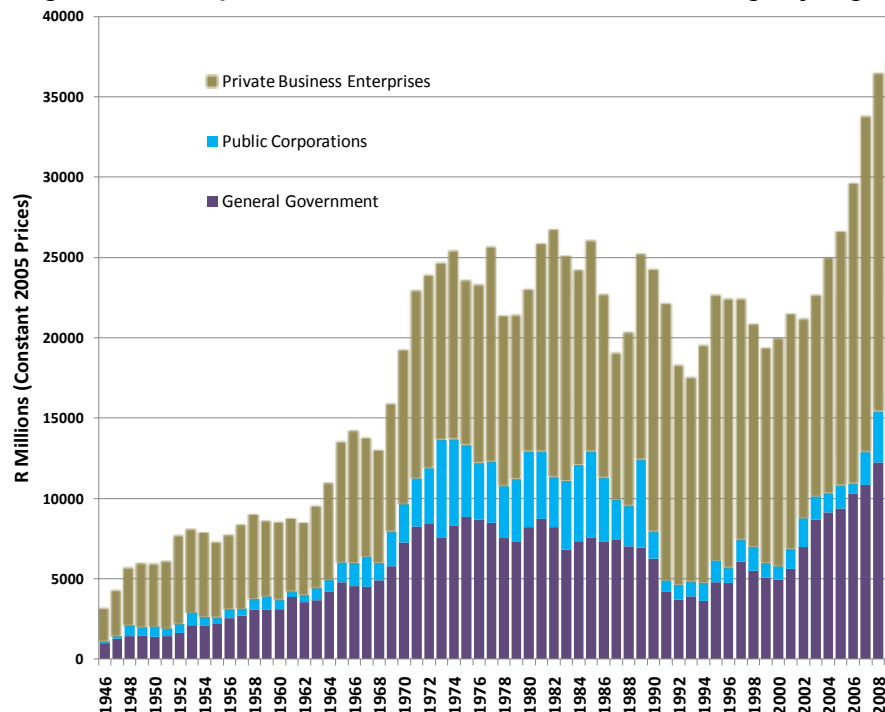
The average annual growth in fixed capital spending by each type of organisation over the past five years (2004 to 2009) was:

General government:	+0.4% p.a.
Public corporations:	+15.9% p.a.
Private businesses:	+11.6% p.a.

Figure 10 indicates the relative levels and contributions to real non-residential building fixed capital formation. There was strong growth in this type of capital formation since 1999 – driven by higher levels of both general government and private business spending. However, there was a fairly sharp drop in investment by general government during 2009.

This type of capital formation is sensitive to vacancy rates for commercial, industrial and retail space. Given the impact of the GEC on retail and industrial rentals, some slow-down in private sector investment could be expected in coming years.

Figure 10: Real gross fixed capital formation into non-residential buildings by organisation



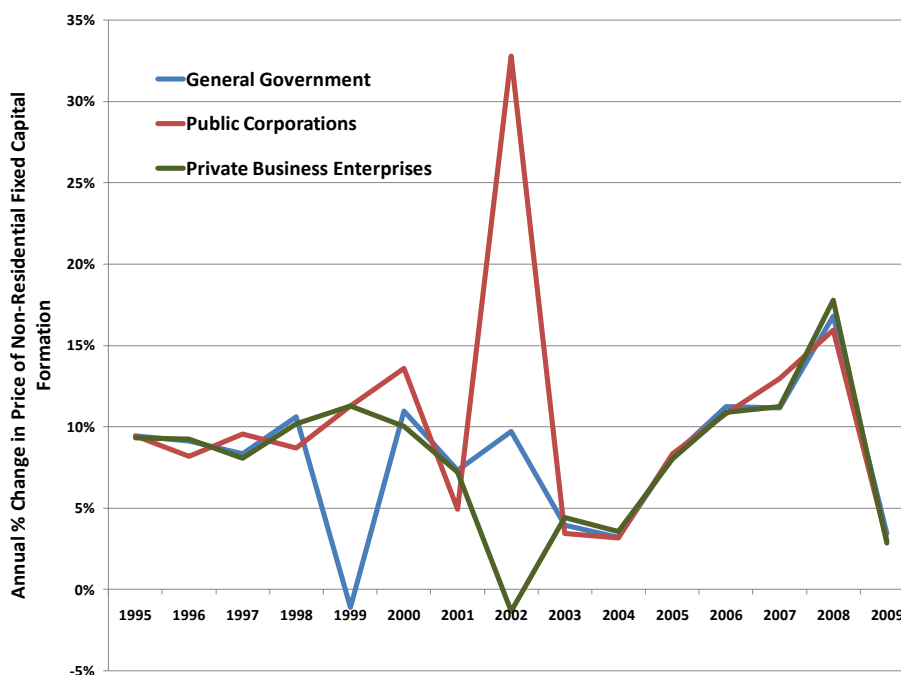
Source of basic data: South African Reserve Bank

Figure 11 indicates the annual increase in the price of non-residential building capital formation. A few anomalies are evident – most notably in 2002 which saw the price of this type of investment by public corporations soar by around 33%, while that of private businesses actually deflated by around 1%. 1999 saw the price of non-residential building decline by around 1% in the case of general government, but this trend was not matched by price changes for private businesses and public corporations. Since 2003, annual price changes in respect of non-residential building investment by all three types of organisations have been remarkably consistent. Although increasing inflationary pressures were evident between 2004 and 2008, these eased substantially in 2009 to around 3%.

The real stock of non-residential buildings in South Africa increased steadily between 1960 and 1989. There was a notable jump in the aggregate value in 1990 (due to increased private sector investment), followed by a period of relatively slower growth that lasted till 2004. In the years since then, the rate of increase in this type of fixed capital has started to accelerate. The replacement value of the stock of non-residential buildings in 2005 price terms was around R690 billion in 2009 – compared with about R596 billion in 1994.

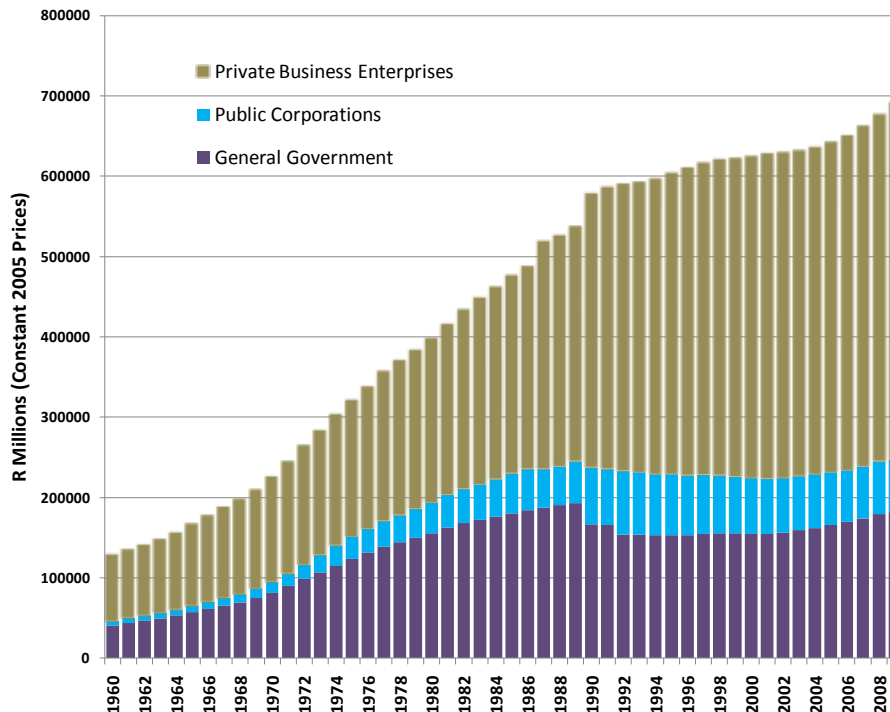
These trends are illustrated in Figure 12.

Figure 11: Annual changes in the price of non-residential building capital formation by organisation



Source of basic data: South African Reserve Bank

Figure 12: Real fixed capital stock of non-residential buildings by type of organisation



Source of basic data: South African Reserve Bank

The current and constant 2005 price values for the consumption of the non-residential building fixed capital stock in recent years is shown in Table 8. In 2009, the depreciation of the national non-residential building stock was estimated at almost R34 billion in current prices – of which close to R13.5 billion related to the public sector.

Table 8: Consumption of non-residential building fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	6,100	6,100	6,423	7,941	6,772	10,118
Public Corporations	2,106	2,106	2,131	2,667	2,263	3,383
Private Businesses	12,550	12,550	13,081	16,133	13,709	20,482
Total	20,756	20,756	21,635	26,729	22,744	33,983

Source of basic data: South African Reserve Bank

The implied depreciation rates range from 3.8% per annum in the case of general government non-residential buildings to 3.5% p.a. for public corporations and 3.2% for private businesses. These figures suggest average life spans for non-residential buildings of 26.5 years, 28.7 years and 31.5 years respectively for general government, public corporations and private businesses.

6.2.3 Construction works

Construction works includes civil construction of classical infrastructure items such as roads, bridges and ports, as well as building construction work in progress – which is classified into residential and non-residential buildings once completed. While the public sector tends to dominate this form of capital formation there is substantial variability in the relative contributions of general government and public corporations. In 1994 general government accounted for 60% of all real fixed capital formation of this asset type, and public corporations less than 8%. However, in 2009, general government only contributed around 32% while public corporations accounted for more than 56%. The relative contribution of private businesses to this form of capital formation dropped from close to a third in 1994 to only 12% in 2009.

Table 9: Contribution to real construction works fixed capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	67.2%	44.4%	60.1%	43.2%	31.7%
Public Corporations	3.5%	40.8%	7.7%	36.6%	56.3%
Private Businesses	29.3%	14.8%	32.2%	20.2%	12.0%

Source of basic data: South African Reserve Bank

The average annual growth in fixed capital spending by each type of organisation over the past five years (2004 to 2009) was:

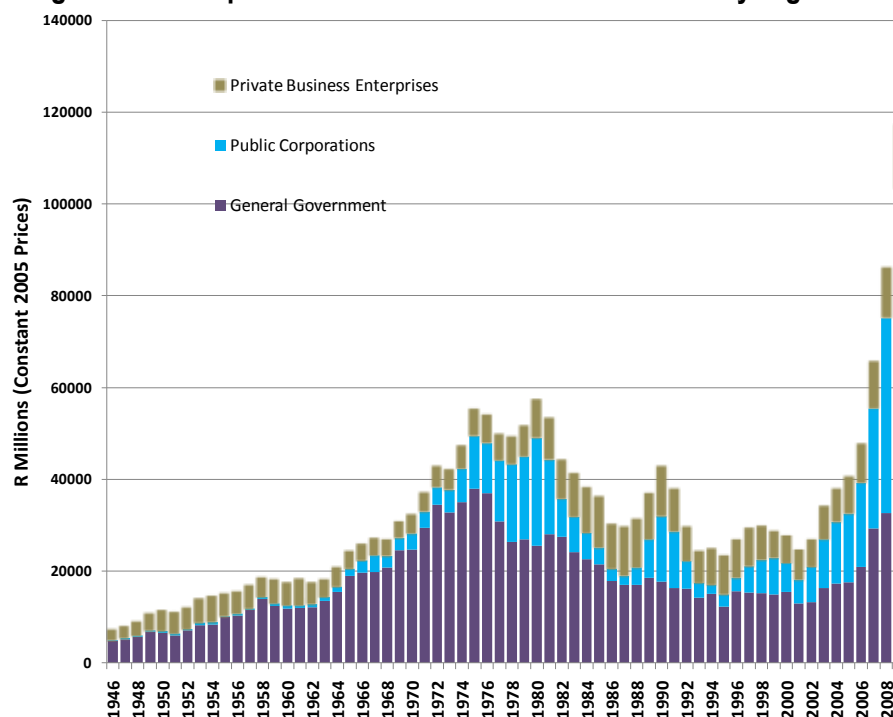
General government: +16.5% p.a.

Public corporations: +37.6% p.a.

Private businesses: +13.4% p.a.

The dramatic growth in construction works capital formation in recent years is reflected in Figure 13. It indicates the relative levels and contributions to real construction works fixed capital formation by different organisations. There was particularly strong growth in this type of capital formation since 2001 – most notably by public corporations, and to a lesser extent general government – as the average annual growth rates shown above attest. However, there was a fairly sharp drop in investment by general government during 2009. Even though capital formation by private businesses also showed healthy growth over this time, its relative share has declined.

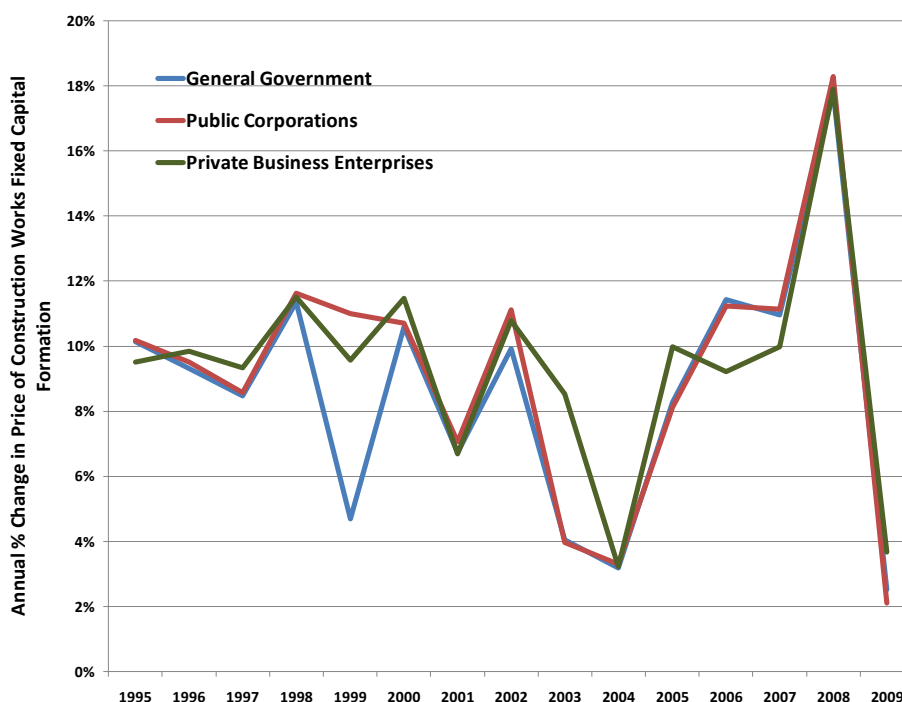
Figure 13: Real gross fixed capital formation into construction works by organisation



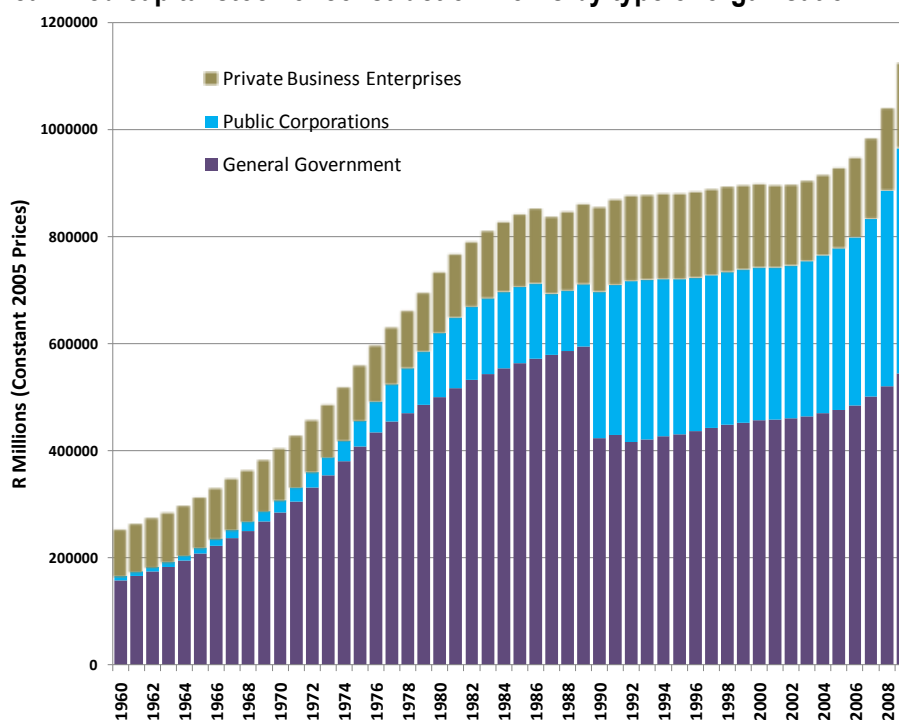
Source of basic data: South African Reserve Bank

Figure 14 indicates the annual increase in the price of construction works capital formation by each type of organisation. Generally price increases have been fairly consistent across all three organisation types, with the rate of increase rising quite rapidly between 2004 and 2008. However, the rate of increase in prices slowed substantially in 2009 – ranging from 2% to 3.5% from levels of around 18% in 2008.

The real stock of construction works in South Africa is shown in Figure 15. It increased steadily between 1960 and the early 1980s, but then the rate of growth started to slow. The total stock of real construction work edged upwards till 2002, after which the rate of growth accelerated strongly. There are clear indications of a reclassification of stock values amongst general government and public corporations in 1990. The replacement value of the stock of construction works in 2005 price terms was around R1.1 trillion in 2009 – compared with about R878 billion in 1994.

Figure 14: Annual changes in the price of construction works capital formation by organisation

Source of basic data: South African Reserve Bank

Figure 15: Real fixed capital stock of construction works by type of organisation

Source of basic data: South African Reserve Bank

The current and constant 2005 price values for the consumption of construction work fixed capital stock in recent years is shown in Table 10. In 2009, the depreciation of the national construction work stock

was estimated at almost R49 billion in current prices – of which close to R35.6 billion related to the public sector.

Table 10: Consumption of construction works fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	12,029	12,029	12,577	15,552	13,445	20,083
Public Corporations	7,201	7,201	8,046	9,946	10,406	15,537
Private Businesses	8,514	8,514	8,660	10,403	8,985	13,190
Total	27,744	27,744	29,283	36,042	32,836	48,935

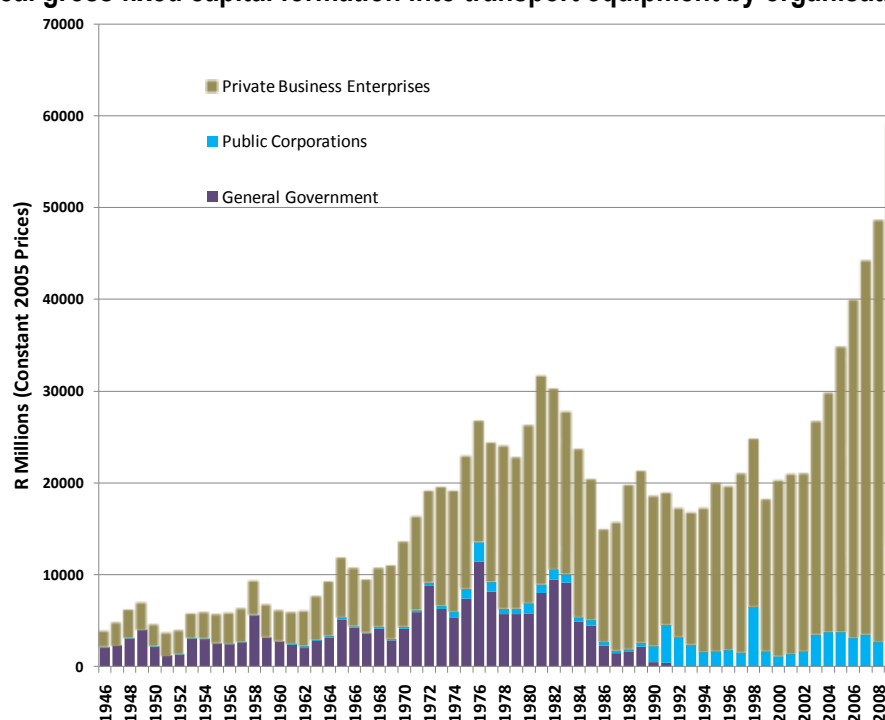
Source of basic data: South African Reserve Bank

The implied depreciation rates range from 2.6% per annum in the case of general government construction works to 2.9% p.a. for public corporations and 5.9% for private businesses. These figures suggest average life spans for construction works assets of 38.7 years, 35.1 years and only 16.9 years respectively for general government, public corporations and private businesses. The differences in depreciation rates and average asset life spans reflect underlying differences in the types of assets supplied by each type of organisation. Whereas civil works in the general government context are likely to relate to aspects such as roads, storm water drains, and sewerage systems, public corporations are more likely to be assets such as airports, sea ports, pipelines and railway lines.

