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Infrastructure for South Africa

An assessment of the obstacles and solutions to greater infrastructure investment

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Foreword

BLSA's mission is to support South Africa by creating an environment in which businesses can prosper, creating the economic growth, jobs and tax revenue needed to develop our country. Infrastructure is one of the important features of that environment. It can improve the efficiency of moving goods, the cost and availability of energy, data access and much more. It also is key to providing social services through schools, hospitals and government facilities. We cannot have the South Africa we all hope for without significant investment in infrastructure.

This has been well appreciated by government. President Cyril Ramaphosa has highlighted the importance of infrastructure since taking office, creating the Infrastructure Fund and other initiatives to boost investment. In doing so he has highlighted the importance of the private sector taking a key role in funding and developing infrastructure.

There is great potential in partnerships between government and business to fill capacity constraints and mobilise funding to support infrastructure investment. There is also much that can be done to open opportunities for the private sector to invest directly in infrastructure, such as energy reform and the availability of spectrum for greater broadband rollout. The private sector has always been the largest investor in infrastructure and it will continue to invest the most. The National Development Plan target of investing 30% of GDP in infrastructure will require a great deal of investment from both the public and private sectors.

Yet despite the wide acknowledgement of the importance of infrastructure, the reality is that overall investment levels have been declining for several years. For us at BLSA it was important to obtain an independent, evidence-based analysis of why this is. That led us to commission this report from Intellidex. As it points out, investment has fallen from 20.3% of GDP in 2015 to 17.9% in 2019, and more recent data suggest it has fallen further in 2020.

I have no doubt there is the will among both the private and public sectors to substantially accelerate investment. I also have no doubt that there is the capacity. But to deliver, we need to understand what the constraints on infrastructure investment across the economy are and how they can be unblocked.

This report is a contribution from BLSA to advancing the conversation on solutions. It comprehensively diagnoses some of the constraints and recommends ways these can be removed. In doing so, the authors highlight the role the private sector can play both as investors and as repositories of the skills needed for successful infrastructure project origination, construction and management.

We hope this report supports thinking towards unlocking greater investment. We all stand to benefit if the blockages can be resolved. I look forward to further engagement with all social partners on doing that.

Busi Mavuso
CEO, BLSA

Executive Summary

- Infrastructure investment has **fallen sharply over the past six years,** from 20.3% of GDP in 2015 to 17.9% in 2019, far from the National Development Plan's target of 30% of GDP.
- The fall has been **particularly clear in public sector spending,** with both SOEs and main-budget spending on infrastructure falling from 7.3% of GDP to 5.4% over the same period.
- The public infrastructure investment that has been undertaken has often delivered **poor value for money** (with some exceptions, including the new universities programme and the Renewable Energy Independent Power Producers Programme).
- Within the private sector, investment is relatively less volatile, averaging 12.7% of GDP over the past five years. But **there is volatility at industry level.** Sectors that have grown investment include construction works (roads, bridges), transport equipment and ICT equipment (which has grown most strongly). There has, however, been declining investment in machinery (by far the largest category), mineral exploration and residential and non-residential buildings.
- Minister of the department of public works and infrastructure, Patricia de Lille, has set **a target of 23% of GDP by 2024** – 15% by the private sector and 8% by the public sector. Achieving this goal will require radical interventions.
- Despite the financial constraints on the state, there is **frequently underspending on infrastructure in the public sector.** This reflects both capacity constraints in public institutions, ranging from municipalities to national departments, and the complexity of the framework for on-budget expenditure.
- The **best sources of funding for infrastructure now,** in terms of the overall economic impact, are: 1) reprioritising existing expenditure from consumption to investment, 2) accessing concessionary infrastructure funding from international multilateral funding institutions and 3) using public-private partnerships (PPPs) that are designed to maximise public value and minimise fiscal risk.
- The long-term **economic effect of infrastructure has a greater impact on employment** levels than the short-term employment created by the construction of infrastructure itself. From an employment perspective, value for money must be assessed in terms of economic impact rather than short-term features of the construction process.
- Public infrastructure procurement in South Africa is starkly divided between three mechanisms: SOEs' procurement, on-budget government procurement and PPPs. SOEs face arguably the least bureaucracy in their infrastructure programmes and effectively have autonomy to develop plans and manage projects. **On-balance sheet procurement is complex, but PPPs are subject to onerous additional bureaucracy.** As a result, the use of PPPs has collapsed with no new projects registered since 2017. This is a central problem that should be addressed through new interventions to support public infrastructure procurement.
- The potential solutions to boosting infrastructure investment range from the simple to the complex. **Interventions that are not subject to the binding constraints of capacity shortages and funding are arguably the simplest for the state to implement.** Policy changes that stimulate private sector investment are essentially "free" to the government but can stimulate large-scale investment. Policy-led stimulus options include:
  - Opening up own generation licensing for companies to easily build new energy generating plants of over 1MW. This could be further stimulated through a grid feed-in scheme that pays companies for their excess power.
  - Licensing spectrum for cellular networks to expand capacity and grow 5G networks, including digital migration of television signals would free up substantially more capacity. This has a strong leverage impact on economic growth by improving connectivity and reducing costs.
  - Concessioning by SOEs, particularly of ports and rail, would allow private companies to use existing infrastructure to facilitate greater economic activity.
  - The collapse of mining exploration investment reflects the long-running policy uncertainty that has constrained the mining sector. Finalising the Mineral and Petroleum Resources Development Act (MPRDA) and mining charter would remove this uncertainty and allow investment to restart. Doing so on terms that are competitive with other major world mining investment destinations would maximise the impact.

- Finalising the expropriation bill and proposed amendments to section 25 of the constitution to recommit to property rights. The more robust the protection afforded property rights, the lower the risks facing investors and therefore the higher the volumes of investment.

- **Ultimately, the less the regulatory burden placed on investors, the higher the investment quantum will be.** This basic rule should be calibrated against public policy objectives such as black economic empowerment (BEE), but trade-offs should be made where substantial improvements in investment flows will result from relatively small policy sacrifices.
- More **administratively complex work will be required to boost public sector infrastructure investment.** Amendments are required to the Municipal Finance Management Act (MFMA), Public Finance Management Act and their corresponding regulations. **The infrastructure procurement process needs to start with a standardised assessment of the best delivery mechanism between on-balance sheet procurement and PPPs.** On-balance sheet should no longer be the default procurement approach. The administrative complexity of infrastructure projects, whether on-balance sheet or through PPPs, should be risk-weighted, with lighter feasibility and affordability assessment requirements for smaller projects. Standard templates should be developed for projects in specific sectors that can be repeated across government, for example municipal wastewater treatment.
- At the SOE level, a different kind of PPP approach should be developed that involves greater use of concessions. **Existing SOE infrastructure can be made much more productive by concessioning access to private companies to operate it,** at least in part. Ultimately, the injection of SOE infrastructure into new PPPs could unlock capital for SOEs as well as substantial increases in economic activity.
- The newly created Infrastructure South Africa (ISA) should focus on **advocating for increased use of PPPs across the public sector,** providing political impetus that has been absent in procurement for over a decade. Public sector infrastructure projects should be systematically analysed to identify PPP opportunities.
- The Infrastructure Fund at the Development Bank of Southern Africa (DBSA) should be used to **de-risk projects to ensure they can form viable PPPs.** ISA and DBSA should work with public institutions to create viable PPPs that are then overseen by National Treasury through its Government Technical Advisory Centre (GTAC) and PPP Unit. De-risking can be achieved through several mechanisms including guarantees of contract performance, revenue guarantees, viability gap funding and, in partnership with multilateral institutions, political risk insurance. These all contribute to making projects bankable, which is the minimum viability level for private sector participation.

- The **temptation should be avoided to create ad hoc frameworks for particular infrastructure projects.** Despite its unprecedented success, the Renewable Energy Independent Power Producers Programme (REIPPP) was conducted without a formal framework, making budgeting and accountability difficult. Such ad hoc measures can seem effective in stepping around blockages to deliver optimal infrastructure projects, but they ultimately undermine the coherence of government's overall infrastructure strategy and appropriate management of the fiscal implications. It is far preferable to create a standardised procurement framework that encourages efficiency, specialised solutions in particular segments and maximises overall value for money within a coherent policy framework.
- In determining the appropriate role for the private sector, the key focus must be **on maximising overall economic value of a project.** Risks should be assigned to parties with the capabilities to best manage those risks at the lowest cost, both in having skills and capacity to minimise negative outcomes and having balance sheets that are uncorrelated to negative outcomes or large enough to withstand shocks.
- The private sector can support the infrastructure effort as fee-paying users, builders, operators, maintainers, owners and funders of infrastructure. **PPPs are the optimal mechanism to structure projects to maximise economic value** by assigning risks and responsibilities optimally between parties.
- The private sector can play a role in **both economic and social infrastructure provision** but different considerations apply in each. Various models exist that ensure socioeconomic rights to access infrastructure are protected while allowing private operation and maintenance of infrastructure.
- South Africa's **banks, pension funds, insurance companies and the private equity industry are well equipped** to invest in infrastructure and have capacity. However, investor appetite must be matched to the risk cycle of infrastructure projects. ESG-themed investment opportunities are a good way of widening the appeal of infrastructure.
- The private sector can **also support the public sector with capacity and skills to design and implement effective procurement programmes.** Such engagement must be funded appropriately, using international grants from development partners where possible, with contracting optimised to ensure alignment of interests.
- Organised business should work to galvanise private sector action to support infrastructure development by:
  - **Developing unsolicited proposals** in terms of existing public procurement frameworks. Both on balance sheet and PPP frameworks allow for unsolicited proposals that will be assessed by public institutions. If deemed viable and in line with policy, they can trigger procurement processes. For infrastructure that can unlock significant economic activity, the private sector can jointly develop such proposals.
  - **Undertaking economic impact assessments** to identify high value for money public infrastructure projects. Projects that leverage significant additional private sector investment by enabling private investment can provide substantial returns to public investment. Government, though ISA, should create the facility to routinely receive and consider such impact assessments.
  - **Developing funding instruments and mechanisms** to support greater private investment in public infrastructure. There is collective appetite across investment institutions for public infrastructure provided it is available through the right instruments. Joint actions by institutional investors to share due diligence costs can reduce transaction costs and help to create appropriate instruments. Public capital markets can develop listed instruments to channel private investment into infrastructure. Such capital market development, however, must be matched by public sector development to be able to use them. This may require regulatory change to enable the public sector to use projects bonds, green bonds and social bonds, for instance.
- **Every crisis creates an opportunity.** South Africa now has the opportunity to calibrate its infrastructure procurement framework to unleash high volumes of investment. But change comes with risks. The urgency with which we must deal with our economic predicament should not lead to rash policy decisions that ultimately damage the wider public interest through short-term interventions that have negative long-term consequences. South Africa has a history of infrastructure procurement with many world-class features. It is far better to calibrate this than to try and reinvent it during a crisis.