6.2.4 Transport equipment

Figure 16 reflects the almost exponential growth in real transport equipment fixed capital formation since 2002. Although the aggregate level of real capital formation for this type of asset continued to grow rapidly in 2009, this was due almost exclusively to a dramatic rise in investment of public corporations – most notably Transnet. Private business investment in transport equipment declined in real terms in 2009 in response to the contraction in the economy as a result of the Global Economic Crisis.

It is evident from the figure that the re-classification of certain transport-related activities in 1989 saw the almost complete withdrawal of general government from this sphere of fixed capital formation. Since 1992 there has been no discernible fixed investment by general government into transport equipment. This is also shown in Table 11 – which indicates that in 2009, general government accounted for only 0.2% of all real transport equipment capital formation in South Africa. The contribution of public corporations was more than 100 times greater than that of general government, while the private business sector accounted for almost 78% of total expenditure.

Figure 16: Real gross fixed capital formation into transport equipment by organisation

Source of basic data: South African Reserve Bank

Table 11: Contribution to real transport equipment fixed capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	44.1%	22.1%	0.6%	0.2%	0.2%
Public Corporations	1.3%	4.2%	8.5%	10.6%	22.2%
Private Businesses	54.6%	73.7%	90.9%	89.2%	77.6%

Source of basic data: South African Reserve Bank

The average annual growth in fixed capital spending by each type of organisation over the past five years (2004 to 2009) was:

General government: +6.5% p.a.

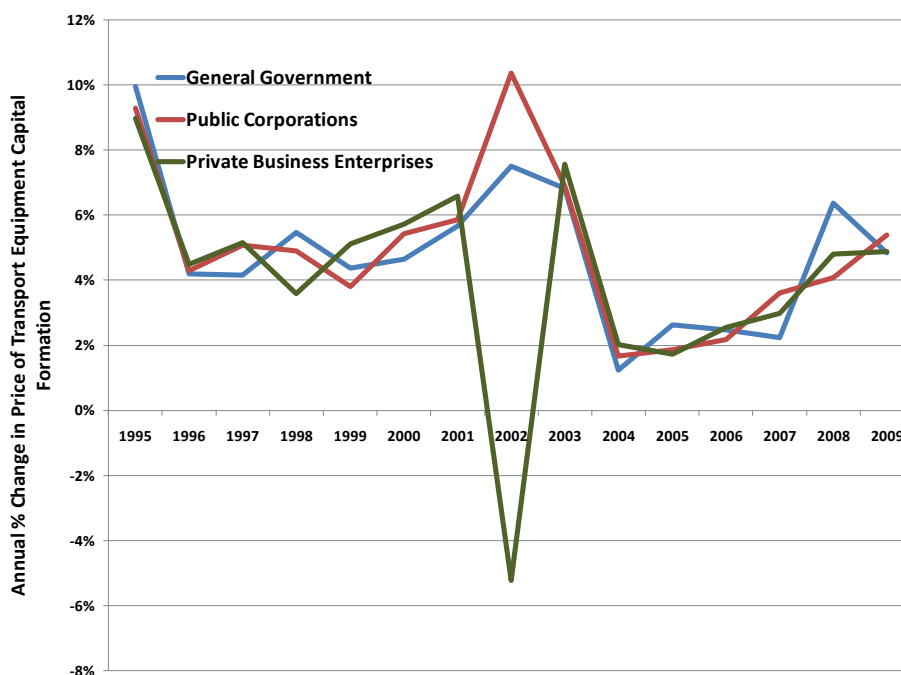
Public corporations: +29.0% p.a.

Private businesses: +12.0% p.a.

Figure 17 indicates the annual increase in the price of transport equipment by each type of organisation. Generally price increases have been fairly consistent across all three organisation types, with the notable exception of a dramatic divergence in 2002 – which saw price increases for public sector investment ranging from 7.5% to 10.5%, and that of private business capital formation

experiencing deflation of more than 5%. The explanation for this anomaly probably lies in the performance of exchange rates – which weakened dramatically in 2001 and the first half of 2002. Private sector investment may have been postponed in many cases until the rand started to appreciate, while public sector investment may have been weighted towards the earlier part of the year. Since 2003, the price increases for transport equipment have been very similar across the different types of organisations – converging on 5% in 2009.

Figure 17: Annual changes in the price of transport equipment capital formation by organisation

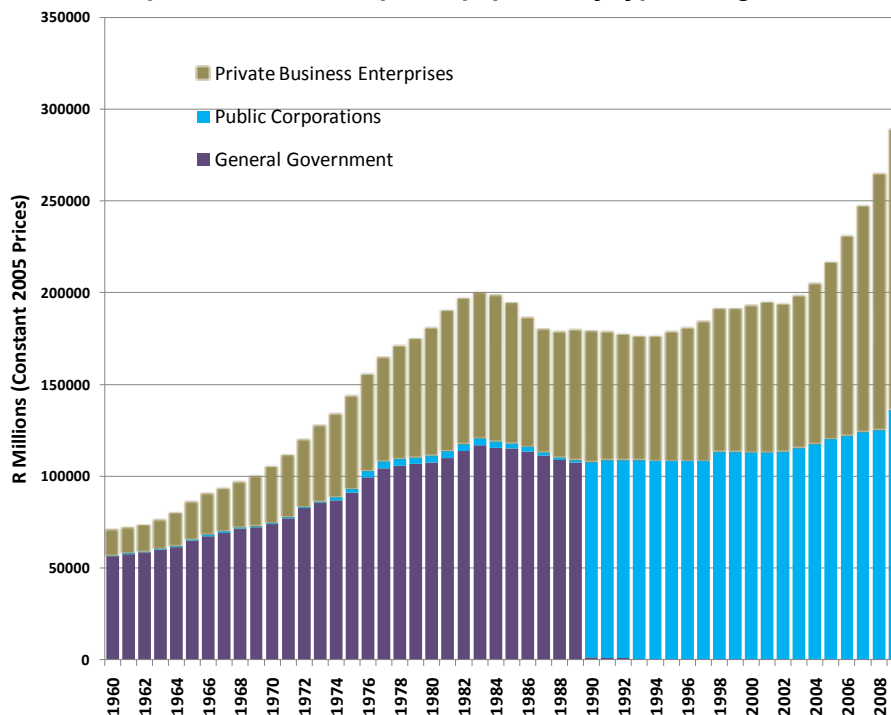


Source of basic data: South African Reserve Bank

The real stock of transport equipment in South Africa is shown in

Figure 18. It increased steadily between 1960 and 1983, but then fell until 1988 before moving sideways till 1995. This was followed by years of relatively low growth which started to accelerate in 2002. The reclassification of transport activities that were previously considered part of general government to public corporation activities in 1989 is clearly shown.

The replacement value of South Africa's stock of transport equipment in 2005 price terms was around R289 billion in 2009 – of which R136 billion was classified as public corporation stock, and R152 billion as private business stock. In 1994 the total stock of transport equipment valued at 2005 prices was R176 billion.

Figure 18: Real fixed capital stock of transport equipment by type of organisation

Source of basic data: South African Reserve Bank

The current and constant 2005 price values for the depreciation of transport equipment capital stock in recent years are shown in Table 12. In 2009, the depreciation of the national transport equipment stock was estimated at more than R40 billion in current prices – of which close to R38 billion related to private businesses and R2.6 billion to public corporations.

Table 12: Consumption of transport equipment fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	100	100	91	95	83	97
Public Corporations	1,003	1,003	1,301	1,377	2,253	2,616
Private Businesses	22,411	22,411	26,555	28,044	32,492	37,715
Total	23,514	23,514	27,947	29,518	34,828	40,429

Source of basic data: South African Reserve Bank

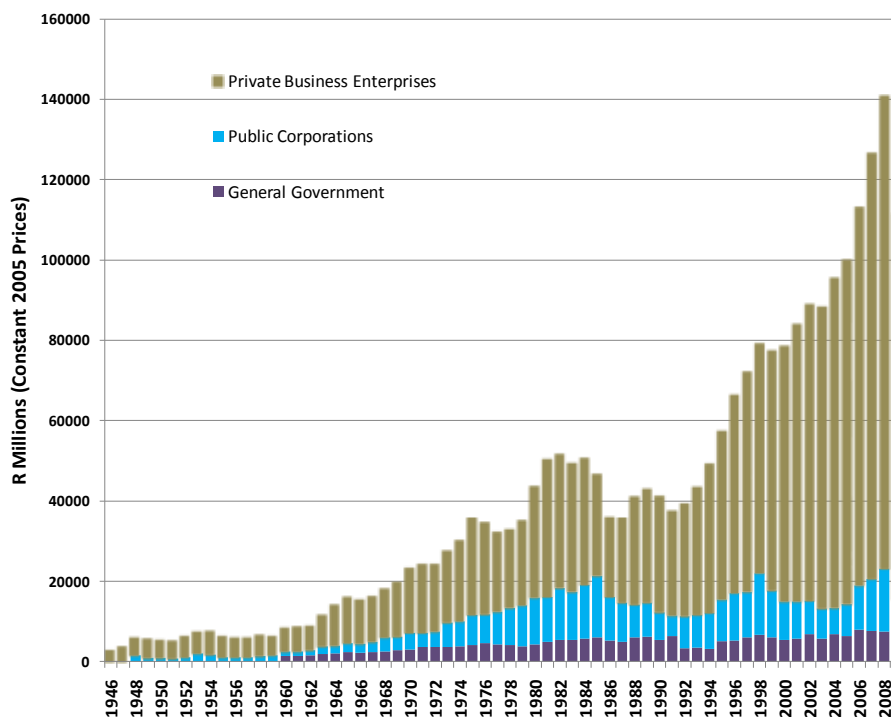
The implied depreciation rates range from 27.4% per annum in the case of general government to 1.8% a year for public corporations and 23.4% for private businesses. These figures suggest average life spans for transport equipment assets of 3.7 years, 55.5 years and 4.3 years respectively for general government, public corporations and private businesses. The differences in depreciation rates and

average asset life spans clearly reflect significant differences in the types of assets supplied by each type of organisation.

6.2.5 Machinery and other equipment

Private industry dominates levels of gross fixed capital formation in machinery and other equipment – accounting for more than 86% of this type of investment in 2009. In aggregate terms this type of investment increased steadily after 1991 – but dropped sharply in 2009 in response to the Global Economic Crisis. Public sector investment in this asset type increased strongly between 1960 and the mid-1980s, but public corporation investment tapered off after the 1985 Rubicon Speech and during the international sanctions that followed. It then increased between 1992 and 1998, but declined in response to the economic fallout from the Asian Crisis. The recovery in this type of public corporation capital formation resumed in 2005, but is estimated to have dropped sharply in 2009. Figure 19 reflects the trends in real machinery and other equipment capital formation since 1946.

Figure 19: Real gross fixed capital formation into machinery and other equipment by organisation



Source of basic data: South African Reserve Bank

Table 13 indicates the percentage composition of machinery and other equipment capital formation by type of organisation. In 1960, the public sector contributed 28.5% - with general government accounting for more than half of this contribution. In 1980, a significant increase in public corporation expenditure had pushed up the public sector to more than 36%, but in the years since then the public sector contribution has declined to less than 14% of the total.

Table 13: Contribution to real machinery and other equipment capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	16.4%	9.8%	6.4%	6.4%	5.4%
Public Corporations	12.1%	26.5%	18.2%	7.9%	8.5%
Private Businesses	71.4%	63.7%	75.4%	85.7%	86.1%

Source of basic data: South African Reserve Bank

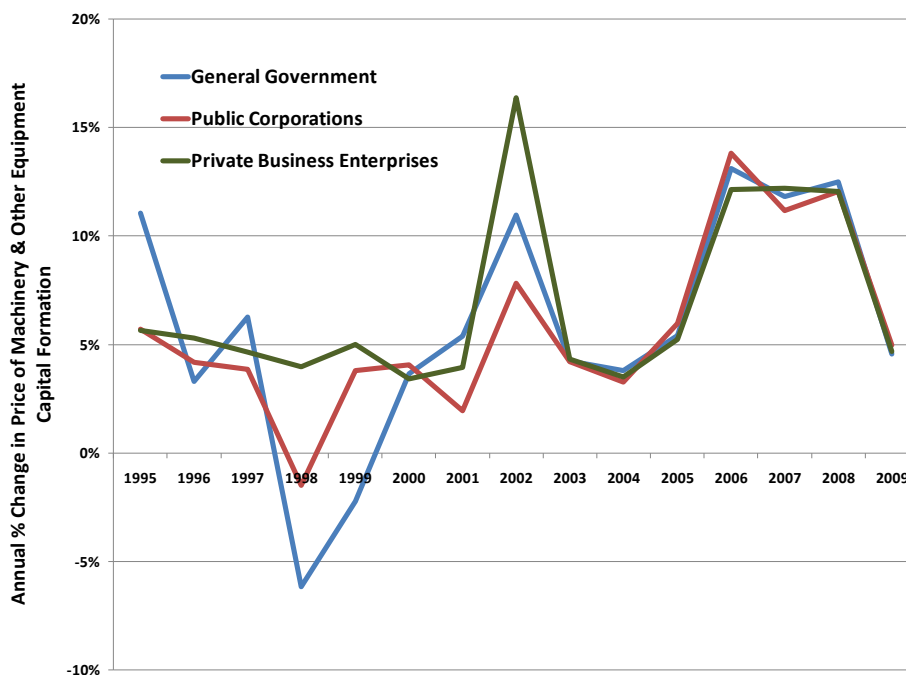
The average annual growth in fixed capital spending by each type of organisation over the past five years (2004 to 2009) was:

General government: -2.5% p.a.

Public corporations: +7.7% p.a.

Private businesses: +3.1% p.a.

Figure 20 indicates the annual increase in the price of machinery and other equipment by each type of organisation. Although there were significantly divergent inflation rates in 1998 and 2002 – coinciding with dramatic depreciation of the Rand on currency markets – the rates of price increases have been remarkably similar since 2003. The 2009 inflation rates for all three organisation types were around 5%.

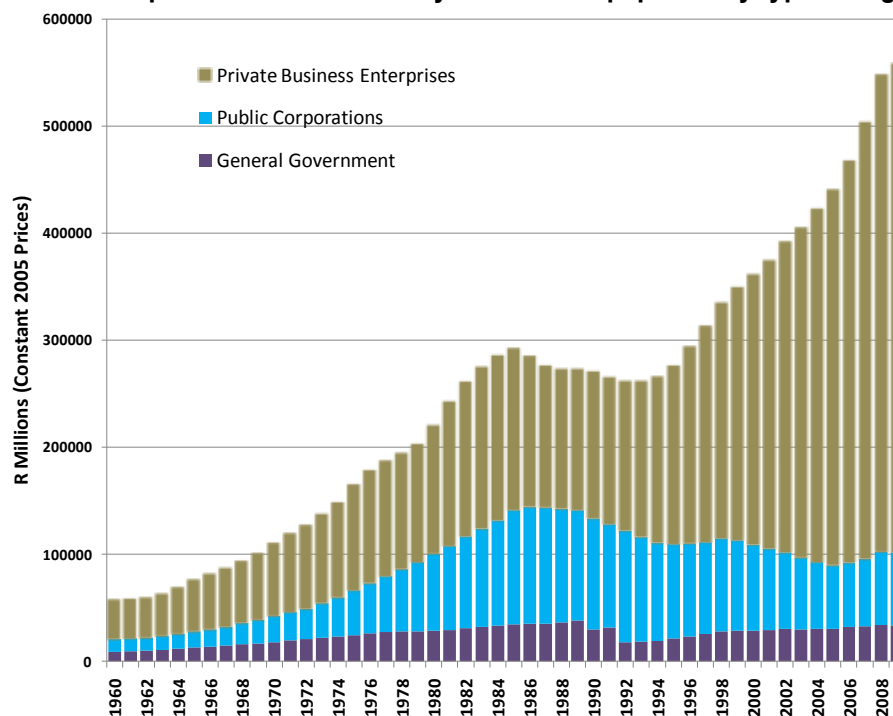
Figure 20: Annual changes in the price of machinery and other equipment capital formation by organisation

Source of basic data: South African Reserve Bank

South Africa's real stock of machinery and other equipment is shown in Figure 21. It increased steadily between 1960 and 1985, when there was an almost equal split between the shares of the public and private sectors. During the low, and sometimes negative, growth that extended from 1985 to 1993, the real fixed capital stock of machinery and other equipment declined – but it has grown strongly since then. The fall in gross fixed capital formation in 2009 was not sufficient to cause a decline in the stock of this type of asset, but the pace of increase – which had been accelerating in the period between 2004 and 2008 – slowed significantly.

South Africa's real stock of machinery and other equipment in 2005 price terms was around R558 billion in 2009 – of which more than R101 billion resided in the public sector. In 1994 the total real stock of machinery and other equipment was R226 billion.

Figure 21: Real fixed capital stock of machinery and other equipment by type of organisation



Source of basic data: South African Reserve Bank

Table 14 shows the current and constant 2005 price values for the depreciation of machinery and other equipment capital stock. In 2009, the depreciation of the national machinery and other equipment stock was estimated at almost R150 billion in current price terms – of which close to R126 billion related to private businesses, R14 billion to public corporations, and almost R10 billion to general government.

Table 14: Consumption of machinery and other equipment fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	6,341	6,341	6,568	8,308	6,624	9,855
Public Corporations	10,797	10,797	10,327	13,066	9,570	14,245
Private Businesses	64,853	64,853	73,943	93,046	85,092	125,590
Total	81,991	81,991	90,838	114,406	101,286	149,665

Source of basic data: South African Reserve Bank

The implied depreciation rates range from 19.5% per annum in the case of general government to 14.1% p.a. for public corporations and 19.1% for private businesses. These figures suggest average life spans for machinery and other equipment assets of 5.1 years, 7.1 years and 5.2 years respectively for general government, public corporations and private businesses.

6.2.6 Computer and related equipment

Computer and related equipment is a relatively newer addition to South Africa's fixed capital – with the first recorded values – at very low levels – in 1960. However, as Figure 22 reflects, there has been very rapid growth in this type of capital formation since its introduction – the low base notwithstanding. Computer equipment was initially used predominantly in the private business sector, and its relative shares have not changed that much since 1960 – although there has been some variation in the contributions of general government and public corporations. The public sector has seen the obvious potential for data and management systems – particularly since the advent of personal computers in the early to mid-1980s.

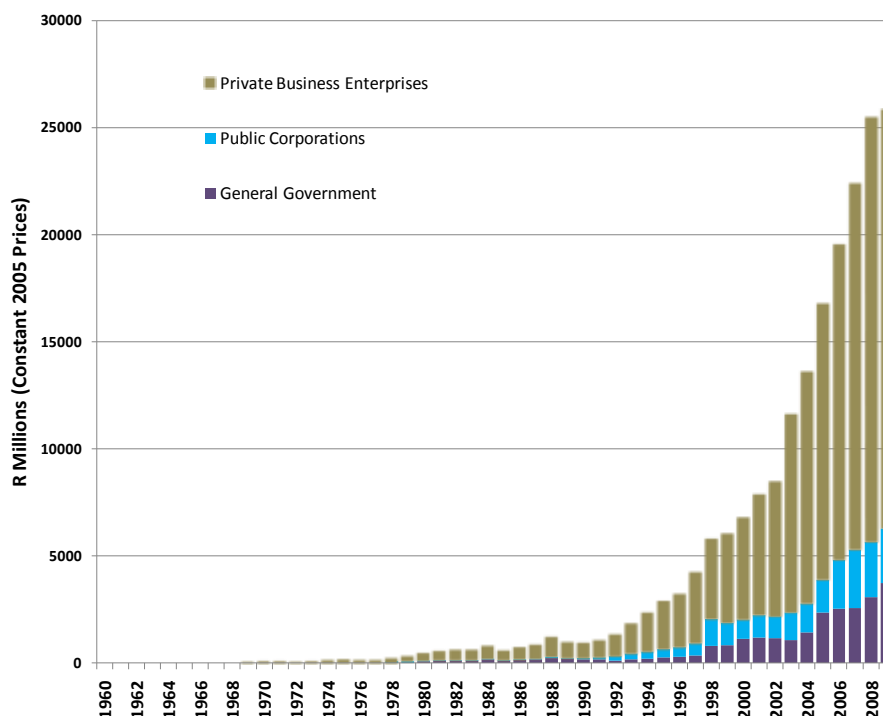
The relative contributions of each type of organisation in 1960, 1980, 1994, 2005 and 2009 are shown in Table 15.

Table 15: Contribution to real computer and related equipment capital formation by type of organisation

Type of Organisation	% Contribution in				
	1960	1980	1994	2005	2009
General Government	18.2%	18.5%	9.1%	14.1%	14.4%
Public Corporations	0.0%	4.1%	13.6%	9.1%	9.9%
Private Businesses	81.8%	77.4%	77.3%	76.8%	75.7%

Source of basic data: South African Reserve Bank

Figure 22: Real gross fixed capital formation into computer and related equipment by organisation



Source of basic data: South African Reserve Bank

The average annual growth in capital spending on computer and related equipment by each type of organisation over the past five years (2004 to 2009) was:

General government: +20.9% p.a.

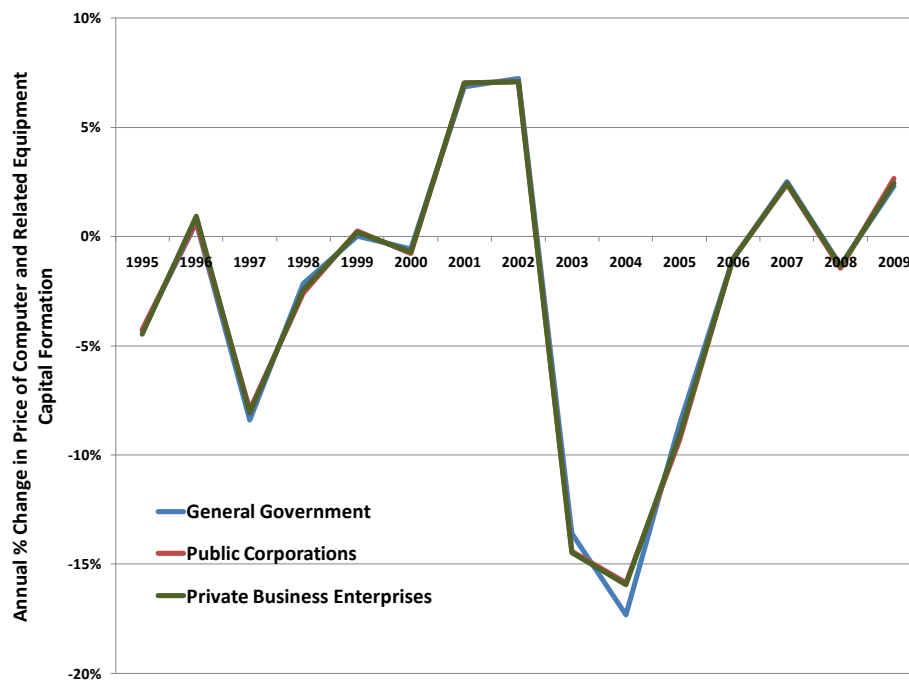
Public corporations: +13.9% p.a.

Private businesses: +12.5% p.a.

Figure 23 indicates the annual increase in the price of computer and related equipment for each type of organisation since 1995. It shows an almost complete alignment in price changes and a number of years when prices of this asset type actually fell. In fact there were only five years over this period in which price changes were positive.

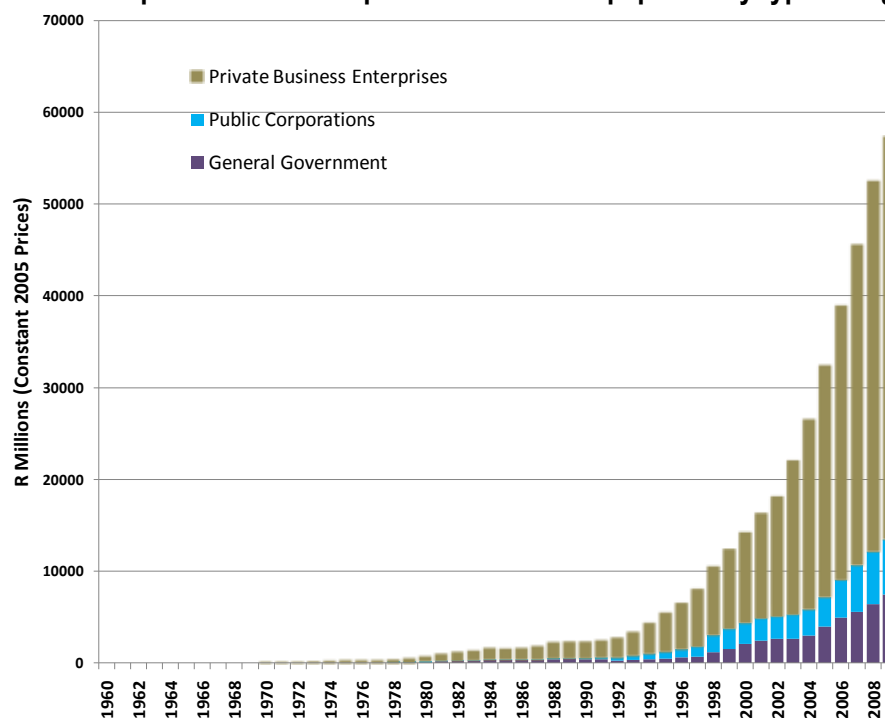
Price increases in 2009 were around 2.5% for all organisations – after a fall in prices of 1% in 2008.

Figure 23: Annual changes in the price of computer and related equipment capital formation by organisation



Source of basic data: South African Reserve Bank

Figure 24: Real fixed capital stock of computer and related equipment by type of organisation



Source of basic data: South African Reserve Bank

The real stock of computer and related equipment in South Africa is shown in Figure 24. It increased steadily over the full period since 1960, but the pace of growth accelerated after 1992. The rate of increase in public sector fixed capital increased at a slower rate than the private sector between 1997 and 2004, but has since accelerated. Over the past five years the rate of growth of new investment by general government and public corporations has been higher than that of private businesses – as the figures shown above indicate. This has contributed to the more rapid growth in the fixed capital stock.

The replacement value of South Africa's stock of computer and related equipment in 2005 price terms was in excess of R57 billion in 2009 – of which around R13.5 billion was located in the public sector. In 1994 the total stock of computer and related equipment in 2005 price terms was only R4.4 billion – less than one tenth of its levels 15 years later.

The current and constant 2005 price values for the depreciation of computer and related equipment capital stock in recent years are shown in Table 16. The figures highlight the rapid growth in the capital stock of this asset type – and hence the extent to which that stock is consumed – as well as the very low or negative price increases. The difference between constant and current price depreciation is negligible. In 2009, the depreciation of the national computer and related equipment stock was estimated at more than R21.5 billion in current prices – of which in excess of R16.5 billion related to private businesses and about R5 billion to the public sector.

Table 16: Consumption of computer and related equipment fixed capital by type of organisation

Type of Organisation	2005 (R millions)		2007 (R millions)		2009 (R millions)	
	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices	Constant 2005 Prices	Current Prices
General Government	1,349	1,349	1,911	1,939	2,680	2,744
Public Corporations	1,188	1,188	1,702	1,725	2,250	2,307
Private Businesses	8,359	8,359	12,130	12,292	16,126	16,513
Total	10,896	10,896	15,743	15,956	21,056	21,563

Source of basic data: South African Reserve Bank

The implied depreciation rates range from 41.8% per annum in the case of general government to 39.3% p.a. for public corporations and 39.9% for private businesses. These figures suggest average life spans for computer equipment assets of around 2.5 years for all organisations.

7. Actual and budgeted spending on infrastructure by the public sector

The analysis in Section 6 made use of unpublished figures by the South African Reserve Bank which are used in the construction of the national accounts. However, while these figures provide a useful historical background to this analysis, and enable a focus on aspects such as the consumption of fixed capital (depreciation) that would not be possible with figures from other sources, they do not provide insights into spending amongst the different tiers of government, or the geographical distribution of such spending. They also do not provide an indication of the efficiency of either the budgeting or spending processes of the public sector.

To undertake such an analysis it is necessary to examine the budgets and accounts of national, provincial and local government, and state-owned enterprises.

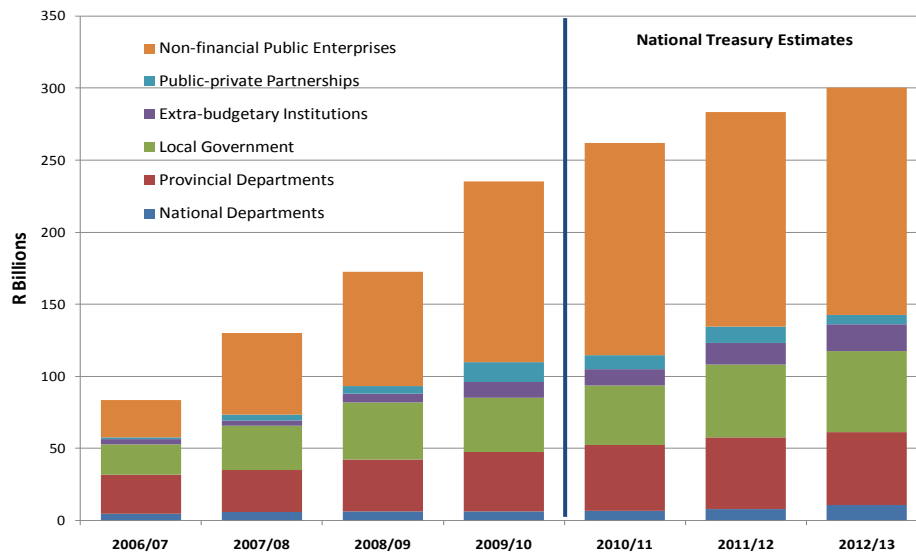
7.1 Total public sector

The historical and estimated infrastructure spending of the various elements of the “public sector” are shown in Figure 25. It indicates a quite dramatic rise in expenditure between fiscal 2006/07 and 2009/10, but projects slower growth in the coming three fiscal years. In aggregate terms, public sector spending on infrastructure rose from almost R84 billion in fiscal 2006/07 to R235 billion in 2009/10 – an average annual increase in nominal terms of 41%. This growth was driven by average annual growth in infrastructure spending by non-financial public enterprises of close to 70% per year. The value of public-private partnerships also grew rapidly over the period – growing by an average 117% per year.

The projected outlook for fiscal 2010/11 to 2012/13 is less stellar – with estimated average growth of only 8.5% a year. Depending on the rate of price increases in capital assets, this could translate into low (or even negative) real growth rates. Spending growth will be driven by extra-budgetary institutions (20% p.a.), national departments (19% p.a.) and local government (14% p.a.), but the value of public-private partnerships is expected to contract by an average of almost 24% a year over the period.

Figure 26 shows the expected compositional changes in the source of infrastructure spending between 2009/10 and 2012/13. It indicates an increase in the expected share of local government from 16% to 19%, a marginal rise in the contribution of extra-budgetary institutions from 5% to 6%, and a decline in the contribution of public-private partnerships from 6% to 2%. The shares of other institutions - non-financial public enterprises (53%), national government departments (3%), and provincial government departments (17%) - are expected to remain the same.

It should be noted that these figures include spending on the maintenance of existing infrastructure, and may therefore differ from the estimates of expenditure on capital assets that are discussed in subsequent sections.

Figure 25: Actual and estimated infrastructure spending by different elements of the public sector

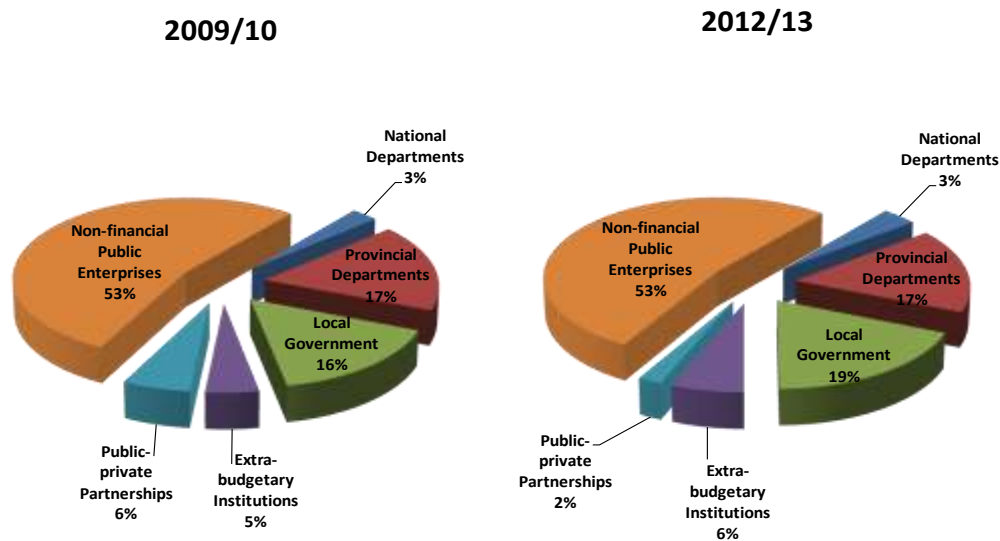
Source: 2010 Budget Review

Table 17 reflects the data used in Figure 25, together with the annual percentage increase in total public sector infrastructure spending, and the cumulative value of spending since the adoption of the ASGISA programme. If National Treasury's estimates are accurate, the total value of public sector infrastructure spend between 2006/07 and 2012/13 will approach R1.5 trillion.

Table 17: Actual and projected infrastructure spending by the public sector

Description	Actual Spending				National Treasury Estimates		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
	R Billions	R Billions	R Billions	R Billions	R Billions	R Billions	R Billions
National Departments	4.6	5.7	6.3	6.4	6.8	7.8	10.7
Provincial Departments	27.1	29.4	36.1	41.2	45.6	50.0	50.8
Local Government	21.1	30.7	39.6	37.5	41.3	50.4	56.0
Consolidated government	52.8	65.8	82.0	85.0	93.8	108.2	117.5
Extra-budgetary Institutions	3.7	3.7	6.2	10.9	11.2	15.1	18.8
Public-private Partnerships	1.3	3.9	4.9	13.8	9.9	11.4	6.1
General Government	57.9	73.4	93.1	109.7	114.9	134.7	142.4
Non-financial Public Enterprises	25.7	56.8	79.4	125.5	147.0	148.7	158.0
Annual Total - Public Sector	83.6	130.2	172.5	235.2	261.9	283.3	300.4
Cumulative Total – Public Sector	83.6	213.8	386.3	621.5	883.4	1,166.7	1,467.1
Annual % Increase - Total		56%	33%	36%	11%	8%	6%

Source: 2010 Budget Review

Figure 26: Comparative composition of public sector infrastructure spending by source

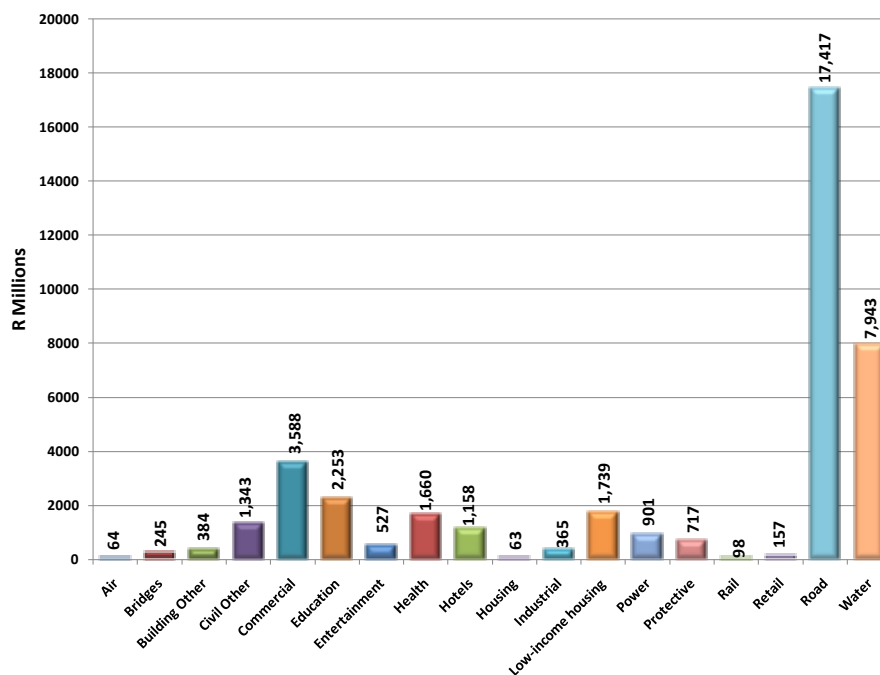
Source: 2010 Budget Review

The preceding figures and analysis used figures quoted in the 2010 Budget. However, it is also useful to view public sector spending on infrastructure from the perspective of the private construction sector. This not only provides an indication of the extent to which private businesses benefit directly from the public sector's need to provide infrastructure, it also provides useful information about the type of construction activity being undertaken nationally, and in the different provinces. The analysis used in this study relies on data obtained from Industry Insight – a private data provider that supplies macro statistical and analytical data to the South African construction industry.

In 2009, Industry Insight's project database recorded the value of total public sector construction projects awarded as being worth R40.6 billion.

Figure 27 indicates the nature and value of these projects. Spending on roads is by far the largest component – accounting for R17.4 billion of the total. It is followed by water (R7.9 billion), commercial (R3.6 billion) and education (R2.3 billion).

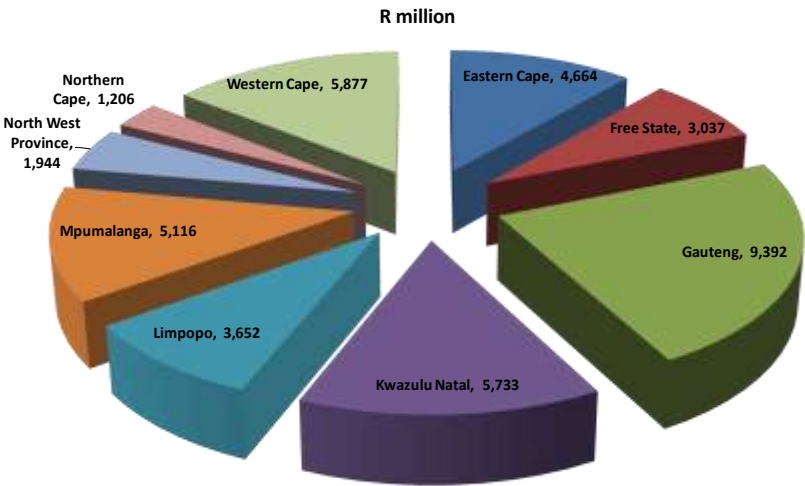
Figure 27: Level and nature of public sector infrastructure spending in 2009 based on reports from private sector construction contractors



Source: Industry Insight

Figure 28 indicates the total value of construction projects awarded in 2009 in each province. Public sector construction projects worth R9.4 billion were awarded in Gauteng. This was followed by the Western Cape with R5.9 billion, Kwazulu Natal (R5.7 billion) and Mpumalanga (R5.1 billion). The Northern Cape had the lowest level of aggregate construction activity, with projects worth R1.2 billion being awarded.