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1. Introduction – The scale of the challenge

Across the world, governments have increasingly sought to include the private sector in the provision of public infrastructure. From a government point of view, there are two main drivers of the trend: fiscal constraints as governments have attempted to repair their balance sheets; and demand for new infrastructure driven by the need to grow the economy while making it greener and more inclusive.

The private sector brings skills and resources to solving infrastructure challenges that the public sector does not have. As we discuss in this report, there are different roles that the private sector can and should play. Not all infrastructure projects should include the private sector. Where it is appropriate, the private sector can ensure optimal use of scarce public resources, freeing up government capacity to focus on planning, commissioning and, in some cases, financing infrastructure, rather than on building, operating and maintaining it.

Government is the custodian of the public good that infrastructure must provide and therefore is central to planning for it. The private sector can enhance the overall delivery of that public good, but only when the right structures are used that reflect the appropriate economics and contracting requirements.

In the South African context, there are five main drivers of infrastructure demand:

1. Most existing infrastructure suffers from a maintenance backlog and is near end-of-life, causing frequent breakdowns and disruptions to the economy;
2. New energy infrastructure is needed to decarbonise the economy to confront climate change;
3. The spatial legacy of Apartheid must be addressed with infrastructure to link places that people live to where they work, and provide homes with associated services;
4. Inclusive economic growth requires infrastructure to support economic capacity and efficiency; and
5. Delivering a better life for citizens requires social infrastructure such as schools, hospitals and other facilities for public services.

These needs have been heightened by the Covid-19 crisis but were urgent already. Age and lack of maintenance has been causing failures from electricity to water and sewerage provision across cities and towns. The reasons are structural, in how infrastructure is planned and commissioned, and in the capacity to deliver maintenance and new projects. South Africa's infrastructure procurement system is fragmented, with accounting officers in municipalities, provinces and national departments, each ultimately responsible for allocating budgets in terms of legislation. This makes coordination across government difficult. The legislative environment also positions on-budget procurement of infrastructure as the norm, with private sector-funded or maintained infrastructure as the exception, requiring more complex governance processes.

The repair and maintenance requirements are substantial, including:

- **Roads.** The country's 750,000kms of roads have a backlog of R197bn of road maintenance, according to a 2014 estimate by the Committee of Transport Officials, though this figure has been challenged and put closer to R409.8bn (Ross and Townshend 2018). In the February 2020 budget, the total allocation for the 2019/20 year for transport and logistics infrastructure was R90.5bn.
- **Water and sanitation.** There are no single figures for the water and sanitation infrastructure backlog given that it ranges from bulk water supply to local sanitation plants. Some indications of the size of need include estimates that 40% to 50% of the country's 1,400 wastewater works are not in a good state, with 80% of them medium to high risk (Parliament of South Africa 2017). In 2015, the Department of Water and Sanitation estimated that the "general sanitation backlog" is R50bn (Department of Water and Sanitation 2015). Urban water provision also requires significant investment for neglected maintenance, although there are few reliable estimates. The 2019/20 revised estimate for expenditure was R33.5bn.
- **Energy.** The problems with Eskom's existing fleet are well known, with the energy availability factor forecast to be 68% in the 2020/21 financial year (Reuters 2020). This has trended downward for two decades, having been 94% in 2000 (Wright and Calitz 2020). The low availability factor is a result of many years of delayed maintenance to plant and the extension of plant life. Eskom is now committed to addressing this backlog through an enhanced maintenance plan. The infrastructure backlog is also significant in distribution infrastructure, both that of Eskom and municipalities. Estimates (somewhat dated) have put this backlog at R70bn (SALGA 2018).
- **Cities.** Metro infrastructure for roads, storm water drainage, bridges and so on all suffer a significant maintenance backlog. Estimates vary widely on the investment needed to repair and maintain such infrastructure. For example, Johannesburg has estimated the city's infrastructure backlog at R170bn (Cox 2017).

- **Rail.** The most serious backlog is at the Passenger Rail Agency of South Africa (Prasa), which has seen major vandalism and deterioration across its 2,280km of rail infrastructure (Ritchi 2020). Prasa has seen the number of trips per year decline from almost 650-million in 2009 to under 150-million in 2019, inducing a revenue crisis leading to a collapse in maintenance. Its fleet is aged, and it does not have adequate infrastructure to run operations. A modernisation programme is intended to address these issues over the next 10 years at a cost of R172bn, while renewal of rolling stock over the next 20 years will cost R123.5bn (Prasa 2020). At Transnet, the maintenance of 31,000km of track and 2,400 locomotives lagged in the decade to 2018. To address the backlog, R51.6bn is budgeted over the next five years for railways, wagons and locomotive maintenance (Transnet 2020).
- **Ports.** The country's eight seaports are managed by Transnet. These have also experienced a backlog in maintenance and R19.4bn has been budgeted for port facilities maintenance in the next five years and R2bn for floating craft (Transnet 2020).

There are also significant backlogs in the maintenance of the state's 93,000 facilities. Maintenance expenditure is dominated by unscheduled maintenance. Facilities operate in a "run to failure" mode in which emergency maintenance is conducted only when a facility collapses (DPWI 2020). This increases the total lifecycle cost of infrastructure as repairing collapsed infrastructure is invariably more expensive than regular planned maintenance. To try and address this legacy, the Department of Public Works and Infrastructure (DPWI) has set a strategic aim to move towards a maintenance budget that is split 80/20 in favour of scheduled maintenance.

Apart from the maintenance backlog, there is also widespread demand for new infrastructure. Over the medium-term expenditure framework period of three years, R815bn has been budgeted by National Treasury (National Treasury 2020). At the Sustainable Infrastructure Development Symposium (SIDS) in June 2020, projects amounting to R2.3-trillion in new investment were announced (Sguazzin 2020).

Maintenance is separate to the construction of new infrastructure that will enable greater economic activity or provide further social services, but there are key linkages. When maintenance is not properly planned into the infrastructure lifecycle, the costs of infrastructure cannot be properly budgeted. Infrastructure falls into disrepair and ceases providing the public and economic benefits intended. Life-cycle planning must cover construction to decommissioning, to ensure appropriate risk/return decisions can be made at the outset. In the public sector, unplanned maintenance has consumed investment budgets and compromised new build programmes. The DPWI has set a target of budgeting 60% towards infrastructure building and 40% towards operations and maintenance to ensure better budgeting for lifecycles, but such a general rule is not as effective as detailed planning and budgeting for each project's life.

Of course, planning does not automatically translate into delivery. The public sector has many examples of well-planned projects that later went wrong due to unforeseen issues such as freak weather, political changes, or loss of key skills. The skills shortage in the public sector has become a major constraint to infrastructure management across its lifecycle. Local government has found it increasingly difficult to attract the engineering talent needed to maintain public infrastructure. Research conducted in 2015 found that the number of professionally registered engineering staff at municipalities had fallen from 455 to 294 in the preceding decade (Lawless 2017). Additionally, those remaining were on average more junior, with the average age having fallen from 46 to 38. According to one estimate, only 30% of registered engineers now work in the public sector from a peak of 70%, with major municipalities like Nelson Mandela Bay reporting it had only one engineer for a city of 1.15-million people (Kahn 2017).

A 2017 study by the public sector education and training authority reported that the top five skills gaps cited by government departments were financial management, policy development & analysis, leadership & management, strategic management & leadership and programme & project management (PSETA 2017). These shortages all affect infrastructure project planning and delivery. A lack of skills in project development has often been cited as a major impediment to new infrastructure projects, particularly those that include the private sector where it is critical that project costs must be quantified and risks allocated to the right parties. This leads to the often-cited conundrum about infrastructure in South Africa: that there is not a lack of funding but a lack of well-prepared and bankable projects. The binding constraint on greater, more effective infrastructure development and management is not money, it is skills.

This discussion should make clear the following important points that will be central in the remainder of this report:

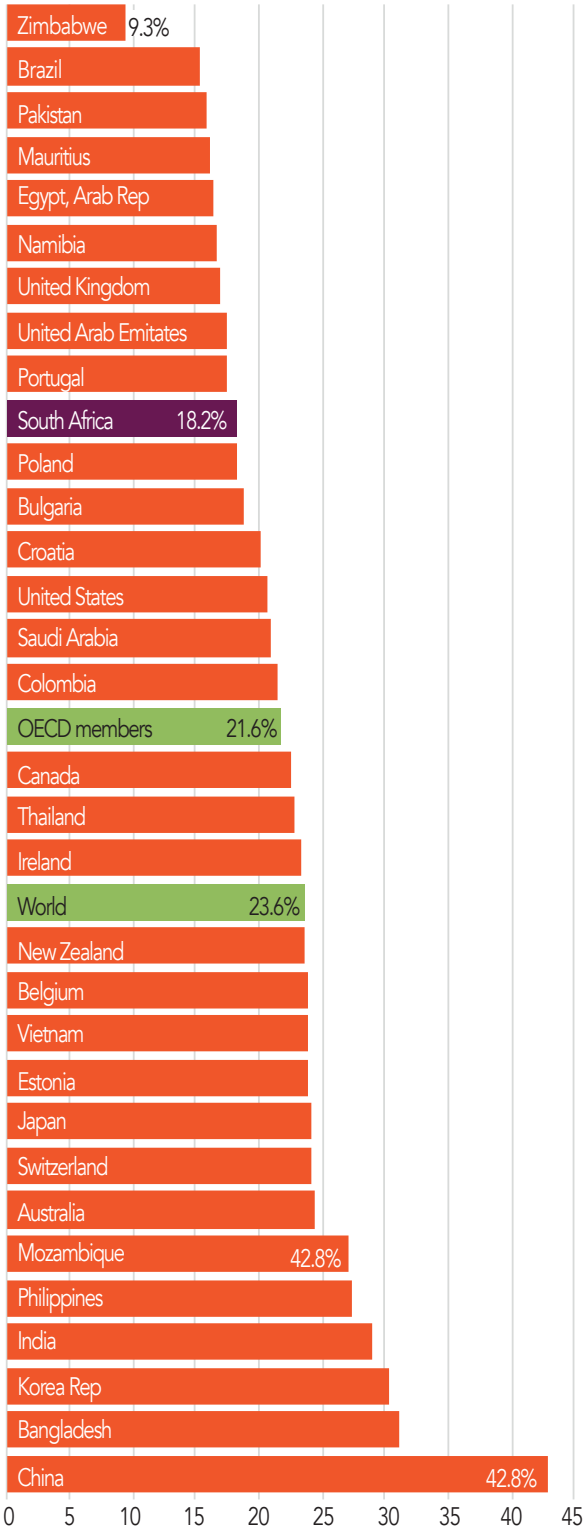
- Infrastructure must be planned for its full lifecycle.
- The state has limited capacity at initiation, operation and maintenance of that lifecycle.