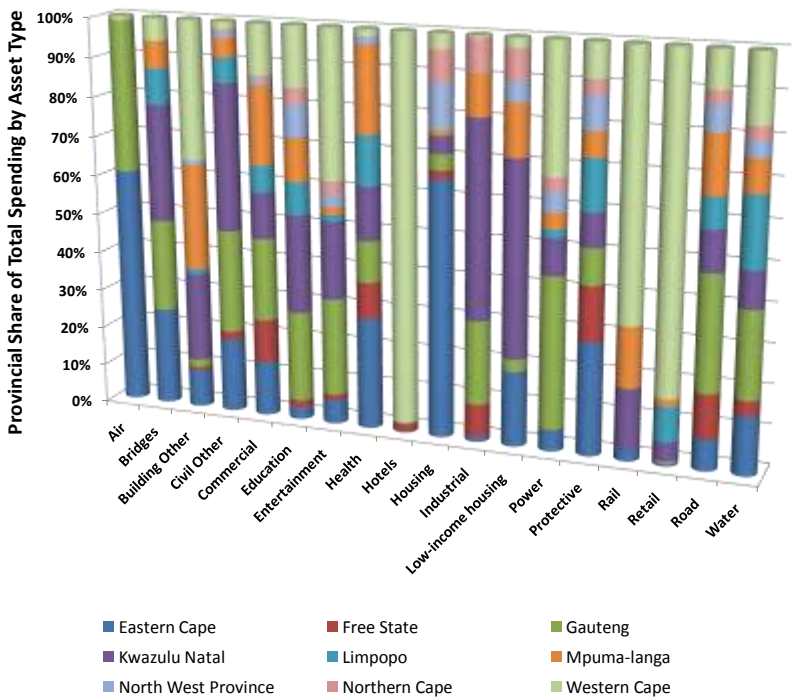
Figure 28: Provincial value of construction projects awarded in 2009



Source: Industry Insight

The provincial share of each type of project is shown in Figure 29. Only two provinces – Gauteng and the Western Cape had projects awarded in all categories.

Figure 29: Provincial share of each type of construction project in 2009



Source: Industry Insight

Table 18 provides a comprehensive provincial breakdown of the value of projects awarded in each type of project in 2009. It confirms a generally high priority is being given to road construction across most provinces. Few provinces are active in “air” projects (which presumably relate to airports), housing that is not geared towards low income groups, and rail-related projects.

Table 18: Detailed breakdown of spending on different project types within each province in 2009

Project Type/ Category	Eastern Cape	Free State	Gauteng	Kwazulu Natal	Limpopo	Mpuma- langa	North West Province	Northern Cape	Western Cape	SA Total
	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm
Total	4,664	3,037	9,392	5,733	3,652	5,116	1,944	1,206	5,877	40,622
Air	39		25						1	64
Bridges	61		58	73	22	17			14	245
Building Other	37	4	8	87	5	104	5		135	384
Civil Other	253	30	353	504	85	64	18	11	25	1,343
Commercial	501	397	757	426	247	721	38	44	457	3,588
Education	70	41	519	565	188	251	188	88	343	2,253
Entertainment	32	8	131	105	8	10	16	19	198	527
Health	471	154	175	227	211	365	29		29	1,660
Hotels		23		3	1	3			1,127	1,158
Housing	41	1	3	3		1	7	5	2	63
Industrial	5	30	77	182		38	-	30	2	365
Low-income housing	332		55	859		230	87	135	42	1,739
Power	48	1	346	84	19	36	47	30	291	901
Protective	204	101	66	61	93	45	60	27	61	717
Rail	3		-	15		15			65	98
Retail	1		1	7	14	3			131	157
Road	1,385	1,951	5,077	1,788	1,353	2,558	1,136	550	1,619	17,417
Water	1,181	297	1,743	743	1,406	656	314	268	1,334	7,943
Health	471	154	175	227	211	365	29		29	1,660

Source: Industry Insight

While there is a concern in some quarters about a rapid fall-off in the level of public sector infrastructure spending after the completion of 2010 FIFA World Cup-related projects, there are still a large number of major projects that are scheduled for completion in subsequent years. These are listed in Table 19. The most significant major projects by value are the Kusile and Medupi power stations – which have a combined price ticket of more than R266 billion, and which should be completed by fiscal 2015/16 (in the case of Medupi) and 2018/19 (in the case of Kusile). Most of the stimulatory impact of these projects still has to flow into the economy. By contrast, the scheduled completion dates for some of the large-scale projects in the transport sector (Gautrain and Gauteng Freeway Improvement Scheme) are more imminent, and a large portion of the costs have already been sunk.

Table 19: Major projects by type, estimated cost, implementing agent and projected completion date

Project Name	Estimated Total Cost (R bn)	Implementation Agent	Projected Completion Date (Fiscal Year)
Energy			
Kusile Power Station	140.7	Eskom	2018/19
Medupi Power Station	125.7	Eskom	2015/16
Ingula Pumped Storage Scheme	16.6	Eskom	2013/14
Transport			
Gautrain Rapid Rail Link	25.2	Gauteng Dept. Roads, Transport & Public Works	2011/12
Gauteng Freeway Improvement Scheme (Phase 1)	22.0	SANRAL	2012/13
Multi-purpose Pipeline (Phase 1)	12.6	Transnet	2011/12
Iron-ore Line	11.6	Transnet	2013/14
Ngqura Container Terminal	7.9	Transnet	2013/14
Water			
Mokolo-Crocodile Water Augmentation Project	14.7	Trans-Caledon Tunnel Authority	2015/16
Olifants River Water Resource Development Project (Phase 2)	13.7	Dept. Water Affairs, Trans-Caledon Tunnel Authority	2016/17
Housing			
Comubia Housing Development	5.1	The Housing Development Agency, eThekweni Metro	2016/17
N2 Gateway	2.3	The Housing Development Agency, Western Cape Dept Housing	2013/14
Hospitals			
Frere Hospital	2.5	Eastern Cape Dept. Health	2013/14
Limpopo Academic Hospital	1.5	Limpopo Dept. Health	
Cecilia Makiwane Hospital (Phase 1)	1.4	Eastern Cape Dept. Health	2013/14
Natalspruit Hospital	1.7	Gauteng Dept. Health	2011/12

Source: 2010 Budget Review, Pg 67

7.2 National government

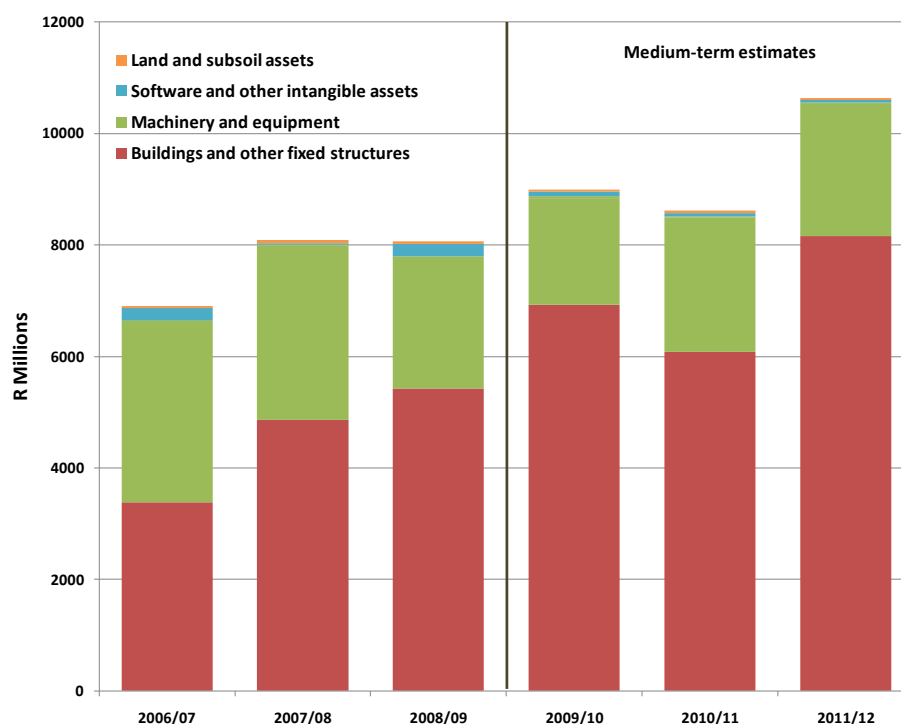
As was noted above, national government departments are responsible for a relatively small proportion of total spending on infrastructure assets – accounting for just 3% of total public sector spending. Between fiscal 2006/07 and 2009/10, budgeted spending at this level of government rose from just over R7 billion to R9.6 billion. Table indicates that – with the exception of fiscal 2007/08 – national departments have tended to under-spend their capital budgets in recent years, and that the gap between budgeted figures and actual ones has been getting bigger. However, at this stage the level of under-spending has been relatively inconsequential when viewed against the spending of the public sector as a whole.

Table 20: Budgeted and actual spending on capital assets by national government departments

Description	Fiscal Year			
	2006/07	2007/08	2008/09	2009/10
Budgeted expenditure on capital assets (R million)	7,081	7,400	8,362	9,635
Actual expenditure on capital assets (R million)	6,905	8,093	7,922	8,993
Actual spending as % of budgeted spending	97.5%	109.4%	94.7%	93.3%

Source: 2010 Budget Review

Figure 30: Value and composition of national government capital expenditure



Source: 2010 Budget Review, pp 174 – 175

Figure 30 indicates the historical, and estimated future level of functional composition of capital expenditure by national government departments. Prospectively, the aggregate figures indicate a cut-back in spending in fiscal 2010/11, followed by fairly strong expansion in fiscal 2011/12. By far the largest portion of national government spending on capital assets is on buildings and other fixed structures. Machinery and equipment tends to make up the balance.

The values of spending on capital assets, together with the composition of spending by asset type, are shown in Table 20.

Table 20: Value and composition by asset type of spending by national government departments on capital assets

National Government - R millions	Actual			Estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Buildings and other fixed structures	3,378	4,857	5,421	6,929	6,079	8,162
Machinery and equipment	3,262	3,139	2,380	1,915	2,412	2,362
Cultivated assets	2	11	-145	28	23	27
Software and other intangible assets	231	22	214	81	55	47
Land and subsoil assets	32	64	52	40	48	33
Total Payments for Capital Assets	6,905	8,093	7,922	8,993	8,617	10,631
% Composition of Capital Spending						
Buildings and other fixed structures	48.9%	60.0%	68.4%	77.0%	70.5%	76.8%
Machinery and equipment	47.2%	38.8%	30.0%	21.3%	28.0%	22.2%
Cultivated assets	0.0%	0.1%	-1.8%	0.3%	0.3%	0.3%
Software and other intangible assets	3.3%	0.3%	2.7%	0.9%	0.6%	0.4%
Land and subsoil assets	0.5%	0.8%	0.7%	0.4%	0.6%	0.3%
Total Payments for Capital Assets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: 2010 Budget review, pp 174 – 175; Provincial Budgets and Expenditure Review: 2005/06 2011/12 Pg 150

7.3 Provincial Government

Collectively, infrastructure spending by provincial governments accounts for around 17% of total public sector expenditure for these types of assets. Budgeted spending on capital assets by provincial governments rose strongly between fiscal 2005/06 and 2009/10 – more than doubling in nominal terms over the period from R11.6 billion to R24 billion.

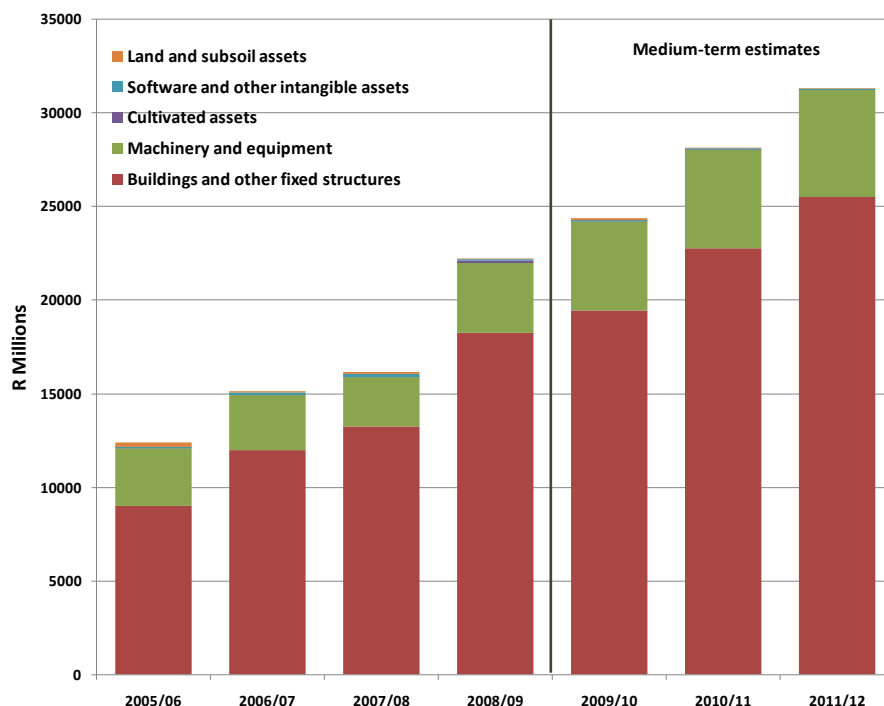
A comparison of aggregate budgeted and actual spending on capital assets reveals a general trend towards modest over-spending of capital asset budgets – with the exception of fiscal 2007/08, where the available figures suggest under-spending of close to R3 billion. Since the corresponding figures for national departments suggested fairly substantial over-spending in this year, it may be that certain responsibilities for the acquisition of capital assets were shifted from provincial governments to national departments.

Table 21: Budgeted and actual spending on capital assets by provincial government departments

Description	Fiscal Year				
	2005/06	2006/07	2007/08	2008/09	2009/10
Budgeted expenditure on capital assets (R million)	11,588	14,686	18,948	21,919	24,011
Actual expenditure on capital assets (R million)	12,386	15,134	16,171	22,216	24,367
Actual spending as % of budgeted spending	106.9%	103.1%	85.3%	101.4%	101.5%

Source: Provincial Budgets and Expenditure Review: 2005/06 2011/12 Pg 150

Figure 31 indicates the level and composition of spending by provincial governments on capital assets. It indicates fairly strong historical growth in spending – particularly in fiscal 2008/09, and estimates continued growth into the future. On average, total spending on capital assets increased by 21.5% annually between fiscal 2005/06 and 2008/09 – due largely to average annual growth of close to 27% in investment in buildings and other fixed structures. The aggregate growth rate over the medium term is expected to slow to just over 12% between 2008/09 and 2011/12.

Figure 31: Value and composition of provincial government capital expenditure

Source: Provincial Budgets and Expenditure Review: 2005/06 2011/12 Pg 150

The historical and projected value and composition of provincial expenditure on capital assets is shown in Table 22. It indicates that provincial spending of this type increased from R9 billion in fiscal 2005/06 to close to R19.5 billion in 2009/10, and that further increases should see this number rise to more than R25.5 billion in coming years. Compositionally, capital expenditure by provinces is dominated by

spending on buildings and other fixed structures – which has tended to account for around 80% of the total in recent years. The balance is made up almost exclusively of spending on machinery and equipment.

Table 22: Value and composition by asset type of spending by provincial governments on capital assets

All Provinces - R millions	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Buildings and other fixed structures	9,006	11,991	13,274	18,256	19,445	22,768	25,506
Machinery and equipment	3,096	2,928	2,625	3,715	4,767	5,270	5,722
Cultivated assets	8	5	5	151	8	9	9
Software and other intangible assets	68	138	172	69	60	57	60
Land and subsoil assets	208	72	95	25	87	29	36
Total Payments for Capital Assets	12,386	15,134	16,171	22,216	24,367	28,133	31,333
% Composition of Capital Spending							
Buildings and other fixed structures	72.7%	79.2%	82.1%	82.2%	79.8%	80.9%	81.4%
Machinery and equipment	25.0%	19.3%	16.2%	16.7%	19.6%	18.7%	18.3%
Cultivated assets	0.1%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%
Software and other intangible assets	0.5%	0.9%	1.1%	0.3%	0.2%	0.2%	0.2%
Land and subsoil assets	1.7%	0.5%	0.6%	0.1%	0.4%	0.1%	0.1%
Total Payments for Capital Assets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Provincial Budgets and Expenditure Review: 2005/06 2011/12 Pg 150

7.4 Local Government

Local government in South Africa consists of 295 metros, municipalities and district councils and is an important government interface for delivering infrastructure – contributing 16% of total public sector spending of this type in 2009/10. This is projected to increase to 19% by 2012/13. However, it is also a tier of government that is faced with significant capacity constraints.

Figure 32 indicates the number of local authorities under or over spending on their capital budgets. It shows that in 2007/08 95 of the 295 local authorities spent less than 40% of their capital budgets, 44 spent between 40% and 60% of their budgets, 9 spent between 60% and 80% of their budgets, and 61 spent between 80% and 100% of their capital budgets. In the same fiscal year 44 authorities spent between 100% and 150% of their capital budgets, 19 overspent on budget by between 150% and 200%, 9 spent between 200% and 300% of their capital budgets, and 7 over-spent by more than 300%.

Although there has been some improvement in budgeting accuracy and/or spending efficiency at the aggregate level for this tier of government, the proportion of local authorities that under-spent on their capital budgets in 2007/08 (71%) is largely unchanged from the proportion that under-spent in 2003/04 (72%). This tends to confirm the view that, while there has been an improvement in spending by metros and larger municipalities, the smaller, more numerous, municipalities and district councils continue to find it difficult to spend their capital budgets. This is despite the clear need to do so from a delivery perspective.

Figure 32: Number of local government authorities under- or over-spending on their budgeted capital expenditure by percentage of capital budget actually spent



Source: Intergovernmental Fiscal Reviews - 2008, 2009

Table 23 indicates the aggregate performance of this tier of government, as well as a breakdown of the number and extent of authorities that are under- or over-spending on their capital budgets. Similar breakdowns for each province are included as Annexures B to J.

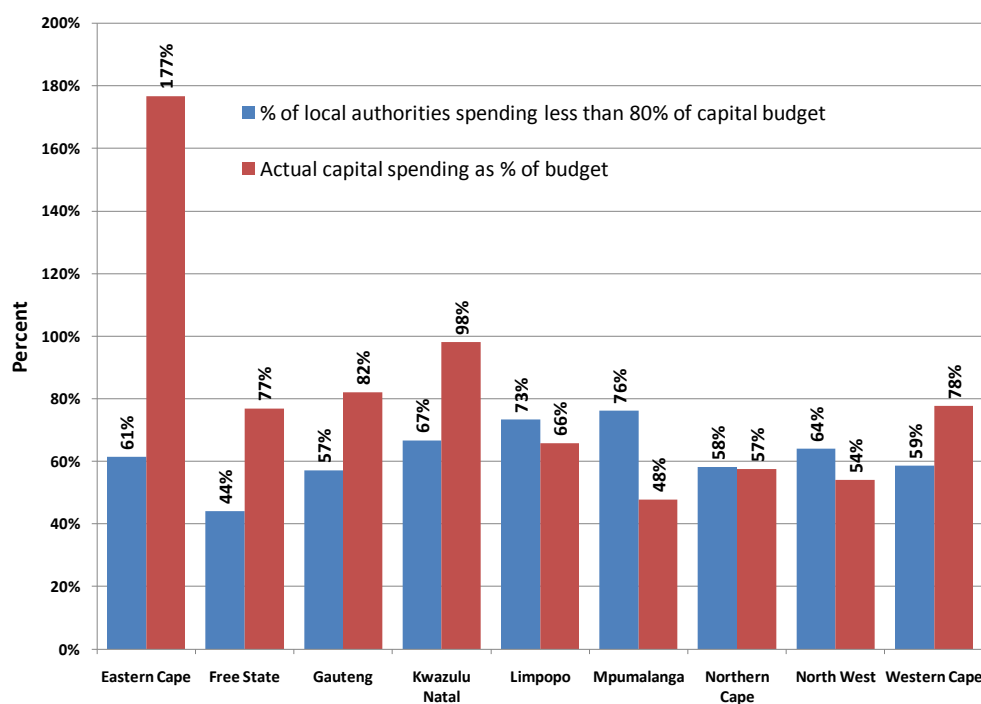
Table 23: Performance of all South Africa local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	16 548	17 047	25 750	29 087	39 736
Actual capital expenditure (Rm)	10 629	13 327	17 219	20 878	35 676
Actual capital expenditure as % of budgeted capital expenditure	64.2%	78.2%	66.9%	71.8%	89.8%
Number of metros, municipalities and district councils in South Africa	295	295	295	295	295
Those spending less than budget:					
Less than 100%	212	201	227	220	209
Less than 80%	148	136	162	161	148
Less than 60%	144	139	153	156	139
Less than 40%	103	98	110	109	95
Those spending more than budget:					
Greater than 100%	81	86	68	64	79
Greater than 150%	43	46	27	29	35
Greater than 200%	25	34	17	23	16
Greater than 300%	18	24	10	10	7

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Figure 33 summarises the budgetary accuracy and capital spending effectiveness of local authorities in each province in fiscal 2007/08. It shows the percentage of local authorities in that province that spent less than 80% of their capital budget, as well as the aggregate actual capital spending by such authorities as a percentage of what was budgeted. In Mpumalanga 76% of local authorities spent less than 80% of their capital budgets, and in aggregate terms municipalities and district councils in that province only spent 48% of what they had budgeted. Free State had the lowest proportion of local authorities under-spending on capital budgets (44%), but in aggregate terms only managed to spend 77% of what they had budgeted. In 2007/08 local governments in the Eastern Cape over-spent dramatically – spending 177% of what was originally budgeted.

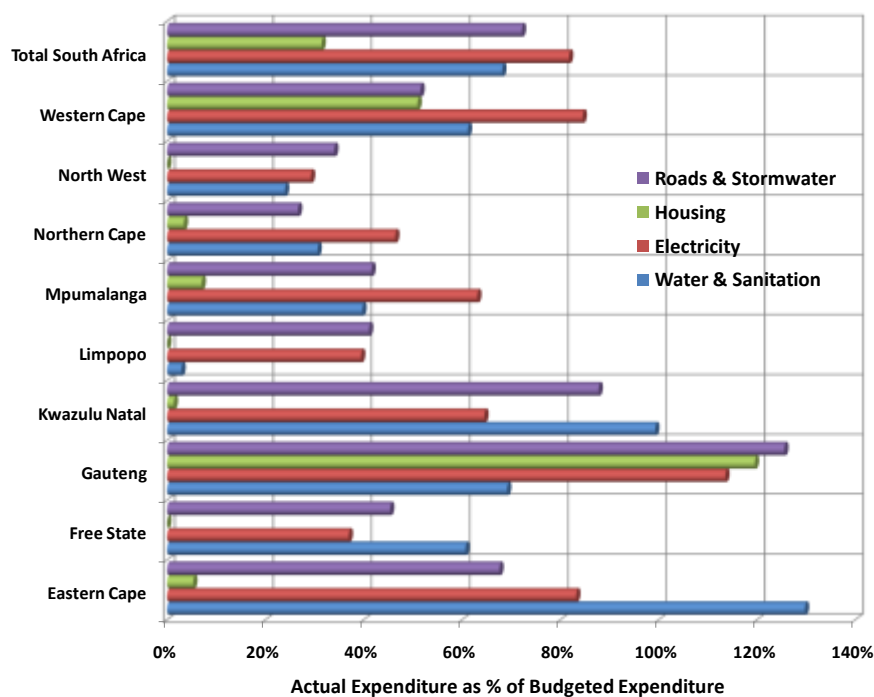
Figure 33: Local government spending effectiveness by province in 2007/08



Source: Intergovernmental Fiscal Reviews - 2008

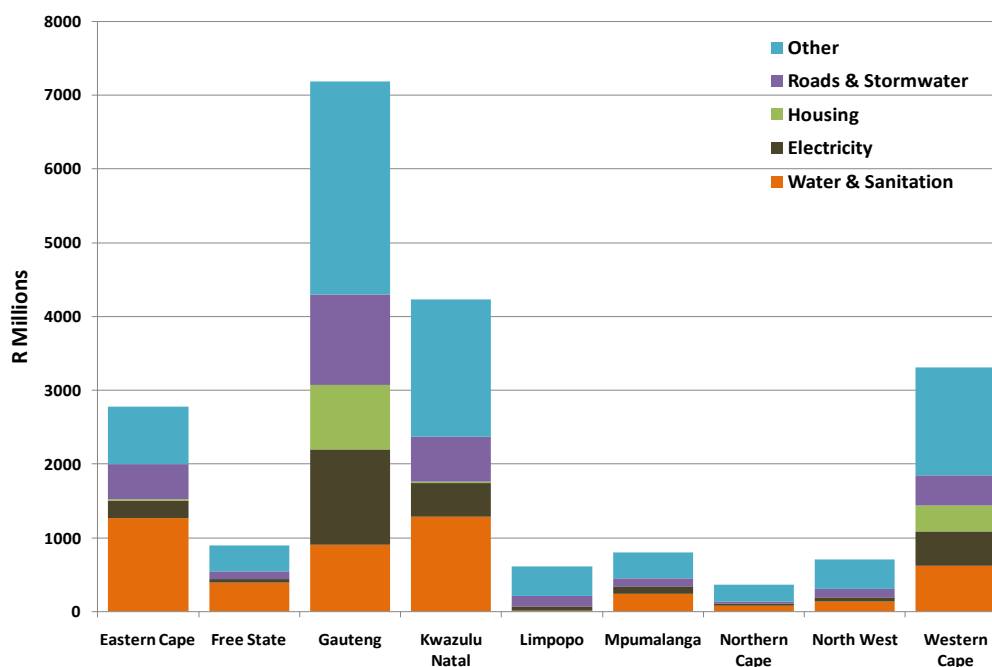
Figure 34 shows a breakdown of the extent to which local authorities in each province and nationally spent their capital budgets in 2006/07, by each type of asset. It indicates highly variable performance across different asset types within the same province. For example, local governments in Limpopo only spent 41% of what was budgeted for roads and storm water; 0% of housing; 39% of electricity; and only 3% of budgeted capital spending on water and sanitation. By contrast, Gauteng local authorities spent 126% of their road and storm water budget, 120% of housing budgets, 114% of electricity budgets and 69% of water and sanitation budgets in the same fiscal year.

Figure 34: Local government actual expenditure as percentage of budget by asset type – 2006/07



Source: Intergovernmental Fiscal Reviews - 2008

Figure 35: Composition of local authority capital expenditure by province in 2006/07

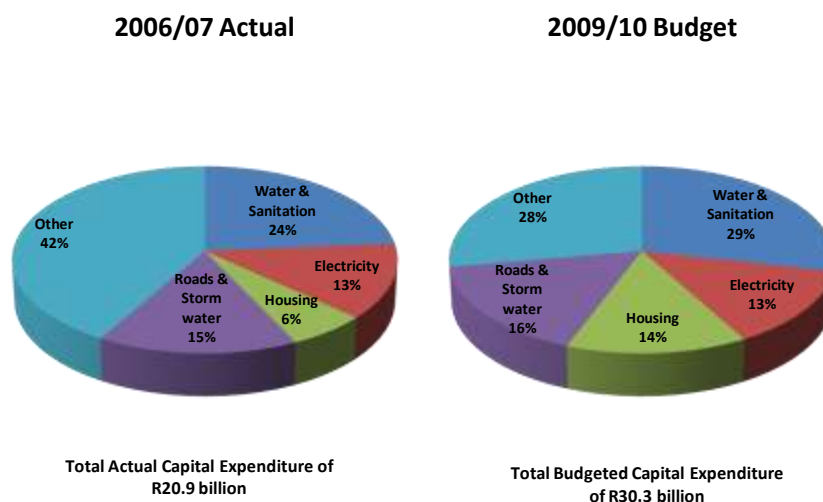


Source: Intergovernmental Fiscal Reviews - 2008

Figure 35 shows the value and composition of capital spending by local authorities in each province in fiscal 2006/07. In that year, Gauteng local authorities collectively spent just over R7 billion on capital assets – with fairly significant levels of spending on each type of asset. With the exception of the Western Cape, most other provinces spent relatively little on housing.

Figure 36 shows the comparative composition by asset type of capital expenditure by local authorities for 2006/07 and 2009/10. It indicated an intention on the part of this tier of government to increase the share of capital spending going to water and sanitation and housing. Spending on electricity was expected to continue to account for about 13% of the total, while the allocation to roads and storm water was supposed to increase marginally from 15% to 16%.

Figure 36: Composition of actual local authority capital expenditure in 2006/07 and budgeted expenditure in 2009/10



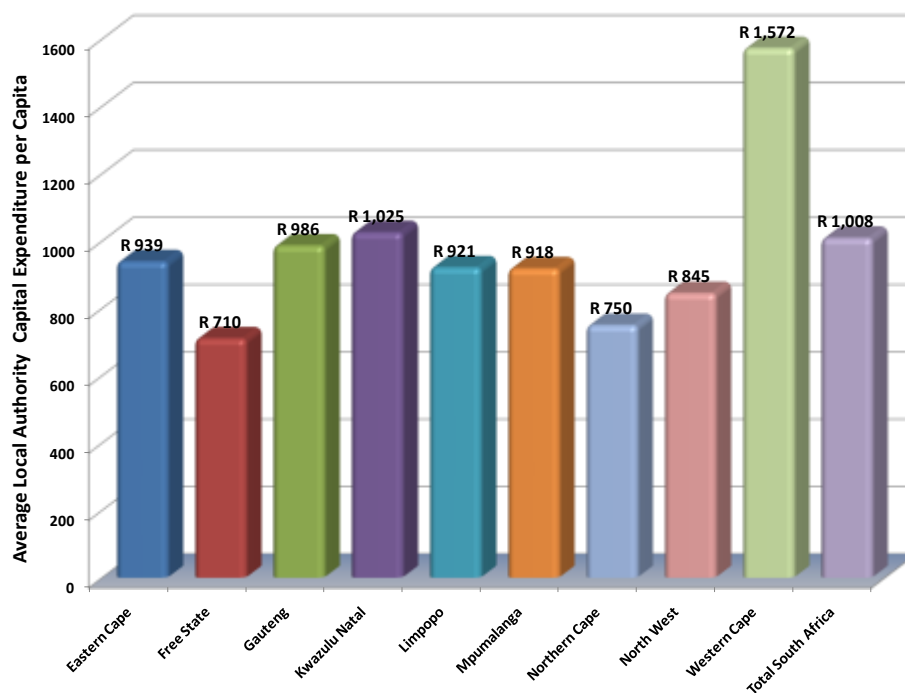
Source: Intergovernmental Fiscal Reviews - 2008

When the budgeted capital expenditure figures for each province's local authorities are divided by their respective populations, it provides an indication of the average spending per capita and could serve to highlight provincial inequalities.

Figure 37 shows these figures. The highest capital spending per capita was expected to occur in the Western Cape, and should have been around R1 600 per inhabitant if budgeted amounts were actually spent. This figure is substantially higher than any other province – with the next highest being R1 025 in Kwazulu Natal. On a per capita basis, spending was expected to be lowest in the Free State.

Given the levels of under-spending highlighted above, the actual per capita spending could be substantially lower than these figures suggest. At the same time, there has been some ramping-up of budgets since the figures on which these calculations were based were published.

Figure 37: Average budgeted local authority capital expenditure per capita in 2009/10 by province



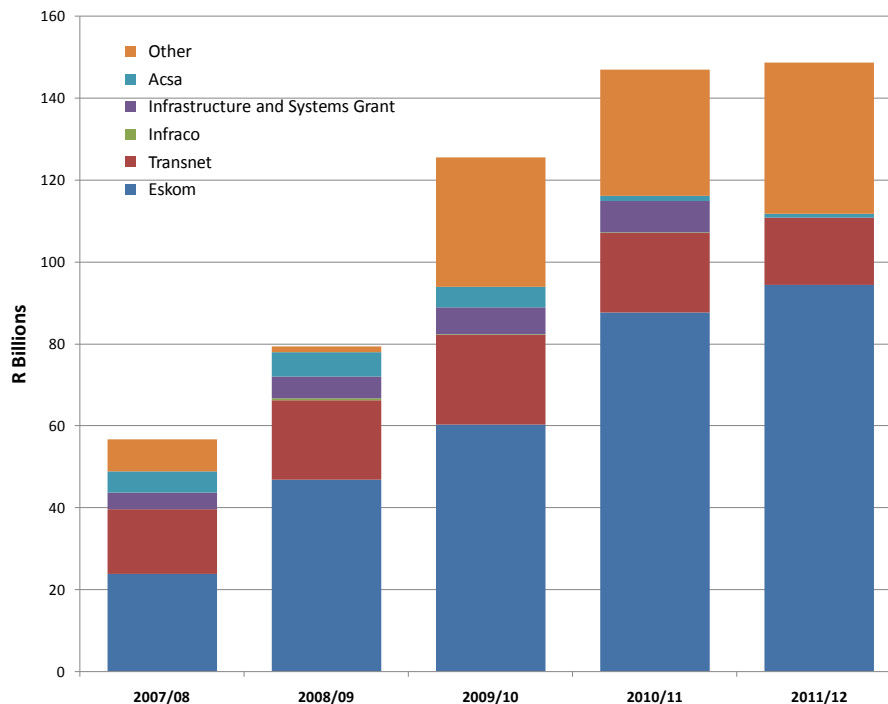
Sources: National Treasury Local Government Database, Quantec

7.4 State-owned enterprises

As was noted in Section 7.1 above, state-owned enterprises are responsible for more than half of the infrastructure spending of the public sector. Figure 38 indicates that spending by Eskom is expected to account for at least half of the capital spending by non-financial SOEs. Spending by these institutions increased by around 70% per annum between 2006/07 and 2009/10, but the rate of growth is projected to slow in the years thereafter – averaging close to 8% a year between 2009/10 and 2011/12. It is worth noting that projected infrastructure spending of non-financial public enterprises has been reduced when compared with estimates contained in the 2008 ASGISA Annual Report.

Total spending by non-financial public enterprises is expected to increase to R149 billion in fiscal 2011/12 – up from R26 billion in 2006/07

Figure 38: Estimated breakdown of actual and planned infrastructure spending by non-financial public enterprises



Source: ASGISA 2008 Annual Report, Recent Annual Reports of Eskom, Transnet, SANRAL and ACSA, 2010 Budget Review

Table 25 indicates the projected capital expenditure of Eskom that was submitted to NERSA in December 2009 as part of their revised application for tariff increases. These capital expenditure plans were predicated on higher tariff increases than those approved by NERSA, but it is not yet clear what effect the lower approved increases will have on the levels of capital spending in years to come. Based on the projections below, annual capital spending will increase from R60 billion in 2009/10 to more than R94 billion in 2011/12, before dropping back to between R69 and R89 billion in subsequent years.

Table 24: Projected capital expenditure by Eskom

Description	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Capex Predicated on Tariff Increases of:	31%	35%	35%	35%	13%	13%
Budgeted Capex as Submitted to NERSA (R Millions)	60,232	87,646	94,417	86,239	68,783	88,905

Source: Revenue Application Multi-Year Price Determination 2010/11 to 2012/13 (MYPD 2) 30 November 2009

The recent actual and projected levels of capital spending by Transnet are shown in Table 25. The projected figures distinguish between spending that is geared towards sustaining existing capacity, and expenditure that aims to expand capacity. The figures indicate that total capital expenditure will tend to

taper-off from its peak of around R22 billion in 2009/10 to close to R9.5 billion in 2013/14. The projected decline is due to a fall-off in spending on new capacity. By contrast, capex aimed at sustaining existing capacity is projected to be relatively more stable – ranging from R7.2 billion to R9.4 billion.

Table 25: Historical and projected capital expenditure by Transnet

Description	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Sustaining Capacity			9071	8121	7180	9439	7718
Expansion			12841	11321	9156	3892	1762
Total	15780	19382	21912	19442	16336	13331	9480

Source: Transnet Annual Report 2009

Table 27 indicates the historical and estimated future capital expenditure of SANRAL. This only relates to projects that SANRAL is directly responsible for, and does not include spending by provincial and local governments on roads – even if they have contracted SANRAL to manage such projects on their behalf. Spending on roads by SANRAL can be divided into toll roads – which increased to more than R12 billion in 2010 but is expected to decline in coming years - and non-toll roads where spending is projected to increase to close to R5.6 billion by 2012. The figures also distinguish between different types of spending, such as strengthening of existing roads, improvements, new facilities and land acquisition.

Table 26: Historical and projected capital expenditure by SANRAL

Type of Capital Spending	Actuals – R Millions				Budget – R Millions		
	2006	2007	2008	2009	2010	2011	2012
Non-Toll Roads							
Sundry Capital Expenditure	(0.4)	1.2	6.4	78.7	41.4	14.7	1.6
Strengthening	286.4	503.6	886.2	1,262.3	2,409.8	3,302.6	4,189.2
Improvements	101.8	282.7	570.6	582.9	1,248.3	860.8	1,018.0
New Facilities	65.9	104.4	131.4	557.7	646.9	405.6	304.9
Land Acquisition	2.3	19.1	19.2	134.0	50.0	50.0	50.0
Sub-total: Non-Toll Roads	455.9	911.0	1,613.7	2,615.6	4,396.4	4,633.7	5,563.7
Toll Roads							
Strengthening	1.4	8.8	98.6	281.0	371.8	258.3	161.0
Improvements	15.0	65.8	530.8	4,863.4	8,996.8	4,643.2	1,156.3
New Facilities	20.9	107.9	166.4	780.9	2,688.2	1,427.2	763.5
Land Acquisition	-	-	-	119.3	-	-	-
Sub-total: Toll Roads	37.3	182.5	795.8	6,044.6	12,056.7	6,328.6	2,080.8
All Roads							
Sundry Capital Expenditure	(0.4)	1.2	6.4	78.7	41.4	14.7	1.6
Strengthening	287.8	512.4	984.7	1,543.3	2,781.5	3,560.9	4,350.2
Improvements	116.8	348.5	1,101.4	5,446.3	10,245.1	5,504.0	2,174.3
New Facilities	86.8	212.2	297.8	1,338.6	3,335.1	1,832.8	1,068.4
Land Acquisition	2.3	19.1	19.2	253.3	50.0	50.0	50.0
Total - All Roads	493.2	1,093.5	2,409.6	8,660.2	16,453.1	10,962.3	7,644.5

Source: SANRAL

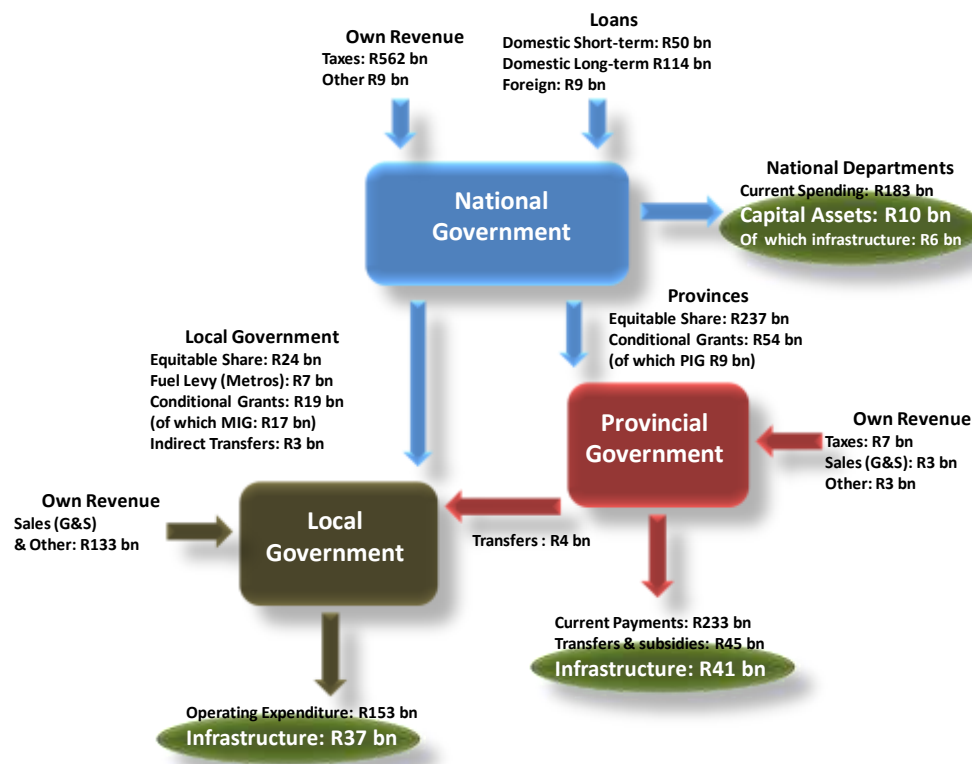
8. Sources of funding for public sector infrastructure spending

The funding of public sector spending on infrastructure can essentially come from the following sources:

- Taxation
- Grants and transfers
- Loans
- User charges
- Private sector contributions to public-private partnerships

Figure 39 indicates the sources of funding for the three tiers of general government. National government raises revenue through taxes and other means, and borrows funds domestically and internationally. These funds are then used to finance the current and capital spending of national government departments, or are transferred to other tiers of government. They may even be transferred or loaned to SOEs or other public entities.