The infrastructure solution cannot be about funding alone. It must be about comprehensive planning and delivery of infrastructure throughout its life. The private sector should be used where appropriate at all points.

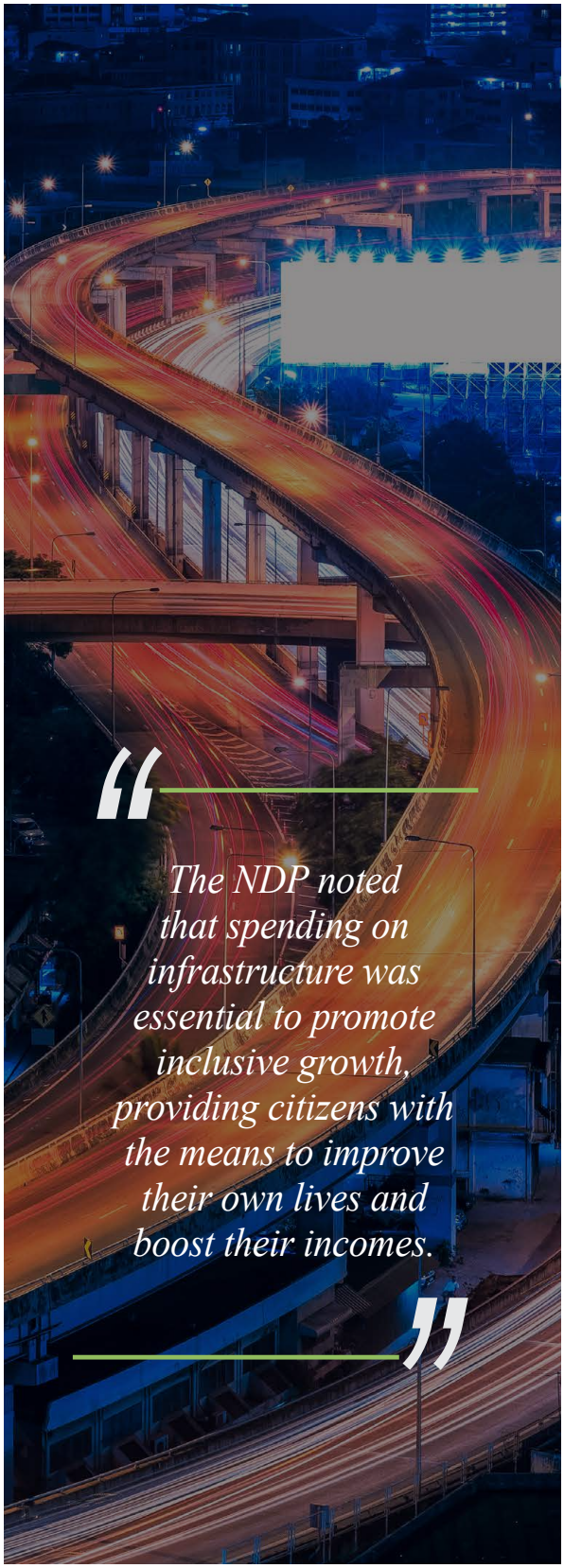
1.1 Declining public investment in infrastructure over the last decade

In 2010 the National Development Plan (NDP) declared that spending on infrastructure should reach 30% of GDP by 2030 (National Planning Commission 2012). It noted that spending on infrastructure was essential to promote inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. This level of spending would bring South Africa closer to high-growth emerging markets such as China, which has spent over 40% of GDP on gross fixed capital formation (GFCF) through the last decade, and India which has spent about 30% of GDP (SARB 2017).

Figure 1: Gross fixed capital formation as a percent of GDP in 2018

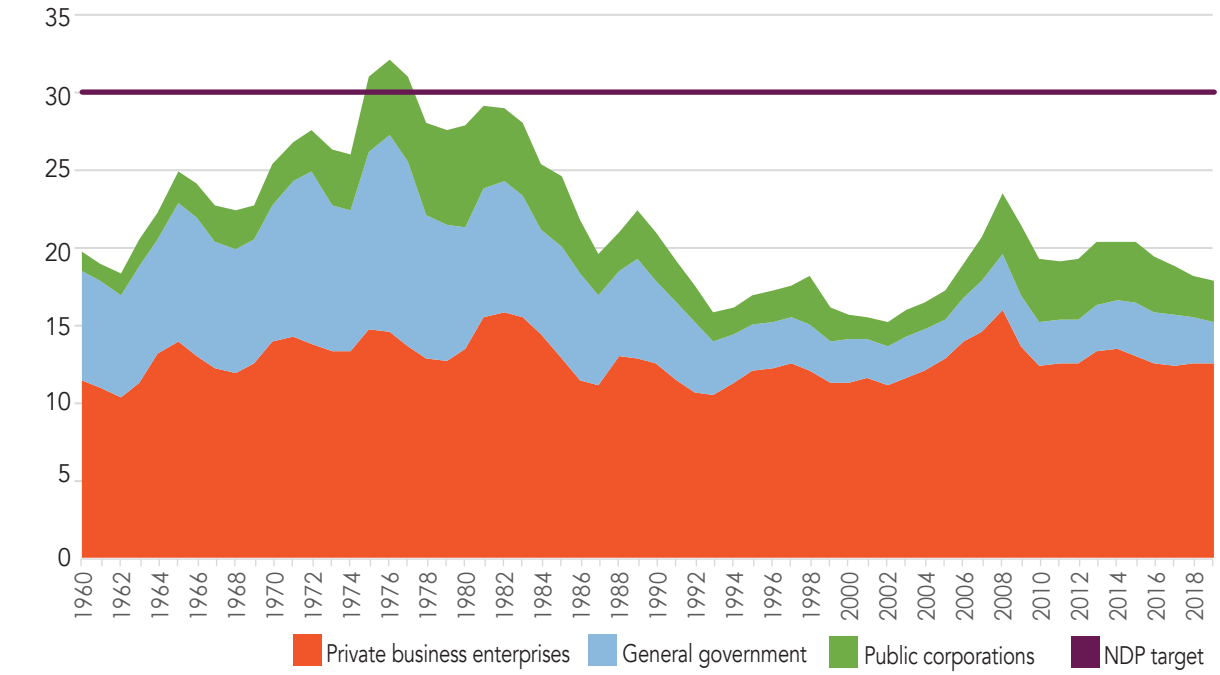


Source: World Bank, World Development Indicators



South Africa's infrastructure spend has significantly lagged this level since the early 1980s, in effect missing a generation of capital investment in roads, rail, ports, electricity, water, sanitation, public transport and housing. The phases of infrastructure spending since democracy track certain interventions. In the 1990s, the recovery and then slump in public spending tracked the expansion of service delivery by Telkom and Eskom to under-serviced areas as well as the purchase of new aircraft by SAA (Perkins, Fredderke and Luiz 2005). That had followed a decline from the record investment levels of the 1970s, arguably because a situation of overcapacity had arisen, for example in electricity and water infrastructure, as well as a decline in domestic savings.

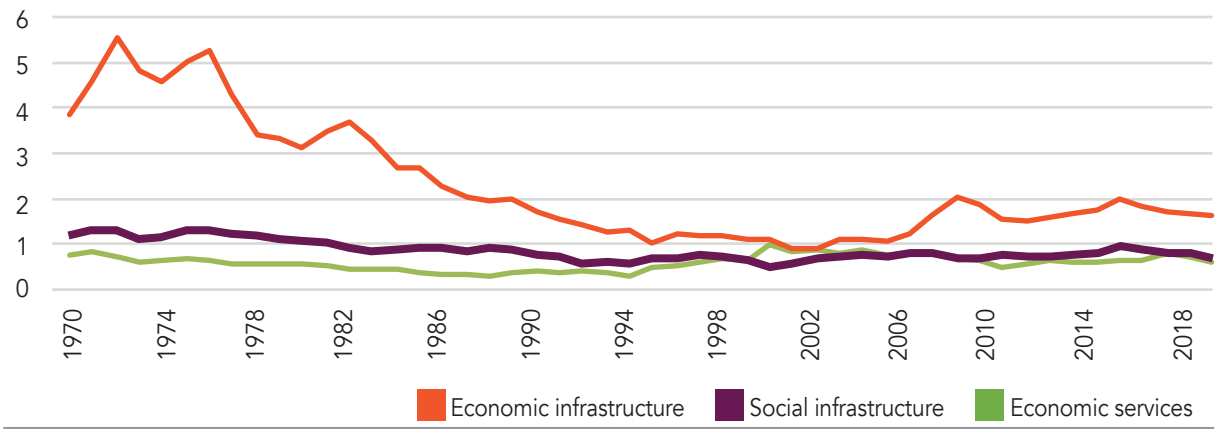
Figure 2: Gross fixed capital formation (annual investment as a percentage of GDP)



Source: South African Reserve Bank, Intellidex calculations

In the post-1994 period, infrastructure investment reached a peak just before the global financial crisis in 2008 (see Figure 2). Investment peaked at 23.5% of GDP that year but dropped sharply following the financial crisis. Post 2008, public sector investment partly picked up the slack through a post-crisis fiscal stimulus strategy by government. This infrastructure programme saw public spending on power plants, ports, railways, freeways, passenger rail and the completion of the 2010 Fifa World Cup stadiums (National Treasury 2010). Spending began to decline again in 2014 – this decline was driven primarily by constraints on SOEs' access to debt as investor concern grew during the state capture era about governance and the level of SOE indebtedness. In 2009, SOEs' infrastructure investment represented 4.6% of GDP but this fell to 2.7% in 2019. General government investment peaked in 2008 at 3.7% but fell to 2.7% in 2019.