Figure 39: Sources of funding for the three tiers of government in 2009/10



Source: 2010 Budget Review

Transfers from national government to provincial government may be classified as equitable shares (which are based on formulas developed by the Financial and Fiscal Commission), or conditional grants. The most significant conditional grant for funding infrastructure spending is the Provincial Infrastructure Grant (PIG). Provinces may supplement transfers from national government through own revenue sources – although these tend to constitute a relatively small proportion of total provincial spending.

Both national and provincial governments can transfer funds directly to local governments, or make indirect transfers by paying particular service providers or households on behalf of a local authority. In the case of national government these transfers to local authorities may take the form of equitable shares or conditional grants (of which the Municipal Infrastructure Grant or MIG is the most significant). South Africa's six metros also receive a portion of the fuel levy.

Table 27 indicates the value of direct and indirect transfers from national government to local authorities. In 2009/10, these amounted to some R19.7 billion, of which the MIG accounted for R11.1 billion and the Public Transport Infrastructure and Systems Fund for R2.4 billion.

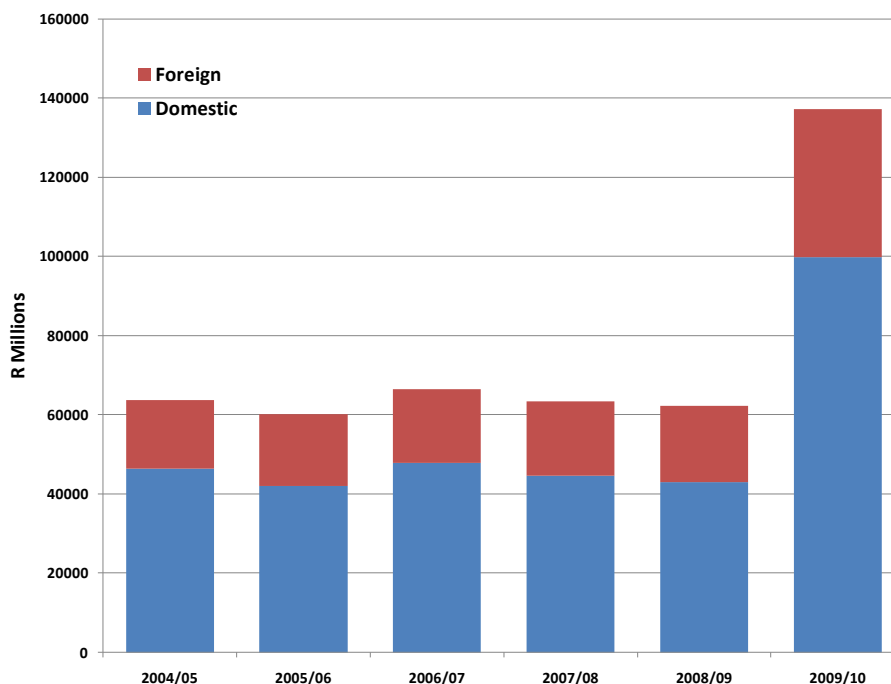
Table 27: Historical and estimated transfers from national government to local authorities

R million	Actual						Medium-term estimates		
	2004/ 05	2005/ 06	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011/ 12	2012/ 13
Direct Transfers									
Water Services Project	217	139							
Sport & Recreational Facilities	134								
National Electrification Programme	251	313	391	462	589	933	1,020	1,097	1,151
Municipal Infrastructure Grant	4,481	5,436	5,938	8,754	9,091	11,107	12,529	15,069	18,322
Public Transport Infrastructure & Systems Fund		242	518	1,174	2,920	2,418	3,699	4,425	4,125
Neighbourhood Development Partnership Grant				41	182	551	1,030	1,190	1,182
2010 FIFA World Cup Stadiums Development Grant			600	4,605	4,295	1,661	302		
Rural Transport Services & Infrastructure Grant					9	10	10	11	12
Electricity Demand Side Management						175	220	280	
Municipal Drought Relief Grant				91	9	54	228		
Other	280	311							
Indirect Transfers									
National Electrification Programme			893	973	1,148	1,478	1,752	1,770	1,914
Neighbourhood Development Partnership Grant			50	61	54	111	125	100	105
Regional Bulk Infrastructure Grant				300	450	612	893	1,675	1,849
Backlogs in Water & Sanitation at Clinics & Schools					186	350			
Backlogs in Electrification at Clinics & Schools					90	149			
Electricity Demand-side Management						75	109	119	
Rural Households Infrastructure Grant							100	350	750
Total	5,363	6,441	8,390	16,461	19,023	19,684	22,017	26,086	29,410

Source: 2010 Budget Review

Public entities are generally responsible for funding their own capital expenditure. However, national government can – in some cases – either act as guarantor of loans accessed by these entities, or extend loans to such entities directly. Figure 40 indicates the value of loans drawn by public entities for which national government has guaranteed payment. These loans may be accessed from local or foreign lending institutions. There was a dramatic increase in the value of loans guaranteed in fiscal 2009/10 – more than doubling from just over R62 billion in 2008/09 to R137 billion in 2009/10. Table 28 shows the dynamic shifts in the level and source of the guarantees extended. It indicates that in 2009/10, the change in the value of loan guarantees accessed by public entities was equivalent to almost 79% of all new fixed capital formation by public corporations.

Figure 40: Total value of loans drawn by public entities that are guaranteed by national government



Source: 2010 Budget Review

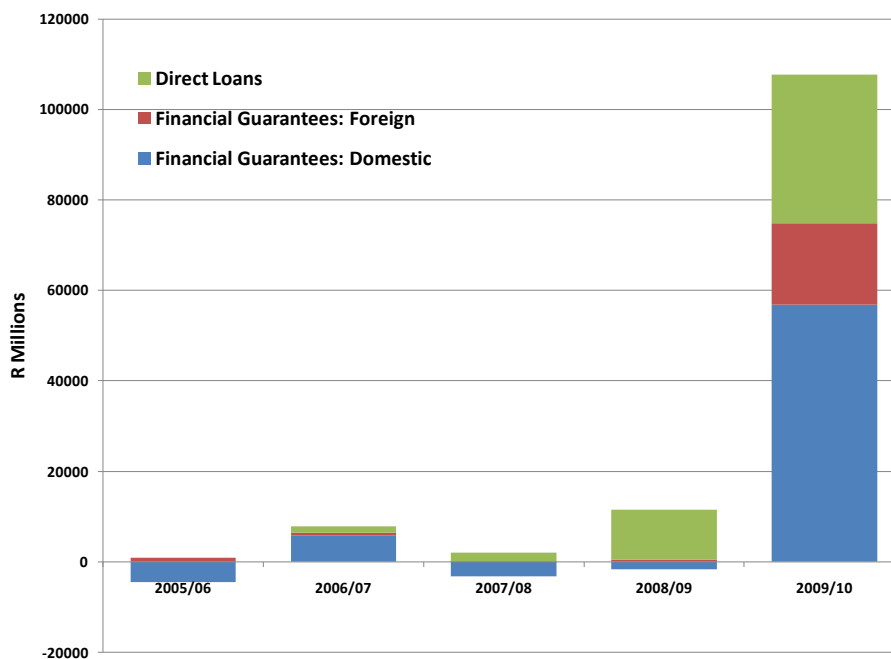
Table 28: Changes in the value of loans accessed by public entities that are guaranteed by national government

Description	Fiscal Years				
	2005/06	2006/07	2007/08	2008/09	2009/10
Change in domestic financial guarantees (Rm)	-4 451	5 819	-3 157	-1 670	56 797
Change in foreign financial guarantees (Rm)	924	548	104	534	18 055
Direct loans to public entities (Rm)	0	1 435	1 960	11 033	32 806
Total change in government loans and guarantees to public entities (Rm)	-3 527	7 802	-1 093	9 897	107 658
Gross fixed capital formation of public corporations at current prices (Rm)	31 023	43 380	64 993	106 158	136 899
Government loans & guarantees as % of gross fixed capital formation	-11.4%	18.0%	-1.7%	9.3%	78.6%

Source: 2010 Budget review, SA Reserve Bank Quarterly Bulletin

In addition to the changes in loan guarantees, government has also, in recent years, extended loans directly to Eskom to fund the building of power stations. In fiscal 2009/10 the value of these loans amounted to almost R33 billion, and in the current 2010/11 fiscal year, they are will exceed a further R20 billion. Together with the increase in loan guarantees in 2009/10, this points to a massive increase in the direct, and contingent liabilities of national government towards public entities.

Figure 41: Changes in the value of loans drawn by public entities that are guaranteed by national government and direct loans to public entities by government



Source: 2010 Budget Review

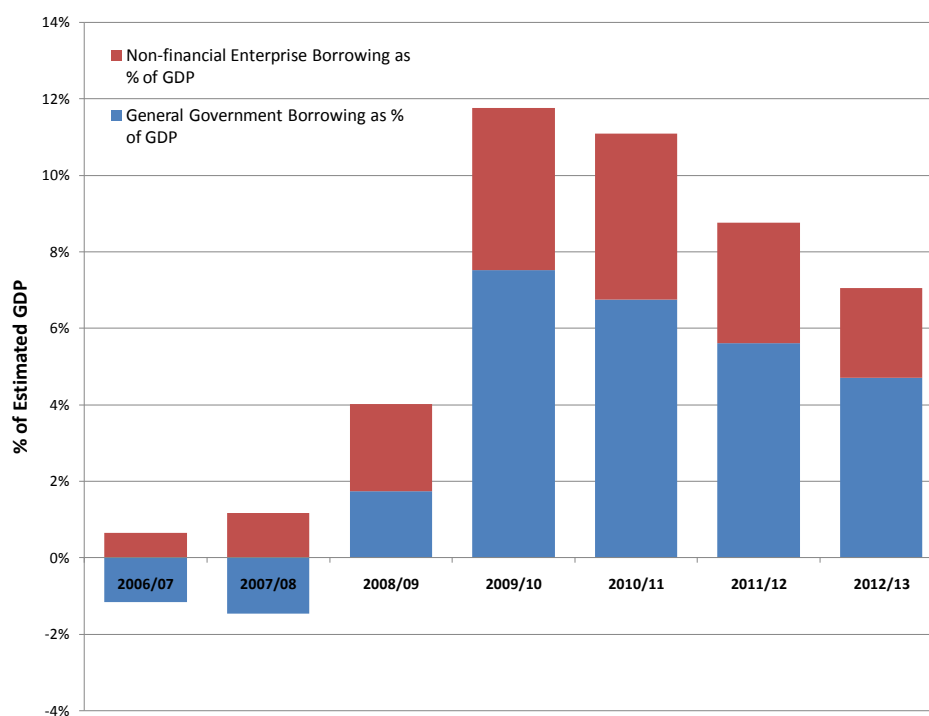
There are, however, indications that the public sector has cut back on infrastructure spending plans in response to the Global Economic Crisis and its aftermath. Table shows the changes in planned infrastructure expenditure between the figures contained in the Medium Term Budget Policy Statement released by National Treasury in October 2009, and the figures contained in the 2010 Budget. These indicate reductions in planned capital spending by general government of between R13 billion and R16 billion over the medium term. However, these cuts have been offset by increased spending plans by extra-budgetary institutions. Non-financial enterprises are expected to cut capital spending in 2011/12, but to then increase expenditure in the following fiscal year – suggesting deferment rather than cancellation.

Table 30: Differences between public sector infrastructure spending estimates – October 2009 to February 2010

R million	2009/10	2010/11	2011/12	2012/13
National Departments	-1,642	-1,862	-2,834	206
Provincial Departments	-685	-2,381	-3,463	-5,524
Local Government	-12,470	-11,601	-7,147	-7,759
Consolidated government	-14,797	-15,844	-13,444	-13,077
Extra-budgetary Institutions	3,035	2,959	6,520	10,563
Public-private Partnerships	11,011	5,386	-3,842	-7,267
General Government	-751	-7,499	-10,766	-9,781
Non-financial Public Enterprises	-1,514	955	-4,709	5,363
Public Sector	-2,265	-6,544	-15,475	-4,418

Source: 2009 Medium-term Budget Policy Statement, 2010 Budget review

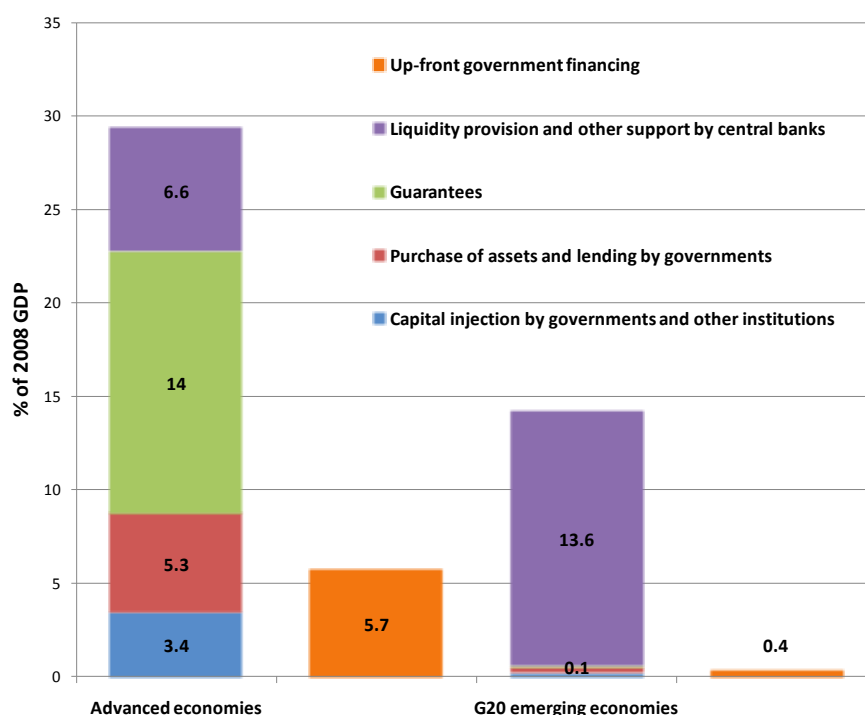
The slowdown in the level of economic activity in the wake of the Global Economic Crisis, and resulting decline in tax collections has necessitated a significant increase in public sector borrowing. In fiscal 2008/09 the combined public sector borrowing requirement amounted to 4% of GDP. However, this increased dramatically to almost 12% of GDP in 2009/10 and is expected to remain at relatively high levels over the medium term.

Figure 42: The public sector borrowing requirement as a percentage of GDP

Source: 2010 Budget Review

A key concern arising from the dramatic increase in the public sector borrowing requirement is whether the implied higher levels of debt are sustainable, and whether they will tend to crowd out the very private sector capital formation that they are seeking to facilitate. These concerns have risen in the wake of the Greek debt crisis. The levels of debt and debt service costs also need to be viewed in the broader context of a widespread consensus that the very large increases in public debt that have arisen in advanced economies as a result of the aggressive measures aimed at fiscal stabilisation of their economies, and the manner in which these measures are to be financed, have increased the likelihood of structurally higher inflation and capital market rates over the next five years or more. Figure 43 highlights the extent and nature of the support measures provided by advanced and developing economies in response to the Global Economic Crisis.

Figure 43: The nature and extent of support measures extended by advanced economies and G20 emerging market economies



Source: IMF World Economic Outlook Update, January 2010

Table indicates the level of South Africa's historical and estimated debt, debt servicing costs and relevant ratios of this debt and debt service costs to other variables such as national government revenue and expenditure and GDP. It indicates that debt service costs are expected to increase from around 8.9% of national government revenue (or 8.9 cents of every rand of tax collected) in fiscal 2008/09 to 12.9% (or 12.9 cents of every rand of tax collected) in 2012/13. This is still substantially lower than corresponding debt servicing costs that existed in 1994, but does point towards an element of crowding out as in the future government will have around 4% less of revenue collected to fund

service delivery. The gross total debt of government is expected to increase quite rapidly from 27% in 2008/09 to more than 43% of estimated GDP in 2012/13.

Another potential concern is that the ratio of debt service costs to net loan debt suggests that National Treasury believes that average interest rates on state debt will decline from around 8.3% per annum in 2009/10 to 7.9% in fiscal 2012/13. This may not be consistent with the view that capital market rates are likely to be structurally higher in coming years.

Table 31: Levels of state debt and debt servicing costs

Description	Actual				Estimates		
	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011/ 12	2012/ 13
Revenue (R bn)	481	560	609	571	643	722	808
Expenditure (R bn)	470	541	636	749	818	888	964
State Debt Costs (R bn)	52	53	54	58	71	88	104
GDP (R bn)	1,833	2,082	2,320	2,450	2,700	2,968	3,296
Debt Costs as % of Revenue	10.8%	9.4%	8.9%	10.1%	11.1%	12.3%	12.9%
Debt Costs as % of Expenditure	11.1%	9.8%	8.6%	7.7%	8.7%	10.0%	10.8%
Debt Costs as % of GDP	2.8%	2.5%	2.3%	2.4%	2.6%	3.0%	3.2%
Domestic Debt (R bn)	471	481	530	702	895	1,086	1,266
Foreign Debt (R bn)	83	96	97	94	106	128	153
Gross Loan Debt (R bn)	554	577	627	796	1,001	1,214	1,419
Less Bank Balances (National Revenue Fund) (R bn)	75	94	101	106	106	106	106
Net Loan Debt (R bn)	478	483	526	690	895	1,108	1,313
Gross Loan Debt as % of GDP	30.2%	27.7%	27.0%	32.5%	37.1%	40.9%	43.1%
Net Loan Debt as % Of GDP	26.1%	23.2%	22.7%	28.2%	33.2%	37.3%	39.8%
Domestic Debt as % Of GDP	25.7%	23.1%	22.8%	28.7%	33.1%	36.6%	38.4%
Foreign Debt as % of GDP	4.5%	4.6%	4.2%	3.8%	3.9%	4.3%	4.6%
State Debt Costs as % of Gross Loan Debt	9.4%	9.2%	8.7%	7.2%	7.1%	7.3%	7.3%
State Debt Costs as % of Net Loan Debt	10.9%	10.9%	10.3%	8.3%	8.0%	8.0%	7.9%

Source: 2010 Budget Review

9. Changes in employment in the construction sector

As was noted in the background section of this document, there is an underlying assumption that the increase in public sector spending on infrastructure will lead to an expansion in the number of people employed – both directly in the construction sector, and indirectly through its facilitation of private sector investment and supply expansion.

The construction sector can be divided into two major sub-sectors: building construction and civil and other construction. While employment trends in civil construction are more likely to reflect underlying trends in spending on power stations, soccer stadia, airports and roads, the preceding analysis also indicated a substantial portion of the investment by general government is into buildings.

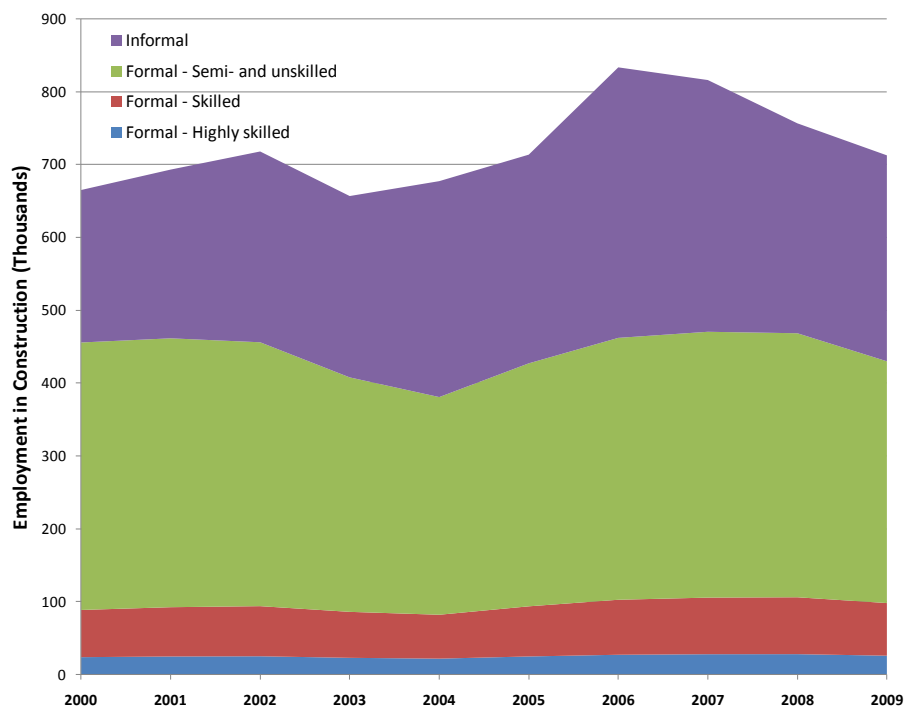
Table indicates estimated trends in employment – both formal and informal – within the whole construction sector, as well as the skills composition of formal employment. It indicates that employment in the sector initially increased quite strongly after 2005 – rising by more than 100 000 between that year and 2007. However, the effects of the global economic slowdown are illustrated in the subsequent decline in total employment. The comparative skills compositions in the different years confirm that highly skilled and skilled workers tend to enjoy greater job-security during downturns in the sector.

Table 32: Composition of employment in the construction sector

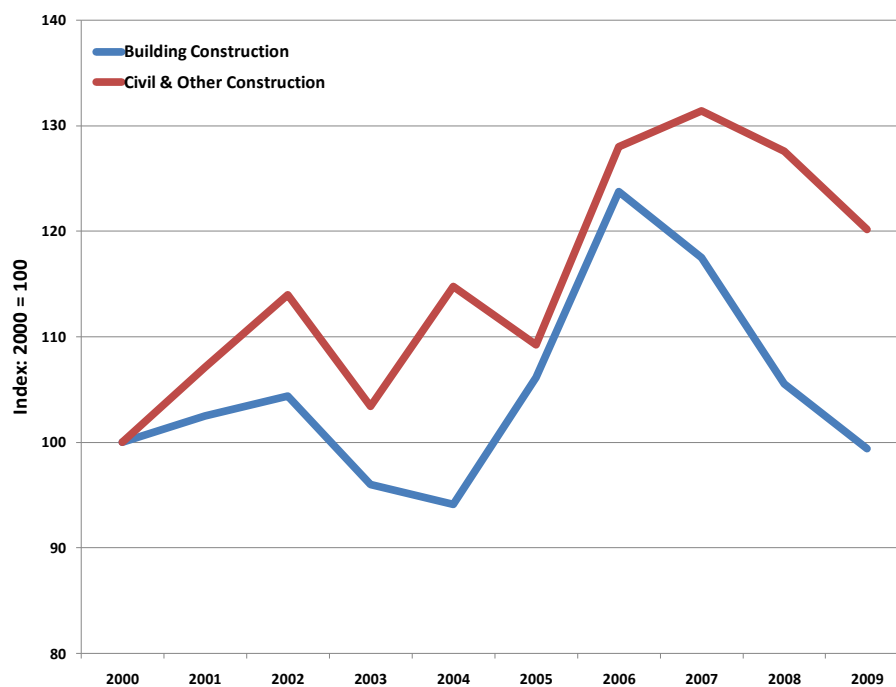
Type of Employment	2000		2005		2007		2009	
	Number (000s)	% of Total	Number (000s)	% of Total	Number (000s)	% of Total	Number (000s)	% of Total
Formal - Highly skilled	23.6	3.6%	24.6	3.4%	27.7	3.4%	25.7	3.6%
Formal - Skilled	64.8	9.7%	68.8	9.6%	77.7	9.5%	72.3	10.1%
Formal - Semi- and unskilled	367.3	55.2%	333.6	46.8%	365.0	44.7%	332.0	46.6%
Informal: Total	209.4	31.5%	286.6	40.2%	345.7	42.4%	282.8	39.7%
Total Employment	665.1	100%	713.7	100%	816.1	100%	712.7	100%

Source of basic data: Quantec SA Standardised Industry Data

Figure 44 indicates total employment in the construction sector by skills level. This rose from 665 000 in 2000 to 834 000 in 2006 - before declining to an estimated 713 000 in 2009. The figure indicates that a large proportion of the estimated employment in the construction sector is informally employed. Their number rose from around 209 000 in 2000 to more than 371 000 in 2006 before slipping back to around 283 000 in 2009. The number of formally-employed semi- and un-skilled workers in the sector stood at 367 000 in 2000. This dropped to just under 300 000 in 2004 in response to an “informalisation” of employment, but increased to 365 000 by 2007 before slipping back to around 332 000 in 2009. The number of highly skilled workers only increased by around 2 000 over the full period, while that of skilled workers increased by around 7 500.

Figure 44: Total employment in the construction sector by skills level

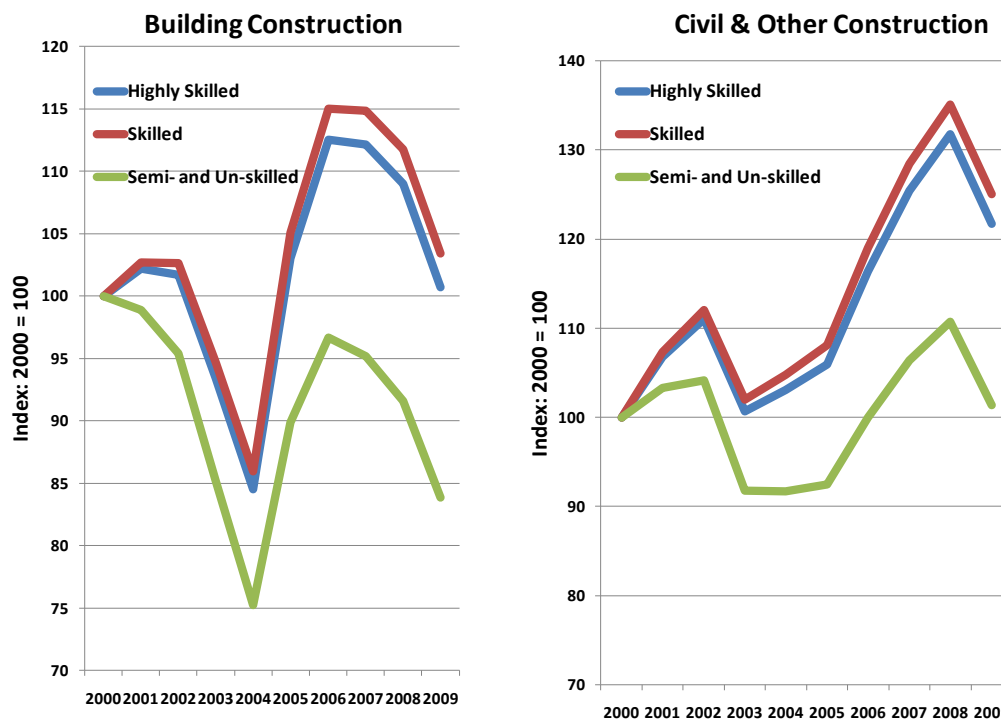
Source of basic data: Quantec SA Standardised Industry Data

Figure 45: Trends in total employment in the building construction and civil and other construction sectors

Source of basic data: Quantec SA Standardised Industry Data

Figure 45 indicates the relative trends in total employment in the building construction and civil and other construction sectors. Employment in the civil construction sector increased by about 31% between 2000 and 2007 - before losing a portion of these gains in subsequent years. In 2009 it was still around 20% above its 2000 levels. Building construction employment increased by close to 24% between 2000 and 2006 before commencing its decline back to its 2000 levels in 2009.

Figure 46: Comparative trends in employment by skills level in the building construction and civil & other construction sectors



Source of basic data: Quantec SA Standardised Industry Data

Figure 46 shows the relative performance of formal employment in the two sectors by skills level. Employment of all skills levels in the building construction sector declined quite sharply between 2000 and 2004, but then responded to the strong increase in demand for housing and other commercial buildings between 2004 and 2006. However, semi- and un-skilled employment remained below its 2000 levels throughout the period.

Employment in the civil and other construction sector followed a quite different pattern – with highly skilled and skilled employment growing steadily between 2003 and 2007, before slipping back. Semi- and un-skilled employment also improved over this period – but at a slower rate.

10. The impact of infrastructure spending on the economy

It is important to acknowledge that the impact of higher public sector infrastructure spending is not limited to the value of that spending. Because of the strong linkages that exist between different sectors of the economy, the impact of spending in one sector is multiplied across the whole economy. This process is known as a multiplier effect.

Multiplier effects – particularly as they relate to fixed capital formation multipliers - are often misinterpreted. In assessing the impact of a R1 million investment in fixed capital in a particular sector, it is important to note that the resulting impact on that sector, and on the economy more generally, can vary substantially. This variation will be influenced by factors such as whether the investment in question constitutes net new investment in the sector, or merely contributes to the maintenance of the existing capital stock in that sector. The extent to which existing production capacity in a sector is currently being utilised will also influence the socio-economic impact of any new investment. The values of multipliers usually assume full capacity utilisation.

While capital formation within the construction sector will be less prone to lumpy capital spending, the same cannot be said for many of the sectors which absorb construction outputs. In the case of sectors where construction inputs tend to be large and lumpy and consequently have a profound impact on capacity utilisation levels, the multiplier effects will be prone to large variations. For example, the construction and commissioning of a new power station will result in a substantial increase in the potential electricity generation of that sector. As a result, levels of capacity utilisation in the electricity generation sector will initially fall substantially, and subsequent investment in the sector will not have the same output, value added, remuneration, gross operating surplus and employment effects as a similar investment would have if the sector was operating at, or close to, full capacity.

For these reasons, it is more accurate to conclude that a particular investment in fixed capital in a sector will support a certain value of output, value added, remuneration and gross operating surplus, and a certain number of jobs. Such support could be of existing economic activity, or new activity, or a mix of the two - depending on whether the investment is net new investment or simply maintenance of existing capital, and on prevailing capacity utilisation levels.

The concept of multipliers arises from the fact that an increase in spending in one sector leads to an increase in demand for the products of those sectors supplying that sector (intermediate inputs) while the additional incomes generated from the value added lead, in turn, to expenditure on the products of other sectors. The result is that an exogenous increase in final demand for the output of one sector leads to an economy-wide impact that may be substantially greater than (a multiple of) the value of the initial increase in spending.

Multipliers can be used to estimate the likely impacts of additional spending on final demand, value added, remuneration, the gross operating surplus, employment, and import leakages. It is possible to distinguish the following multiplier effects³:

³“ Input Output Analysis Sectoral Multipliers for South Africa in 1993” compiled by Gerhard Kuhn and Rentia Jansen, IDC, October 1997

- **Initial impact:** The initial impact is the contribution the specific sector under consideration makes to each one of the above variables. In this context, it would constitute the additional turnover, value added, remuneration, operating surplus or employment injected into the economy that is directly attributable to a change in activity levels in that sector.
- **First round effect:** First round suppliers are those industries who deliver goods and services directly to the particular sector concerned. The first round effect takes account of the initial impacts of the “injected activity” on all first round/direct suppliers.
- **Direct effect:** The direct effect constitutes the sum of the initial impact and the first round effect.
- **The indirect effect:** Indirect suppliers are those industries who, on their part, deliver goods and services to the first round suppliers. For example, the purchases by manufacturing from the electricity sector are regarded as first round impacts of the manufacturing industry, but the backward linkage of the electricity sector, with for instance the coal mining industry and the linkage of the coal industry, in its turn, with its suppliers of intermediate goods and services, are regarded as part of the indirect impact of the manufacturing industry.
- **Induced effects:** Induced effects arise because of the additional household income generated as a result of the direct and indirect effects. The induced effect multipliers capture the additional (induced) effects of household income generation through payments for labour services and the associated private consumption expenditure on goods produced by the various sectors. In this case, household income is treated as being spent within the system and thereby generating further economic activity and thus resulting in larger multiplier effects throughout the entire economy.
- **Total impact:** The total impact is the sum of the direct, indirect and induced effects. It constitutes the potential economy-wide impact of increased activity in a particular sector

Table indicates the estimated average multipliers for a R1 million increase in final demand from the building construction, and civil and other construction sectors. The figures indicate that an increase in final demand from the building construction sector will ultimately give rise to additional sales throughout the economy of R3.86 million, will generate additional labour remuneration (at 2008 prices) of around R548 000, will require gross domestic fixed capital formation of about R288 000, and will support the employment of about 9.4 people.

The multipliers for the civil and other construction sector are similar. A R1 million increase in final demand in that sector will give rise to an average increase of final demand throughout the economy of R3.7 million, will generate additional labour remuneration of around R543 000, will require additional fixed capital formation of R301 000, and support the employment of around 9.4 jobs throughout the economy.

Table 33: Estimated multipliers of the building and civil and other construction sectors for 2008

Description	R Million						
	Initial impact	First round	Direct impact	Indirect effect	Direct & indirect impact	Induced impact	Economy-wide impact
Building Construction							
Sales per R1 million final demand	1.00000	0.68462	1.68462	0.71441	2.39904	1.46348	3.86252
Gross domestic product (At basic prices) per R1 million final demand	0.25640	0.19248	0.44888	0.24364	0.69252	0.55147	1.24399
Labour remuneration per R1 million final demand	0.12524	0.08684	0.21208	0.10085	0.31293	0.23480	0.54773
Gross domestic fixed investment (Average) per R1 million final demand	0.03204	0.05220	0.08424	0.06771	0.15195	0.13667	0.28862
Employment per R1 million final demand	2.87069	1.49104	4.36173	1.42361	5.78534	3.66154	9.44688
Civil and Other Construction							
Output per R1 million final demand	1.00000	0.65231	1.65231	0.55170	2.20401	1.50122	3.70523
Gross domestic product (At basic prices) per R1 million final demand	0.30592	0.20659	0.51251	0.20089	0.71340	0.56568	1.27909
Labour remuneration per R1 million final demand	0.14153	0.08066	0.22218	0.08033	0.30252	0.24085	0.54337
Gross domestic fixed investment (Average) per R1 million final demand	0.04032	0.06346	0.10378	0.05672	0.16050	0.14020	0.30070
Employment per R1 million final demand	3.42012	1.23700	4.65712	1.02137	5.67849	3.75595	9.43444

Source: Quantec

Using the average multipliers for both sectors, and the estimated general government spending on construction-related infrastructure in fiscal 2009/10, the impact on the economy is as shown in Table 29. The spending in question is estimated at R51.3 billion. The table indicates that this spending gave rise to, or supported, economy-wide output of around R194 billion, added R64 billion to South Africa's GDP, generated labour remuneration of around R28 billion, required additional fixed capital formation of R15 billion, and supported the employment of around 485 000 people.

Table 29: Estimated effects of general government spending on construction-related infrastructure in 2009/10 on the economy

Effects Arising from Construction-related Infrastructure Spending by General Government of R51 347 million	R Million						
	Initial impact	First round	Direct impact	Indirect effect	Direct & indirect impact	Induced impact	Economy-wide impact
Sales	51,347	34,324	85,671	32,506	118,176	76,114	194,291
Gross domestic product (At basic prices)	14,437	10,246	24,682	11,413	36,095	28,681	64,776
Labour remuneration	6,849	4,300	11,149	4,652	15,801	12,212	28,012
Gross domestic fixed investment (Average)	1,858	2,969	4,827	3,195	8,022	7,108	15,130
Employment (Jobs supported)	161,507	70,038	231,545	62,771	294,317	190,433	484,749

Source: Quantec

11. Rankings of South Africa's infrastructure and competitiveness

Another objective of the public sector spending on infrastructure is to support the competitiveness of South African businesses. It is, in the end, firms – not countries - that compete with one another for shares of particular markets – so market share of local and global markets for particular products provides the best indication of microeconomic competitiveness. However, country competitiveness is critical to company competitiveness because the quality of institutions and infrastructure and the stability and appropriateness of macroeconomic policy have a profound impact on the level of transactions costs facing firms, and hence on their ability to compete in global markets.

Competitiveness is, ultimately, a relative term. The mere fact that a country has improved in many (or even all) the diverse aspects that influence competitiveness does not automatically imply that that country will be more competitive. If the rate of improvement, and their collective impact, is less than that of other competing countries, then the competitiveness of the country in question might actually deteriorate in relative terms. This is probably particularly true in South Africa's case, where the country has slipped in competitiveness rankings, despite a perceived improvement in many areas regarded as relevant to national competitiveness. In this context, the following definition by Antonio Roversi may be appropriate:

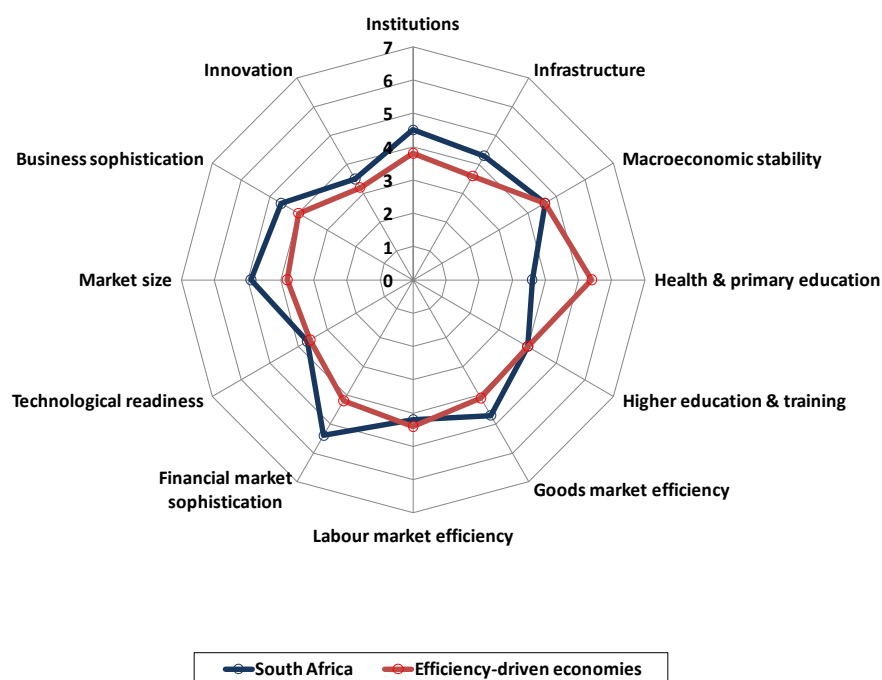
Competitiveness is the ability to run not faster than the grizzly bear but to run faster than your fellows, friends or your competition....

While the quantity of a country's infrastructure may be absolute, the qualitative dimension of that infrastructure has an absolute, functional dimension, but also a relative, competitive dimension. The World Economic Forum's *Global Competitiveness Report* classifies participating countries in accordance with their "stage of development" and weights the twelve pillars listed below in accordance with their perceived importance to that country's stage of development.

- i) Institutions
- ii) Infrastructure
- iii) Macro economy
- iv) Health and primary education
- v) Higher education and training
- vi) Goods market efficiency
- vii) Labour market efficiency
- viii) Financial market sophistication
- ix) Technological readiness
- x) Market size
- xi) Business sophistication
- xii) Innovation

A country's stage of development is based on the level of GDP per capita at market exchange rates, and on the share of primary goods exports to total exports. On the basis of these indicators, participating countries are regarded as being factor driven, efficiency driven or innovation driven economies. South Africa is classified as an efficiency-driven economy. Figure 47 indicates South Africa's scores for each of the 12 pillars of competitiveness listed above. Each pillar has a maximum score of 7, and South Africa's scores are compared with the average for other efficiency-driven economies. South Africa scores better-than-average in respect of infrastructure.