Figure 3: Breakdown of functional categories of general government infrastructure spending (percent of GDP)



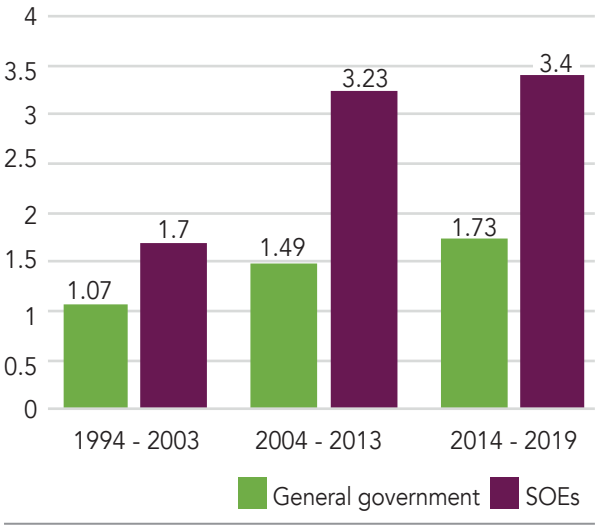
Source: South African Reserve Bank, Intellidex calculations

A further breakdown of the public sector elements of infrastructure spend reflects the variation over time of spend between social and economic infrastructure (see Figure 3). This shows that social infrastructure spending (see 4.1 for details on types of infrastructure) has remained relatively stable at between 0.45% and 0.95% of GDP. Far greater fluctuation has occurred in spending on economic infrastructure which reached 5.52% in 1972 and a post-democracy peak of 2.01% in 2008.

Main government spending on economic infrastructure was higher in the second decade of democracy than the first at an average 1.07% of GDP from 1994-2003 and 1.73% in the most recent five years. This was largely matched in spending by SOEs. Included in more recent figures is the cost of the Medupi and Kusile new builds, which in 2019 were estimated to cost R451bn, about 8.9% of nominal 2019 GDP. Other large infrastructure investments have included Transnet's 1,064 locomotives contract, which had cumulatively amounted to R34.9bn by March 2020 (Transnet 2020). This broadly supports the narrative that public investment in economic infrastructure has been growing.

It is worth emphasising the scale of the challenge. Spending of 17.9% of GDP amounted to R909bn in 2019 (in 2010 rands). Increasing this to 25% would imply an additional R360bn of spending per year, equivalent to building 12 new Gautrain projects every year.

Figure 4: Average investment in economic infrastructure in three main periods (percent of GDP)



Source: South African Reserve Bank, Intellidex calculations

Poor value for money

However, the headline investment number does not necessarily mean value for money for the public. The effectiveness of this spending is questionable. Eskom noted in its last annual report that "the new plant at Medupi, Kusile and Ingula Power Stations have not achieved the desired levels of performance and reliability due to a combination of plant design deficiencies and operational and maintenance inefficiencies" (Eskom 2020). Similarly, Transnet said that "the high levels of capital investment in the recent past were poorly coordinated and unbalanced. As an example, the high level of investment in locomotives and wagons was not matched by the necessary investment in the rail network and terminals, and in maintenance in general. Large cost overruns on major capital projects, including the 1,064 locomotive programme and the New Multi-Product Pipeline (NMPP), compounded the problem. Consequently, expected efficiencies and capacity expansions arising from the accelerated capital programme were not realised and volume performance was significantly below anticipated levels" (Transnet 2020).

These issues are more widespread. National Treasury conducted 30 expenditure reviews between June and October 2020 and noted that, "In several high-spending procurement areas, including information and communications technology, and infrastructure, it appears that government is overpaying for goods and services" (National Treasury 2020). Large infrastructure SOEs like Eskom, Transnet and Prasa were heavily caught up in the state capture era. "These SOEs have been engaged in extensive infrastructure expansion but have been subjected to inappropriate political control and abuse of the tender process, and have become vehicles for patronage instead of service delivery," notes the Human Sciences Resources Council (HSRC 2020).

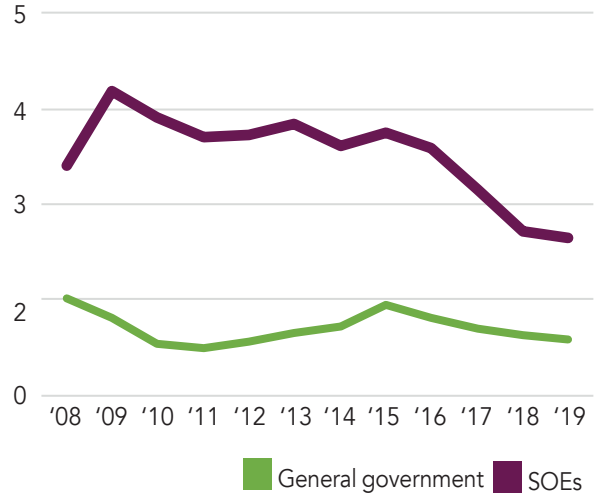
The cost to the public of such inefficiency is twofold. First, the direct costs incurred by the taxpayer in budget overruns required to achieve the planned infrastructure output. For example, Medupi and Kusile were initially budgeted to cost R163.2bn in 2007 and be fully online by 2015 (Watermeyer and Phillips 2020). Second, the indirect costs not being able to use the

infrastructure that should have been available. Delays in bringing Eskom's new builds online have contributed to load shedding which is estimated to cost the economy some R700m per load shedding stage per day (Intellidex calculations). These factors mean the historic spending figures on infrastructure have to be treated cautiously, as the economic impact (i.e. value for money) of that spend may have varied over time.

Figure 5 shows a pronounced recent decline in investment, particularly by SOEs. This decline, at least in part, is attributable to financial constraints facing the SOEs. These have arisen from deteriorating operating performance leading to lower revenue collection and high costs, and from reduced access to debt markets to raise funding.

The SOEs' financial predicament has forced government to step in with financial support. In the case of Eskom, over the three-year MTEF period, government will transfer R112bn to Eskom to enable it to meet short-term financial obligations (National Treasury 2020). This leaves the utility with limited resources to fund further infrastructure and its focus has been on completing Medupi, Kusile and the Ingula pump storage scheme.

Figure 5: Public investment in economic infrastructure (percent of GDP)



Source: South African Reserve Bank, Intellidex calculations

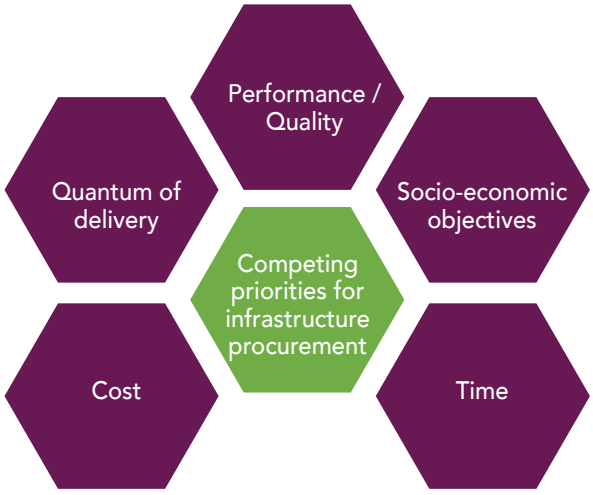
1.2 Underspending in public sector infrastructure budgets

Broadly in government, it is notable that infrastructure investment has often fallen below budgeted amounts. On average from the 2015/16 to 2018/19 financial years, the state spent only 85% of its capital budgets. This happened during a period when National Treasury enforced new rules for the supply chain management system on major public entities and national business enterprises (Watermeyer and Phillips 2020). In 2016/17, none of the metropolitan councils spent more than 80% of their capital budgets (with the worst spending just 55%).

Many factors contribute to this underspending. Capacity shortages are usually the most common issue, with public entities unable to conduct appropriate procurement processes and then manage project development and implementation.

A National Treasury review in 2015 led to new supply chain management regulations in terms of the PFMA (National Treasury 2015). This led to the Standard for Infrastructure Procurement and Delivery Management (SIPDM) framework, which aimed to ensure value for money from infrastructure, ensuring that maximum impact is achieved for the cost, emphasising efficiency in the planning and implementation process for projects. The SIPDM was well received by many in the construction industry. For instance, Consulting Engineers South Africa saw it as helpful in unblocking the infrastructure project pipeline that had accumulated "often through inadequate planning and allocation of resources, as well as excessive bureaucracy" (SAICE 2016).

Figure 6: Balancing competing objectives in infrastructure procurement



Source: South African Institute of Civil Engineers (2016), Intellidex

The SIPDM attempted to balance competing issues that must be managed through an infrastructure procurement process, depicted in Figure 6. These are in tension – high quality infrastructure can be delivered on time if price is ignored. Conversely, price can be reduced if socioeconomic consequences of a project are ignored. All these priorities can be disrupted by corruption in the procurement process and strict control frameworks are therefore important. Ultimately, determining value for money from infrastructure is about maximising all these objectives simultaneously.

The SIPDM acknowledges that a good project can take several years to be developed and implemented, with the control framework for infrastructure delivery rigorous and skills-intensive. It regulates the full project process from design through to execution, imposing control frameworks for each step. Processes must comply with the SA Bureau of Standards' standards for construction procurement. One of the requirements in terms of these regulations was that any deviation of more than R20m in a contracted amount would be allowed only in exceptional circumstances and require prior written approval from National Treasury. This created lengthy delays, with approvals frequently denied, leading to projects running beyond deadline. In many cases, this reflected inefficient approaches to risk sharing, with construction companies forced to carry greater risk than would be optimal. An unintended consequence was that it encouraged suppliers to build in significant contingency costs into contract prices (Watermeyer and Phillips 2020).

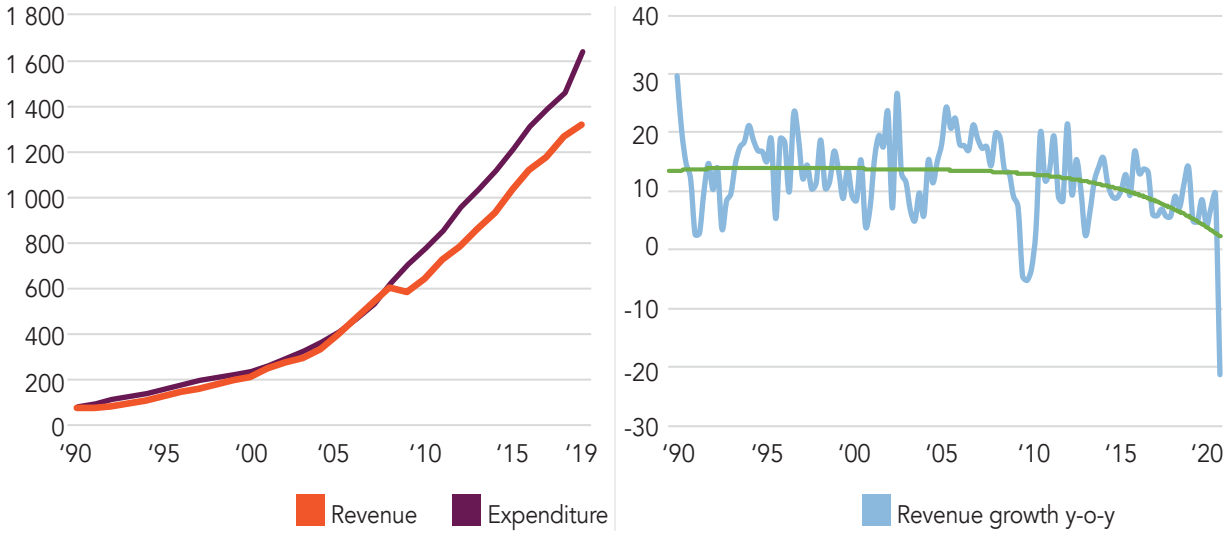
This framework was replaced in 2019 by the Framework for Infrastructure Delivery and Procurement Management (FIDPM) that aimed to address issues that had arisen around the SIPDM (National Treasury 2019). Most of the changes were to align the framework with other legislation and professional competence standards, which promoted some level of efficiency but did not consist of a wholesale review of how the framework affected the public sector's ability to efficiently procure infrastructure. The inability to meet budgets that have been allocated for infrastructure shows that government departments and other state entities have found it difficult to deliver infrastructure through the framework. On this reading, the problem is not money, but skills and capacity to work within the procurement framework. The procurement framework, however, only applies to projects that are delivered through the public entities' own procurement system. As we discuss below in section 6.2, PPPs can operate outside of the FIPDM. These, however, are governed by other regulations which can be even more onerous, as we will discuss.

From a private sector perspective, one of the most problematic consequences of the FIDPM and failure of public institutions to deliver infrastructure projects is the high number of failed tenders. A National Planning Commission study found that from January to September 2018, 17,599 tenders were published, but only 5,255 were awarded and 1,326 were cancelled. In the end, 10,132 were not awarded, 58% of those published (MDA 2020). Failed tenders create extensive costs for the private sector which prepares proposals to submit. Such costs are then factored into future bids, leading to an overall increase in the cost of procurement for the public sector and a decline in trust between the private sector and government.

1.3 Government fiscal constraints and consequences for infrastructure investment

The government has been running a large fiscal deficit since 2008 – the so-called "hippo's jaws". As Figure 7 shows, the jaws opened after the financial crisis in 2008 when revenue from tax collection dipped sharply. While growth in revenue resumed in 2010, the growth rate has been on a declining trend. Government expenditure, however, has continued at an accelerating growth rate. In part, this has been driven by growth in compensation – the public sector wage bill – which has, on average, grown 7.2%/year over the last five years. Other consumption line items have also grown with the result that growth has skewed towards consumption rather than investment.

Figure 7: National government consolidated revenue and expenditure (Rbn) and revenue growth rate (%)



Source: National Treasury, Intellidex calculations

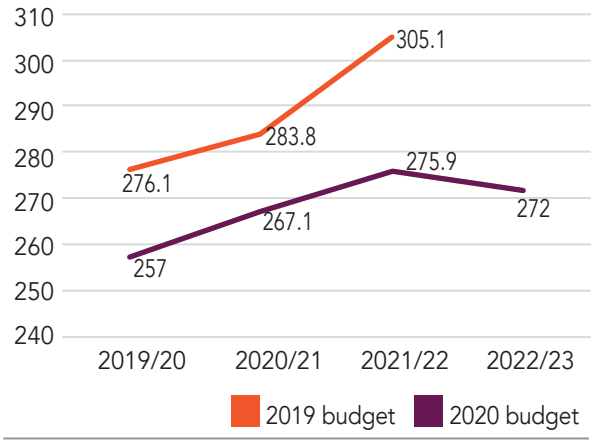
Debt has accumulated as annual budget deficits have had to be financed. The resulting deterioration of the national balance sheet resulted in the loss of the country's last investment-grade credit rating in March 2020, just as the Covid-19 crisis was breaking. The crisis has exacerbated this extremely negative scenario, causing a collapse of government revenue as tax receipts have fallen sharply. The government has implemented sweeping cuts to expenditure, following the October 2020 Medium-Term Budget Policy Statement (MTBPS). The MTBPS reduced budgets for non-interest expenditure by R60bn in 2021/22, R90bn in 2022/23 and R150bn in 2023/24, which will be 1.9% of GDP. There is still nominal growth in spending, with total expenditure set to grow 0.9% on average a year over the three-year period, but this will be negative in real terms. Government is aiming to protect funding for infrastructure investment as these cuts are implemented though infrastructure investment has still declined (National Treasury 2020).

It will be difficult to protect budgets that have been unspent historically. Several government infrastructure budgets are in the form of conditional grants, which are made to local government to fund specific projects. In the 2020 budget, conditional grants saw one of the largest reductions in budget allocations (National Treasury 2020). Provincial conditional grants were cut by R18bn, including human settlement grants (R6.7bn cut), provincial roads maintenance grant (-R1,9bn) and education infrastructure grant (-R1.9bn). Local government conditional grants were cut by R18.5bn including the public transport network grant (-R4.3bn), the urban settlements development grant (-R5.9bn), municipal infrastructure grant (-R2.8bn) and water services infrastructure grant (-R1.7bn). These cuts do not necessarily mean less infrastructure built because the binding constraint has been capacity to develop and implement projects, but the budget cuts mean the option of increased infrastructure is closed off, removing the possibility of resolving the capacity constraints.

Overall, the 2020 budget, including SOE spending, reduced the budget for infrastructure over the three-year MTEF period from R864.9bn in 2019 to R815.0bn (see Figure 8). Further reductions are likely in 2021. Additionally, the fiscal crisis has affected spending by SOEs. They have struggled to access financial markets to raise funding for infrastructure projects. The stress placed on the main government balance sheet feeds through to SOEs as they cannot access government guarantees and have less reliable access to equity and other funding should their balance sheets come under pressure.

Although National Treasury has said it intends to focus budget cuts on consumption expenditure rather than investment, the NDP goal of spending 30% of GDP on infrastructure will not be achieved if we are to solely rely on public spending. There is no alternative but to stimulate private sector investment into infrastructure, while also ensuring maximum value for money from the public spending that takes place.

Figure 8: Consolidated public infrastructure spending budgets (Rbn)



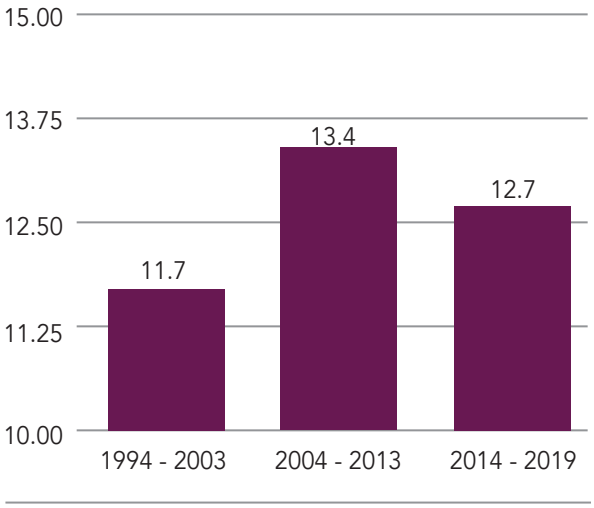
Source: National Treasury, Intellidex calculations

1.4 Flat private fixed capital formation

As Figure 2 above showed, private sector investment is less volatile than public sector infrastructure investment - peaking at 15.9% of GDP in 2008, surpassing prior records set in the early 1980s. Since 1994, private sector expenditure has averaged 12.6% of GDP, with a peak around 2007/8. Over the last five years, private sector investment has been relatively strong, particularly given weak economic conditions and poor corporate profitability.

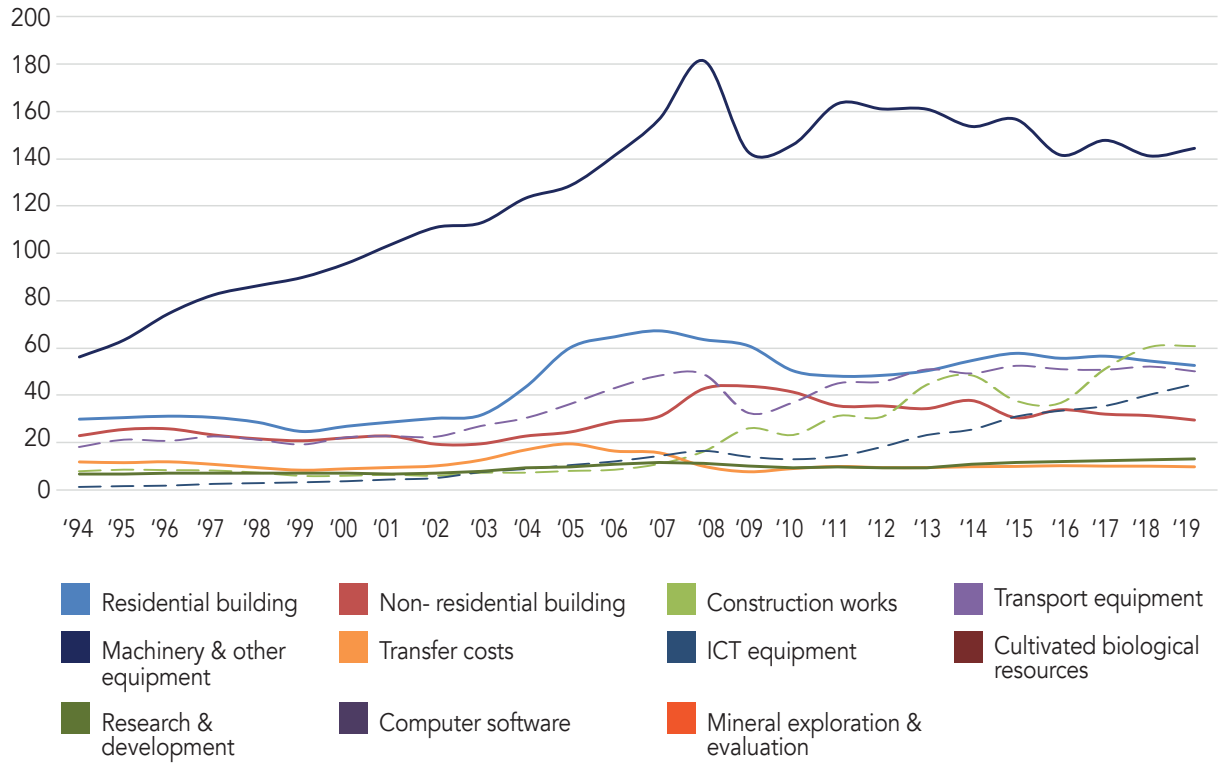
A more granular breakdown of private fixed capital formation shows more detail on trends in investment (see figure 10).