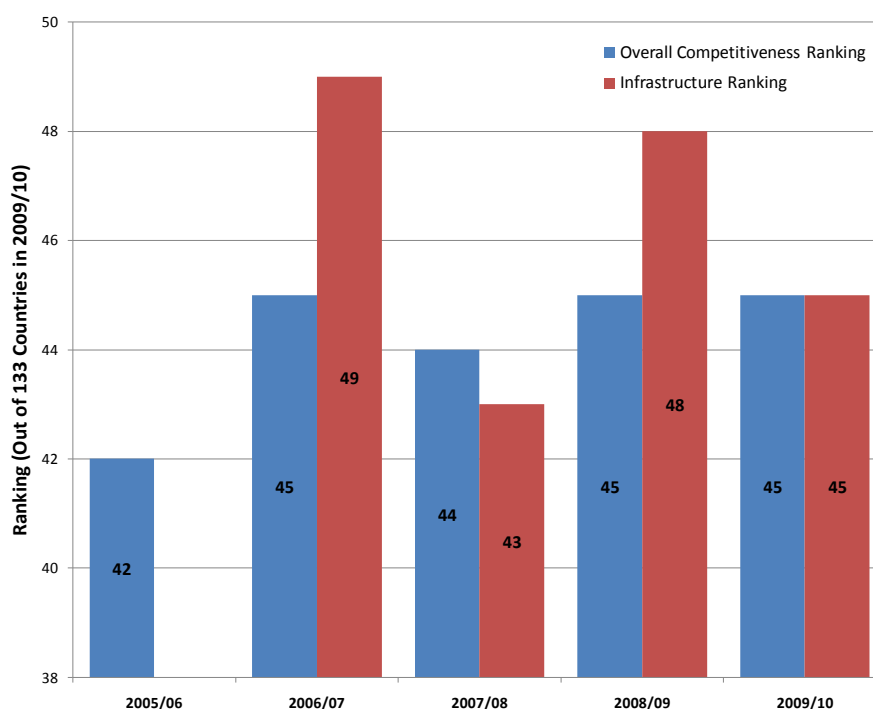
Figure 47: South Africa's scores according to the 12 pillars used in the Global Competitiveness Report 2009/10



Source: Global Competitiveness Report, 2009/10

Figure 48 indicates trends in South Africa's overall competitiveness, and that of its infrastructure. The overall competitiveness ranking has been reasonably static since 2006/07, after slipping from its ranking in 2005/06. The infrastructure ranking has been more volatile, improving from 49th to 43rd between 2006/07 and 2007/08, before deteriorating back to 48th. This deterioration may have been influenced by the electricity blackouts and load-shedding in early 2008. The infrastructure ranking has since improved to 45th.

Figure 48: South Africa's rankings for overall competitiveness and infrastructure according to the Global Competitiveness Report



Source: Global Competitiveness Reports, 2005/06 – 2009/10

South Africa's rankings in respect of the various sub-components of the overall infrastructure assessment are shown in Table 30. They indicate a relatively positive assessment of air transport, and available seat kilometres, a reasonable – but deteriorating assessment of road quality, and poor rankings in respect of electricity supply quality and the number of telephone lines.

Table 30: South Africa's rankings in respect of infrastructure according to the Global Competitiveness Report

Year	Ranking Out of 134 Countries in Respect of:							
	Quality of Overall Infrastructure	Quality of Roads	Quality of Railroads	Quality of Ports	Air Transport	Available Seat Kilometers	Quality of Electricity Supply	Telephone Lines
2007/08	43	38	41		22	21		
2008/09	46	40	37	49	25	21	101	91
2009/10	43	40	40	49	23	23	100	91

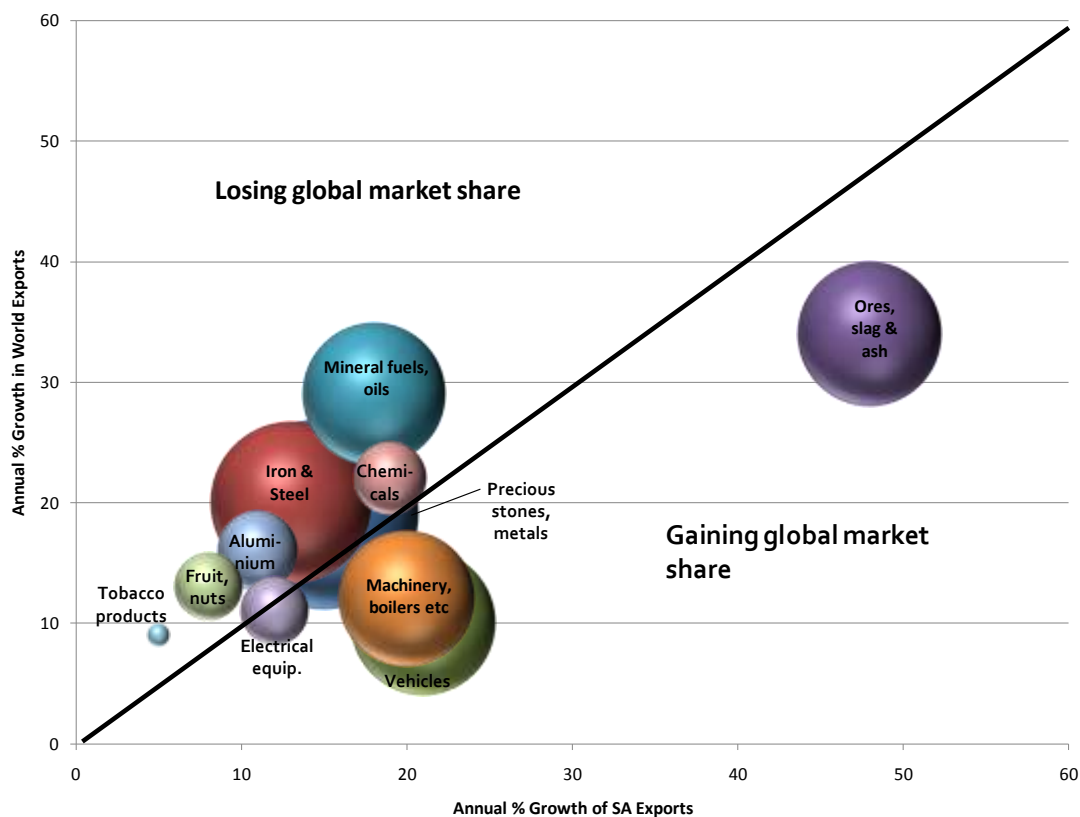
Source: Global Competitiveness Report 2007/08, 2008/09 & 2009/10

As stated earlier in this section, it is ultimately firms that compete – not countries. So the true test of the impact of public sector infrastructure spending on competitiveness should be determined by whether firms based in South Africa are gaining global market share. Figure 49 indicates the most

significant South African industry sectors to have gained global market share in recent years contrasted with some of the sectors to have lost market share. The underlying hypothesis is that merchandise products where the value of South African exports have been growing faster than global growth in exports for the same product categories are gaining market share, and thereby revealing improved competitiveness. Product categories where South African export earnings are growing slower than global export earnings, or are contracting, are indicating deteriorating competitiveness. So, in this instance, ores, slag and ash, motor vehicles, machinery and boilers, and electrical equipment exports are gaining market share – and by inference becoming more competitive. Precious stones and metals, mineral fuels and oils, iron and steel, aluminium, fruit and nuts and tobacco products are losing global market share and becoming less competitive.

While providing an interesting insight into the microeconomic competitiveness of different industries, these figures can – at best – suggest possible correlations with spending on infrastructure. To be conclusive, such an analysis would require that all other factors that impact on a firm's competitiveness are kept constant. It would also be necessary to determine the extent to which infrastructure either contributed to improved competitiveness, or inhibited competitiveness, for each industry. Such an analysis is beyond the remit of this study.

Figure 49: The revealed competitiveness of some of South Africa's more significant merchandise export sectors



Source of basic data: TradeMap

Although not shown in the above figure, the worst performing product categories were nickel, stone and plaster, other clothing, knitwear and zinc – which all experienced negative export earnings growth at a time when global exports of these products was increasing.

12. Conclusion

The quality and quantity of infrastructure has a significant impact on the ability of an economy to grow and develop over time. Ultimately, infrastructure is that part of the fixed capital stock that is available as a supplementary capital input to different sectors of the economy.

On a per capita basis, spending on public sector infrastructure underwent a significant decline between 1984 and 2004, and is still substantially below its peak levels. However, if the growth in spending that was seen in recent years is maintained, average per capita spending on infrastructure will approach or exceed its 1984 level by 2018. While there are concerns that public sector infrastructure spending will slow after the completion of the FIFA World Cup, there are still a large number of projects – most notably in the energy, transport and water sectors – that should sustain spending at relatively high levels for some years to come. Nevertheless, maintaining the pre-2010 level of growth may be difficult in coming years due to the effects of the Global Economic Crisis on economic growth, tax collections, government debt and debt servicing costs, and the availability and price of loan finance.

While the direct impact of infrastructure spending on employment in the construction sector has waned as a result of the economic slowdown, public sector spending on construction-related infrastructure continues to support the employment of around 485 000 people throughout the economy. Although the effects of the recent surge in infrastructure spending have yet to be reflected in a positive impact on South Africa's overall competitiveness ranking, it is expected to improve as a consequence of past, and planned, spending. The real benefits of this spending will only be felt by businesses generally once the various projects are completed.

Perversely, disruptions during the construction and implementation phases of the various infrastructure projects may actually have served to undermine the competitiveness of private businesses (and the economy more generally) in the short-to-medium term. This points to the need for more effective and strategic planning in respect of the future provision of public sector infrastructure.

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15. Annexures

Annexure A: The extent to which different assets comply with the characteristics of infrastructure

Type of Asset	High/ Moderate/ Low	Lumpiness	FC:VC ratio	Sunk Costs	Multiple - users	Externalities	Long lead times
Transport: Air	Airport runways	Hi	Hi	Hi	Mod	Mod	Hi
	Terminal facilities	Mod	Mod	Mod	Mod	Lo	Mod
	Air Navigation Assets	Lo	Lo	Mod	Mod	Lo	Mod
Transport: Sea	Dock facilities	Hi	Mod	Mod	Lo	Mod	Mod
	Accessibility	Lo	Mod	Mod	Lo	Mod	Lo
	Harbour approaches	Lo	Lo	Mod	Mod	Mod	Mod
	Navigation aids	Lo	Lo	Mod	Mod	Lo	Mod
Transport: Rail	Tracks	Mod	Mod	Mod	Lo	Lo	Mod
	Signalling	Lo	Lo	Lo	Lo	Lo	Lo
	Interchange	Mod	Mod	Mod	Mod	Mod	Lo
	Rolling stock	Lo	Lo	Lo	Lo	Lo	Lo
Transport: Road	Road carriageways	Mod	Mod	Hi	Hi	Mod	Mod
	Interchanges	Mod	Mod	Mod	Mod	Mod	Lo
Telecommunications	Non-local transmission	Mod	Mod	Mod	Lo	Lo	Lo
	Cellular towers	Mod	Mod	Mod	Lo	Mod	Mod
	Local loops	Mod	Mod	Mod	Mod	Lo	Lo
	International cables, satellite connections etc.	Mod	Mod	Mod	Lo	Mod	Mod
Energy: Gas	Resource availability	Hi	Mod	Hi	Lo	Lo	Mod
	Extraction assets	Mod	Hi	Mod	Lo	Mod	Hi
	Processing assets	Mod	Mod	Mod	Mod	Lo	Mod
	Bulk distribution	Hi	Hi	Hi	Mod	Mod	Mod
	Local reticulation	Mod	Mod	Mod	Lo	Mod	Mod
Energy: Electricity	Primary energy	Hi	Mod	Mod	Mod	Lo	Mod
	Generation assets	Hi	Hi	Hi	Lo	Hi	Hi
	Transmission	Hi	Mod	Mod	Lo	Mod	Hi
	Local reticulation	Mod	Mod	Mod	Lo	Mod	Mod
	Retailing	Lo	Lo	Lo	Mod	Lo	Lo

Energy: Petroleum	Importing	Lo	Lo	Lo	Lo	Mod	Mod
	Refining	Mod	Mod	Mod	Mod	Mod	Mod
	Bulk Storage	Mod	Mod	Mod	Mod	Mod	Mod
	Distribution (by road)	Lo	Lo	Lo	Mod	Lo	Lo
	Retail outlets	Mod	Lo	Mod	Lo	Mod	Mod
Water	Water capture	Hi	Hi	Hi	Mod	Mod	Mod
	Treatment	Hi	Mod	Mod	Lo	Mod	Mod
	Bulk Distribution	Hi	Hi	Hi	Mod	Mod	Mod
	Local reticulation	Mod	Mod	Mod	Lo	Mod	Mod
	Irrigation	Mod	Mod	Mod	Mod	Mod	Mod

Based on the above table, the authors concluded that the most clear-cut economic infrastructure are:

- All categories of water assets in the table above;
- All categories of gas assets, and all categories for electricity except retailing;
- Cellular towers, local loops and international connections; but technological change is increasing the substitutability of landline and cellular services, reducing disruption potential of infrastructure failures;
- Airport runways and terminals, dock facilities, roads, rail tracks and inter-modal interchange facilities.

Source: Clough et al (2004)

Annexure B: Performance of Eastern Cape local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	2 607	2 227	2 873	3 542	4 874
Actual capital expenditure (Rm)	1 036	1 107	1 243	2 774	8 613
Actual capex as % of budgeted capex	39.7%	49.7%	43.3%	78.3%	176.7%
Number of metros, municipalities and district councils in province	45	45	45	45	45
Those spending less than budget:					
Less than 100%	35	33	39	28	34
Less than 80%	28	30	32	28	27
Less than 60%	26	27	27	22	22
Less than 40%	21	18	20	19	19
Those spending more than budget:					
Greater than 100%	10	12	6	17	11
Greater than 150%	5	9	2	16	8
Greater than 200%	5	5	1	6	5
Greater than 300%	2	5	0	3	3

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure C: Performance of Free State local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	1 008	659	949	1 415	1 989
Actual capital expenditure (Rm)	665	601	841	894	1 530
Actual capex as % of budgeted capex	66.0%	91.2%	88.6%	63.2%	76.9%
Number of metros, municipalities and district councils in province	25	25	25	25	25
Those spending less than budget:					
Less than 100%	18	13	19	20	16
Less than 80%	13	12	15	18	11
Less than 60%	12	9	10	13	10
Less than 40%	10	4	8	6	7
Those spending more than budget:					
Greater than 100%	7	11	5	5	8
Greater than 150%	2	5	3	1	2
Greater than 200%	2	3	2	0	0
Greater than 300%	2	2	2	0	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure D: Performance of Gauteng local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	3 873	4 742	5 969	6 765	9 616
Actual capital expenditure (Rm)	3 316	4 551	5 396	7 182	7 887
Actual capex as % of budgeted capex	85.6%	96.0%	90.4%	106.2%	82.0%
Number of metros, municipalities and district councils in province	14	14	14	14	14
Those spending less than budget:					
Less than 100%	11	10	11	10	9
Less than 80%	10	8	9	7	8
Less than 60%	6	6	5	7	5
Less than 40%	4	4	3	3	3
Those spending more than budget:					
Greater than 100%	3	4	3	4	5
Greater than 150%	1	3	2	0	3
Greater than 200%	1	3	1	0	1
Greater than 300%	0	1	1	0	1

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure E: Performance of Kwazulu Natal local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	3 684	4 074	4 914	5 841	7 693
Actual capital expenditure (Rm)	2 646	3 116	4 177	4 234	7 544
Actual capex as % of budgeted capex	71.8%	76.5%	85.0%	72.5%	98.1%
Number of metros, municipalities and district councils in province	60	60	60	60	60
Those spending less than budget:					
Less than 100%	40	47	46	49	47
Less than 80%	35	42	43	44	40
Less than 60%	29	34	35	34	32
Less than 40%	16	24	27	24	22
Those spending more than budget:					
Greater than 100%	20	13	14	11	13
Greater than 150%	14	5	6	2	5
Greater than 200%	7	5	5	2	3
Greater than 300%	3	4	2	1	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure F: Performance of Limpopo Province local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	985	909	1 639	1 859	3 621
Actual capital expenditure (Rm)	259	671	769	612	2 379
Actual capex as % of budgeted capex	26.3%	73.8%	46.9%	32.9%	65.7%
Number of metros, municipalities and district councils in province	30	30	30	30	30
Those spending less than budget:					
Less than 100%	25	23	25	23	23
Less than 80%	25	16	22	21	22
Less than 60%	23	16	16	15	17
Less than 40%	17	12	11	12	10
Those spending more than budget:					
Greater than 100%	5	7	5	7	7
Greater than 150%	2	3	1	1	4
Greater than 200%	0	3	0	1	1
Greater than 300%	0	3	0	1	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure G: Performance of Mpumalanga local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	659	638	1 332	1 846	2 724
Actual capital expenditure (Rm)	371	642	744	800	1 302
Actual capex as % of budgeted capex	56.4%	100.8%	55.9%	43.3%	47.8%
Number of metros, municipalities and district councils in province	21	21	21	21	21
Those spending less than budget:					
Less than 100%	19	11	16	19	19
Less than 80%	16	7	15	17	16
Less than 60%	12	6	10	15	14
Less than 40%	9	5	7	9	9
Those spending more than budget:					
Greater than 100%	2	10	5	2	2
Greater than 150%	2	5	2	1	1
Greater than 200%	2	3	2	1	0
Greater than 300%	2	2	0	1	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure H: Performance of Northern Cape local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	298	393	471	624	763
Actual capital expenditure (Rm)	311	312	325	369	438
Actual capex as % of budgeted capex	104.3%	79.3%	69.0%	59.1%	57.4%
Number of metros, municipalities and district councils in province	32	32	32	32	32
Those spending less than budget:					
Less than 100%	19	21	24	23	19
Less than 80%	14	19	22	20	18
Less than 60%	13	15	18	17	12
Less than 40%	11	11	12	12	10
Those spending more than budget:					
Greater than 100%	13	11	8	9	12
Greater than 150%	7	9	4	6	7
Greater than 200%	5	6	3	3	3
Greater than 300%	3	5	2	1	1

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure I: Performance of North West local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	806	887	2 099	2 453	2 460
Actual capital expenditure (Rm)	517	669	1 212	703	1 329
Actual capex as % of budgeted capex	64.1%	75.5%	57.7%	28.7%	54.0%
Number of metros, municipalities and district councils in province	25	25	25	25	25
Those spending less than budget:					
Less than 100%	17	17	19	24	18
Less than 80%	16	17	19	23	16
Less than 60%	12	14	16	20	12
Less than 40%	8	8	10	20	11
Those spending more than budget:					
Greater than 100%	8	8	6	1	7
Greater than 150%	4	4	3	0	1
Greater than 200%	3	2	2	0	0
Greater than 300%	3	2	2	0	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009

Annexure J: Performance of Western Cape local government authorities

Indicator	2003/04	2004/05	2005/06	2006/07	2007/08
Budgeted capital expenditure (Rm)	2 628	2 519	5 504	4 742	5 995
Actual capital expenditure (Rm)	1 508	1 657	2 512	3 309	4 653
Actual capex as % of budgeted capex	57.4%	65.8%	45.6%	69.8%	77.6%
Number of metros, municipalities and district councils in province	30	30	30	30	30
Those spending less than budget:					
Less than 100%	28	26	28	24	24
Less than 80%	19	15	17	11	17
Less than 60%	9	9	11	7	10
Less than 40%	2	3	5	1	1
Those spending more than budget:					
Greater than 100%	2	4	2	6	6
Greater than 150%	1	0	0	1	1
Greater than 200%	0	0	0	0	0
Greater than 300%	0	0	0	0	0

Source: Intergovernmental Fiscal Reviews - 2008, 2009