Figure 9: Average private sector fixed capital formation (percent of GDP)



Source: South African Reserve Bank, Intellidex calculations

Figure 10: Breakdown of private fixed capital formation (Rbn, 2010 constant prices)



Source: South African Reserve Bank, Intellidex calculations

Some notable features of the historic trends shown in Figure 10 include:

- Minerals exploration and evaluation has been at its lowest level in history, having peaked at R4.8bn in 2006, it recorded only R377m in 2019 and R387m in 2018.
- Residential buildings construction peaked in 2007 but has remained fairly robust over the last five years at levels significantly higher than the first decade of democracy.
- Non-residential building construction peaked in 2009 when Fifa World Cup-related infrastructure was being built and has trended downward since.
- Cultivated biological resources – i.e. planted farms and similar – has trended downward since a peak of R7.2bn in 2013, posting R4.7bn in 2019.
- By far the largest contributor to fixed capital formation is machinery and other equipment. This peaked in 2007 and has broadly trended negatively since 2010, though it remains at levels above 2006. We expect this line will correlate with overall industrial activity, which has trended downwards since the global financial crisis, electricity cost and availability being a key factor in reduced industrial activity.
- Several areas have seen robust growth in the last several years including ICT equipment, transport equipment, computer software and construction works.
- The growth in ICT and software investment represents increasing digitisation of the economy and firms have invested in computer systems and networks.

Not all infrastructure investment is necessarily positive. For example, when companies buy generator equipment to cover for poor electricity reliability, this registers as investment in machinery and other equipment but does not expand economic output. Again, value for money is the critical factor where infrastructure must be assessed relative to alternatives. In the case of power generation, efficient low-cost provision of a stable electricity supply by Eskom would represent better value for money.

In this way, as with public sector infrastructure spend, caution must be applied to interpreting the figures. Public sector spend can be high but lead to poor outcomes and economic benefits, while private sector spend can be merely to compensate for poor public provision and represent poor value for money overall.

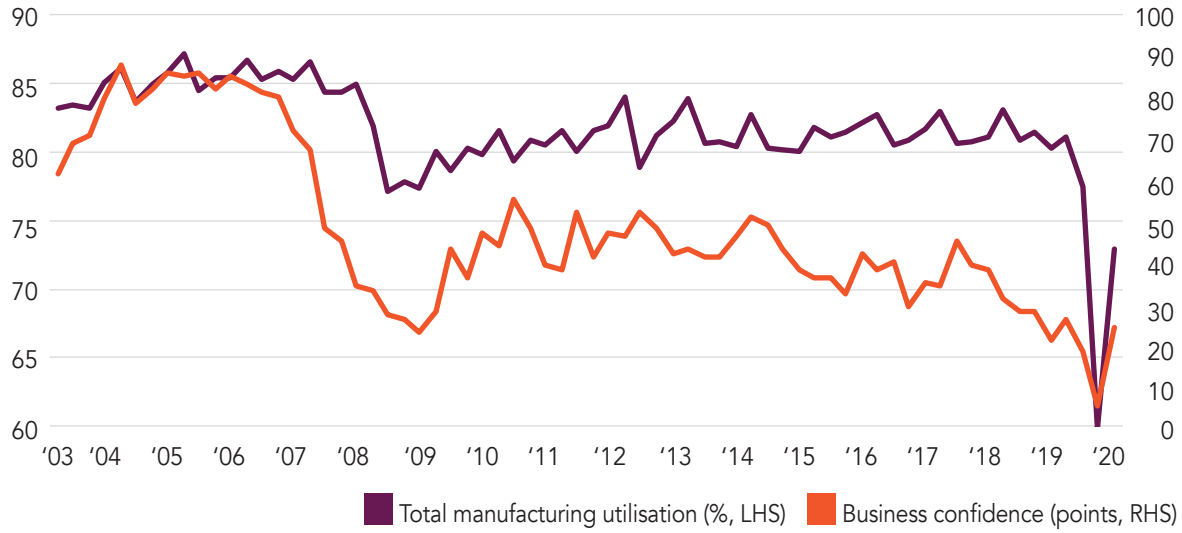
1.5 What causes private sector investment to increase?

Private sector fixed capital formation is largely driven by anticipated demand, existing capacity utilisation and the cost of capital. When demand is expected to be robust and firms are producing near their existing capacity, they invest to expand potential output. The cost of capital affects whether projects are financially viable in that they have a positive net present value. This is driven by interest rates and the valuation of shares on stock markets. During a bull market, the cost of capital declines and it becomes cheaper for companies to get money from shareholders to finance investment. Similarly, low interest rates stimulate investment widely in an economy.

However, low interest rates cannot stimulate investment if companies do not perceive any demand and have available capacity.

The record levels of investment achieved in 2007 and 2008 coincided with high consumer and business confidence. As shown in Figure 11, the period 2004-2008 showed capacity utilisation averaging about 85% and business confidence at record highs above 80 points. These had a positive reflexive relationship with infrastructure investment, both contributing to decisions to invest in expanded capacity and in supporting business confidence further through the economic activity generated by infrastructure investment.

Figure 11: Capacity utilisation and business confidence



Source: StatsSA, InFront, Bureau for Economic Research

The reflexive relationship between investment and confidence makes it difficult to achieve one without the other. President Cyril Ramaphosa has put infrastructure investment central to the economic recovery plan as a mechanism to drive demand and confidence, rather than the outcome of demand and confidence. "Infrastructure has immense potential to stimulate investment and growth, to develop other economic sectors and create sustainable employment both directly and indirectly," he said when announcing the plan (Ramaphosa 2020). This is true of public infrastructure when it delivers value-for-money economic infrastructure such as transport and energy capacity, which can in turn stimulate economic activity. However, it requires a further step for that demand to translate into capacity utilisation, business confidence and private sector fixed capital formation.

The data indicate some clear relationships between private sector investment and policy. The extremely weak investment in mining exploration since 2009, for example, coincides with an extended period of policy uncertainty for the industry, with both the Minerals and Petroleum Resources Development Act and the mining charter subject to review, clouding the outlook for royalties and BEE ownership requirements, among other issues. In 2018 when South Africa recorded just R387m in mining exploration investment, Australia recorded approximately R23bn of exploration investment despite arguably having worse prospects for mineral resources (Constable 2019). We expect expansion by existing mining operations would also be negatively affected in the same way. Similarly, policy uncertainty on land reform and property rights will have constrained investment in immovable assets and may

have contributed to the decline in biological assets from R9.7bn in 2013 to R4.7bn in 2019.

Such policy-affected investment by the private sector is, to some extent, independent of the capacity and demand issues that drive "normal" investment decisions. Policy can affect private investment both positively and negatively. Creating uncertainty or increasing the cost of investment through restrictive licensing and other policies will constrain investment. Conversely, positive policy changes can lead rapidly to expansion of private sector investment when opportunities are created. For example, the long-awaited auction of digital spectrum to mobile telephone operators will trigger extensive investment in expanding network infrastructure. Changes to electricity generation policy to allow embedded generation by firms of over 1MW and the sale of excess generation into the grid would trigger largescale investment in energy infrastructure.

Such "policy-led" infrastructure investment can be triggered at low cost and in an environment of weak business confidence and excess capacity in the economy. Such investment would contribute to demand in the economy while simultaneously creating capacity and efficiencies. A public infrastructure investment programme can similarly stimulate demand in the economy through the procurement of projects. The feedback mechanism then drives wider demand and capacity utilisation which in time drives further private sector investment, creating a virtuous cycle. Policy and public sector infrastructure investment are the triggers to spark the virtuous cycle.

1.6 Infrastructure investment and economic growth

In general, spending by government raises aggregate demand in the economy and supports economic growth. The usual mechanism to assess this is the fiscal multiplier. A multiplier of 1 means that for every R1 spent by the government, R1 is added in GDP. South Africa's fiscal multiplier has ranged from a high of 1.6 in 2010 to possibly a slightly negative multiplier in 2019, implying that for every R1 spent by government, a net decrease occurred in GDP (SARB 2020). A negative multiplier is unusual but can arise when there is such an adverse reaction by the private sector to spending by the government that the economy shrinks. Adverse reactions may occur when government spending is funded out of high tax rates or financial repression (such as crowding out private investment or compulsory purchases of government bonds) or when the consequences for government credit worthiness is severe, leading to solvency problems among investors in government paper.

Investment has a higher multiplier than consumption, particularly where such investment is focused on domestic capital rather than imports. All else being equal, therefore, the shift in government spending composition from consumption to investment should be positive for the economy even while the overall budget is held constant. Multipliers are also larger when capacity utilisation is low as firms are able to supply infrastructure at relatively lower cost, leading to better value for money.

The economic impact of infrastructure investment is not a function of spending alone, but also its long-term productivity impact. Infrastructure should enable businesses and individuals to produce goods and services more efficiently. Obviously, some kinds of spending have a greater impact on this efficiency than others. Infrastructure that catalyses private sector economic activity by reducing the cost of moving goods around the country and through ports, or that enables development of housing and other construction around bulk public services, can have large effects.

Infrastructure has both short-term and long-term effects (the following discussion is adapted from Stupak, 2017). In the short term, during the construction phase, goods and services are consumed in creating infrastructure, but the overall impact on the economy depends on how it is financed and how quickly it is rolled out. When funded out of tax increases, the short-term economic impact can be negative as demand is displaced from the private sector. When funded out of debt, the impact will depend on government's cost of debt and overall balance sheet position. If government has little borrowing and low-cost access to debt, particularly if that debt is funded by foreign investors and there is no crowding out of domestic funding, the overall short-term economic impact will be high. Also, the economic impact occurs only when payment happens – many infrastructure projects have long lead times during project preparation requiring investment by potential suppliers with no guarantee of returns.

In the long term, the productivity benefits of infrastructure contribute to GDP, but again the extent of this benefit depends on the way the infrastructure is financed. If it crowds out private sector investment and has a relatively small economic impact, the effects will not necessarily be net positive. Infrastructure that is funded at low cost with minimal impact on domestic funding or tax revenue, will have the highest long-run benefit. Investing in a new office building for a government department, for example, may have a small impact on the productivity of that department

which would contribute to economic growth, but investing in a new gantry crane in a port might have a much larger economic impact by increasing the port's capacity. It is crucial that the economic impact of infrastructure is sufficient to cover the cost of the infrastructure, including the cost of finance, otherwise it amounts to net value destruction.

Long-term benefits depend substantially on the kind of infrastructure. Core economic infrastructure like roads, utilities and ports have larger economic effects than social infrastructure like schools and hospitals, though social infrastructure is important for other reasons (see section 2.1 below). Some investment can unlock significantly greater economic activity than other investment and this long-term impact assessment must be factored into procurement decisions in allocating scarce public funding and other resources. Infrastructure that is delivered on time and on budget will have greater long-run benefits than projects that are late and have cost overruns. Overall, efficiently delivered projects calibrated to maximise economic efficiency effects that are funded at low cost will have the most significant impact and are most likely to dominate any negative effects of the financing used.

Below we list the potential funding sources for infrastructure in South Africa and the expected economic effects:

Funding source	Relevant features	Expected short-term GDP effect	Expected long-term GDP effect
Shifting existing budget from consumption to investment	Cuts to public sector wage bill, services and other consumption spending	Positive by improving the fiscal multiplier	Positive with no crowding out of private investment
Compulsory purchase of SOE debt	Pension funds and other institutions are forced to acquire bonds to fund infrastructure (prescribed assets)	Negative – contagion of weak government balance sheet to consumer and financial sector balance sheets will damage confidence and outweigh aggregate demand impact of projects	Negative – crowding out of private sector investment, particularly at below market yields, leaves less capital available for high-return projects in the private sector
Market priced government issuance	Usual domestic issuance, however sub-investment grade credit rating and poor core credit metrics (e.g. debt-to-GDP ratio and budget deficit) imply high cost of market access	Likely negative – large budget deficit creates financial risk for existing bond holders leading to lower investment in other risky activities	Likely negative – crowding out impact on domestic market, particularly with reduced foreign participation in new issuance, may outweigh productivity gains
Concessionary foreign MFI funding	Infrastructure funding provided by international financial institutions like the World Bank and the New Bank for International Development	Positive – depending on conditions of lending but may improve wider market confidence in government fiscal sustainability while creating short-term demand.	Positive – no crowding out of domestic market. Enhanced oversight may improve value for money of infrastructure and long-term productivity impact
Tax increases	Hikes in personal, business and consumption taxes in order to fund infrastructure	Negative – given SA's tax rates are high by global standards, further increases will move economic activity out of the country while reducing consumer discretionary spending	Mostly negative – while better for government fiscal sustainability, the decrease in long-term demand may outweigh the productivity benefit of the infrastructure
Public-private partnerships	Private sector funds infrastructure development with government taking risk through revenue guarantees, offtake agreements, concessions, etc	Generally positive – the terms of the PPP will affect impact. PPPs that amount to off-balance sheet liabilities for the government may be perceived negatively but can usually stimulate private sector investment	Mostly positive – PPPs usually include full life cycle project planning with good provision for maintenance, maximising long-term productivity impact

Our analysis indicates that the best sources of funding for infrastructure for the government are:

1. Reprioritising existing expenditure from consumption to investment;
2. Accessing concessionary infrastructure funding from international multilateral funding institutions; and
3. Using PPPs that are designed with minimal negative consequences for fiscal risk.

1.7 Infrastructure investment and employment

The employment created by infrastructure is mostly a function of the economic effect – as output increases, firms hire more employees to expand production to meet greater demand in the economy. Conversely, if infrastructure is funded in a way that reduces overall economic activity, net employment may shrink.

Employment is also affected directly by the infrastructure created. In the short-term workers are hired during the construction phase. In the long term, the productivity impact of the new infrastructure improves the competitiveness of firms which allows them to expand and increase employment. The size of these effects, however, is difficult to measure. Most studies argue that the employment impact is greater in the long term than in the short term (Stupak 2017). However, some have found that in China the impact on employment is very weak, both in the short-term and long-term (He 2017). One study found that employment impact of road infrastructure is positive in the UK, but that this works by increasing the number of firms operating rather than increasing the headcount of existing firms, though existing firms increased salaries and productivity (Gibbons, et al. 2019).

This corresponds with the ambiguous net economic effects of infrastructure. The conclusion is that employment effects depend on the projects undertaken, particularly in respect of the productivity impact in the long run. South Africa's infrastructure programme must carefully choose projects to ensure the best long-term productivity impact in the economy.

Employment outcomes are likely to vary, but policy around procurement can lead to greater or lesser effects. Construction can be relatively labour intensive which can be encouraged through procurement conditions. Local content proportions in the new infrastructure will lead to greater domestic employment. However, placing such constraints on the providers of infrastructure will increase costs and will apply only in the short run, with the attendant negative effects of requiring increased funding to cover higher costs. The productivity impact of the infrastructure tends to be the larger driver of employment creation – so in maximising the employment impact, it is most important that productivity is maximised.

Funding decisions can also be relevant, particularly where infrastructure investment is undertaken as an alternative to consumption. Infrastructure tends to be capital intensive, requiring extensive use of capital equipment. When it is undertaken as an alternative to consumption of labour-intensive services, net employment may be lower. Such short-term effects, however, are likely to be swamped by the long-term employment effects of increased productivity in the economy.

2. Types of infrastructure

2.1 Economic and social infrastructure

Economic infrastructure supports and generates economic activity such as roads, ports, railways, telecommunications networks, airports, electricity generation, distribution and so on. Social infrastructure is the combination of basic tools to support human development such as hospitals, clinics, schools, government social services facilities and so on. These depend on each other – the economy cannot function without well-educated and healthy citizens while citizens cannot live good lives without an economy to generate income and economic infrastructure to support their lifestyles.

However, there are important differences when it comes to the project management and financing of these types of infrastructure. Economic infrastructure creates economic value. Transport, power and telecommunications networks allow for firms to create and distribute goods and services in generating financial returns. It therefore directly affects the generation of revenue in an economy. Economic infrastructure also supports economic growth and improves people's standard of living.

Social infrastructure, in contrast, does not directly lead to increased economic activity or living standards. It supports the social development of a country but does not directly lead to activity that generates revenues.

The distinction plays into debates over how infrastructure should be financed. Ultimately, infrastructure can be financed either by those who use it or by taxpayers. This is true of both private and public infrastructure.

Economic infrastructure generates economic value for its users. A "user pays" principle is therefore often applied. A port, for example, is funded by charging berthing and storage fees.

There are several benefits to a user pays model:

- Fees are a good way of managing congestion in the use of economic infrastructure as it narrows usage to those who derive on economic benefit that exceeds its cost.
- Fees ensure efficient allocation of resources by providing a clear decision rule for what projects to develop. Charges must fully cover the cost of providing services while people buy services up to the point at which the value they receive is equal to the price they pay (Bird and Slack 2017).
- A user pays principle ensures the (public) provider is efficient. Users become a political bloc with an interest in ensuring that they do not suffer excessive charges.

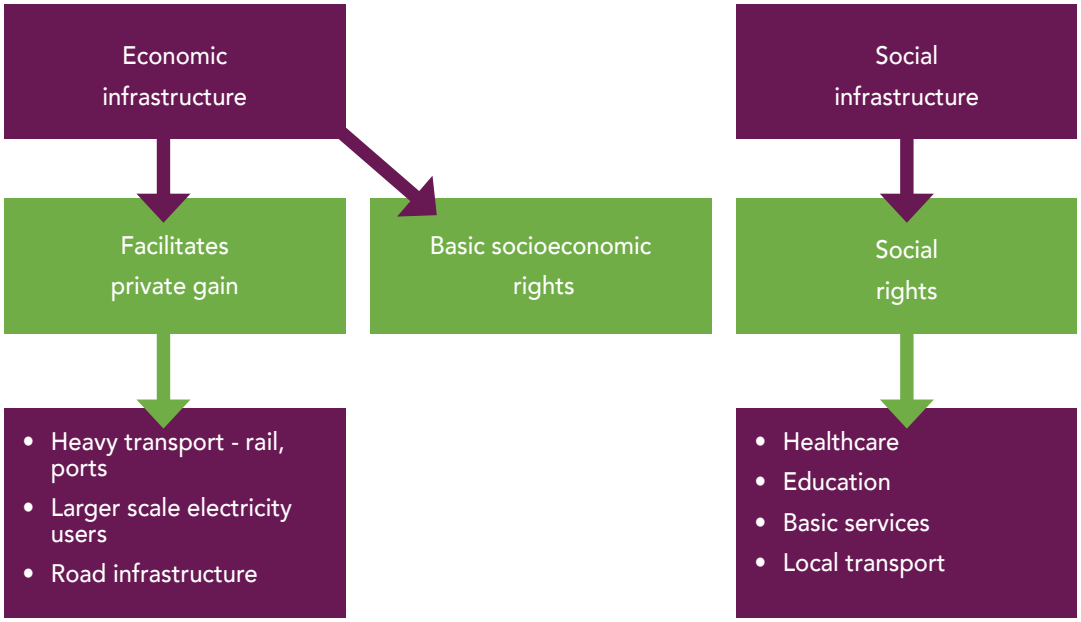
However, these principles must accommodate various issues in practice. When the public sector provides economic infrastructure, it is seldom purely economic. Water and electricity, for example, support economic activity when they are provided to firms, but they also support a minimum quality of life for individuals. The South African constitution delineates social and economic rights and provides that everyone is entitled to reasonable access to housing, health care and education (Goldstone 2006). Socioeconomic rights affect access to electricity, water and transport, among other services. For example, the electricity price setting mechanism in South Africa through the National Electricity Regulator of SA (Nersa) has been challenged in court on the grounds that excessive increases interfere with the socioeconomic rights of individuals (Odeku and Gundani 2017). Since the advent of democracy, the electrification of the country has been important for social reasons, with Eskom having connected over 3-million new customers and the extent of electrification of households having increased from 36% in 1990 to 90% in 2016. On top of this infrastructure rollout, in 2003 government introduced free basic electricity, with the tariff kicking in only once a threshold is reached (ibid).

This followed the implementation of free water in 2001 at municipal level which provided for six kilolitres of water to be provided to households per month, with progressively higher tariffs applying for higher consumption, funded out of the equitable share (Calfucoy, et al. 2009).

Access to other forms of infrastructure also have social rights dimensions, for example, transport is important to ensure children can access educational facilities while water and sanitation reduce illness (Gnade, Blaauw and Greyling 2017). Even telecommunications infrastructure has some social benefit aspects in the provision of free emergency calling.

On top of this dual economic and social role some infrastructure plays, there is purely social infrastructure too. This refers to infrastructure that serves the basic social needs of the population, including healthcare and education facilities, the court system, defence infrastructure and the infrastructure that supports other basic government services from social grants to identity registries.

Figure 12: Economic infrastructure must also deliver on socioeconomic rights



Economic infrastructure in its pure form facilitates private gains in the form of increased earnings for firms and individuals. However, in South Africa the constitutional commitment by the state to meet socioeconomic rights of citizens, subject to reasonable resource constraints, means that economic infrastructure also plays a social function.

The case for user pays models is clear in the case of pure economic infrastructure. The private gains that arise from its use should be used to finance it. However, a pure user pays principle violates the socioeconomic rights of individuals when they do not have the resources to pay to consume basic provision. It can also be difficult to implement a user pays model where use cannot be restricted, and the infrastructure forms a public good (such as flood controls).

In resolving these concerns, several options are available:

- **License the private sector to provide the infrastructure but ensure licence conditions cover the socioeconomic needs of the population.** For example, in 1996 Telkom was granted a legislated monopoly on fixed line telecommunications for five years, provided it installed 2.8-million new lines including 120,000 payphones, with 1.7-million in under-serviced areas (ITU 2001). Such an approach depends on the viability of fully capturing the required socioeconomic objectives up front, particularly in matters involving fast-changing technology. Indeed, in the case of Telkom, cellular services quickly made much of its rural infrastructure redundant.
- **State procures all output from the infrastructure.** The use of the infrastructure then becomes a political decision rather than an economic one. Several PPPs that use this model have been implemented, including office accommodation for government departments, prisons and hospitals. Such infrastructure is either directly financed by the state or financed privately but funded out of the cash flows from state procurement.
- **Private sector funds and operates the infrastructure but state procures access to satisfy socioeconomic needs.** The state can be a customer to any private infrastructure facility in order to acquire services on behalf of another user. Some mixed-use housing projects consist of a mix of private accommodation and state-funded accommodation. Similarly, the state rents accommodation in commercial mixed-use facilities.
- **State funds and operates the infrastructure.** Much road infrastructure is operated by Sanral, for example, on an open access basis. In such cases, user pay models can still be used to generate revenue, and private funding can be raised to finance the infrastructure.

2.2 Appropriateness of private sector roles in each

The public and private sectors have different functions to play in creating infrastructure. The appropriate role should be determined by the allocation of risk to the party best able to manage it. Risk has many definitions, but broadly reflects the probability of some adverse event that will affect the value of the infrastructure. Risks can be reasonably predictable, such as the amount of sunshine or wind to expect when planning a renewable energy project, or quite unpredictable, such as the impact of epidemics or earthquakes. Where they are predictable, they can largely be factored into a model so that over the long term they are accommodated. Unpredictable risks are those which cannot be costed and they will include surprise upside events as well as surprise downside ones. In user-pay models, risks include demand risk, being the amount of use to be made of the infrastructure and therefore the revenue that can be generated.

Irwin (2007) argues that the right approach to risk allocation is that which maximises the value of the project. Value reflects the ability of each party to:

- **Influence the likelihood of the risk occurring**. For example, private providers are best skilled to manage project construction and therefore should carry the risk of cost overruns or delays. They can choose the materials to be used to lower cost and choose the working conditions for workers. If a private provider is responsible for operating and maintaining the infrastructure, it has a strong incentive to ensure high quality construction.
- **Influence the cost to the project should a risk occur.** For example, no one can anticipate an earthquake, but a project can be designed to minimise the consequences should one occur. Making a private developer responsible for some level of repair in the event of an earthquake will incentivise design techniques that ensure damage is minimal.
- **Absorb the risk.** If the likelihood of risks cannot be controlled by either the private sector or state, then it should be allocated to the party best able to absorb the risk if it occurs. The relevant factors will be the size and features of the balance sheet of the risk-carrying party, including the correlations with other assets on the balance sheet, the ability to insure such risks with third parties, and the ability to pass on costs to users. Ultimately, a risk is borne by shareholders in the case of private firms or taxpayers in the case of the state. Because the taxpayer base is far larger than any firms' shareholder base, there are some risks that only the public sector can take.

The above considerations suggest the private sector should frequently play a role in infrastructure. In construction, for example, the risks of accidents and material deviations from design specifications is significant and the construction firm is best played to manage these risks. Therefore, worldwide, it is usually private firms that undertake construction. One downside of this approach, however, is that construction firms need to have large balance sheets to be able to absorb risks of expensive failures during construction, so excluding small companies from the construction end of the infrastructure lifecycle. However, in the case of very large risks that arise particularly in megaprojects, the state will need to carry more of the risk as the largest balance sheet available. The state (or multilateral financial institutions) can also de-risk a project by absorbing the political risks associated with it, such as the costs of changing policy that affects pricing related to the project.

The allocation of risk directly affects the cost of the infrastructure. Risk is worked into the cost of finance for a project and maintenance and operating charges will similarly reflect risk being carried by the private provider. In allocating risk, therefore, the fundamental principle to apply is Irwin's **principle of maximising the overall value of a project, while keeping in mind the social objectives of government.**

In general, the rule of thumb that has arisen is that the private sector should take on construction and operating risks, but, given its much larger balance sheet, the public sector should bear the financial risk. This rule of thumb has many exceptions and it may be appropriate for the private sector to carry at least some financial risk, particularly where there are user fees that need to be collected and usage needs to be stimulated through marketing. The private sector, however, brings innovation and skills to the project construction and operations which can be specified through key agreements on service standards.

However, political risks are difficult to manage because legislation can be changed and parties in power can change. There are ways that the private sector can mitigate these, by ensuring that it engages with legitimate state representatives that genuinely protect the public interest. However, political risks can arise over the lifetimes of projects that are hard to manage.

Political risks are factored into the risk analysis by considering "triggering events" and their likelihood. Triggering events range from new policies that affect the cashflows during the lifetime of the project through to industrial action or criminal acts. The feasibility of the project can be enhanced by identifying and managing such risks. Where the private sector depends on government as the single client for an infrastructure project over a long period,

which is typically the case in social infrastructure like a hospital, the political risks are higher in that a different government in future may not support continued payment for the infrastructure. This is less of a risk in user-pay models because users provide an independent source of revenue and form a political bloc that is likely to support ongoing access to use of the infrastructure. As a result, the cost of social infrastructure may be higher as the private sector factors in these risks to the cost of finance.

Here is an example of how political risk can be managed in a project (from Hainz & Kleimeier, 2012):

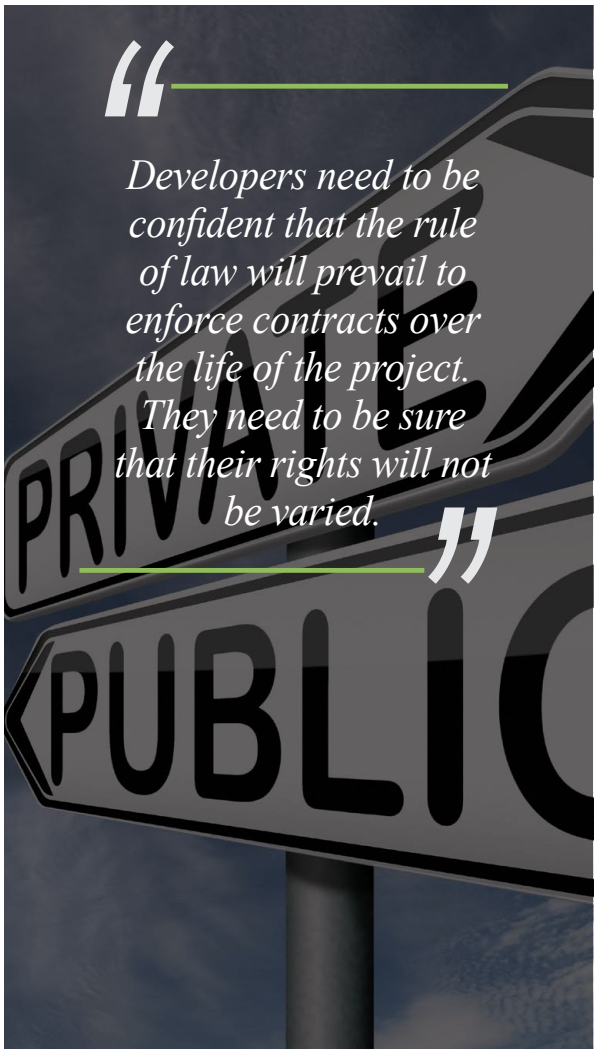
The South African petrochemical group Sasol opts for a unique hybrid project finance structure to finance a gas field project in Mozambique. Under this hybrid structure, lenders initially have full recourse to Sasol, which assumes almost all project-related risks. The sole – but important – exception is the project's political risk. The loan contract specifies that, if well-defined political risk events occur, the financing structure automatically changes from the full-recourse structure to a project finance structure. In this case lenders have recourse only to the project but no longer to Sasol. Cadwalader, the project's legal consultant, emphasises the role of development banks in actively mitigating political risk: "Sasol would like to maximise the influence that the political risk providers [...] bring to the deal – their ability to exert political pressure on, in this case, the Mozambican government to prevent or cure a political risk event."

In this example, the project reduces risk by separating it from the company's core balance sheet in that in the event of a well-defined political trigger, lenders will then not have access to the rest of its assets. As the lenders are mostly government-owned development finance institutions (DFIs), there is an alignment of risk with government absorbing risks that may arise because of its own actions.

Governments can de-risk projects in many other ways. In the South African Renewable Energy Independent Power Producers programme, for example, the implementation agreements with the producers include a central government guarantee (Eberhard, Kolker and Leigland 2014). This reduced the risk that if Eskom as the buyer were unable to meet its obligation to acquire the output of the IPP, the government would step in and make good the commitment. This removed risks that IPP developers faced in being reliant on a single customer for their output in the form of Eskom. The IPP programme, however, also allocated risks to the private sector. Developers were required to post bonds or bank guarantees equivalent to R100,000 per megawatt that was only released once the project came online. Any deadline slippage therefore cost developers money. At the time (the first three IPP projects were closed between 2010 and 2013), South Africa was investment-grade rated and the guarantee was meaningful for investors.

Developers need to be confident that the rule of law will prevail to enforce contracts over the life of the project. They need to be sure that their rights will not be varied. For example, mining decisions are extremely long term with copper mines having lives of up to 70 years and coal mines of up to 35 years (Statista 2020). In South Africa, mining rights are only granted for 30 years, placing an outer end on the cashflows factored into a project design. When mining rights vary over time, mining project finance risk analysis requires significant discounting.

We explore other ways governments can reduce risks in section 8.3.



3. Risk considerations facing private investors

Much infrastructure investment is undertaken by the private sector. Factories, mines, chemical plants, cell phone networks, office blocks, hospitals, schools, housing, broadband fibre and local road infrastructure have all been built and operated by companies.

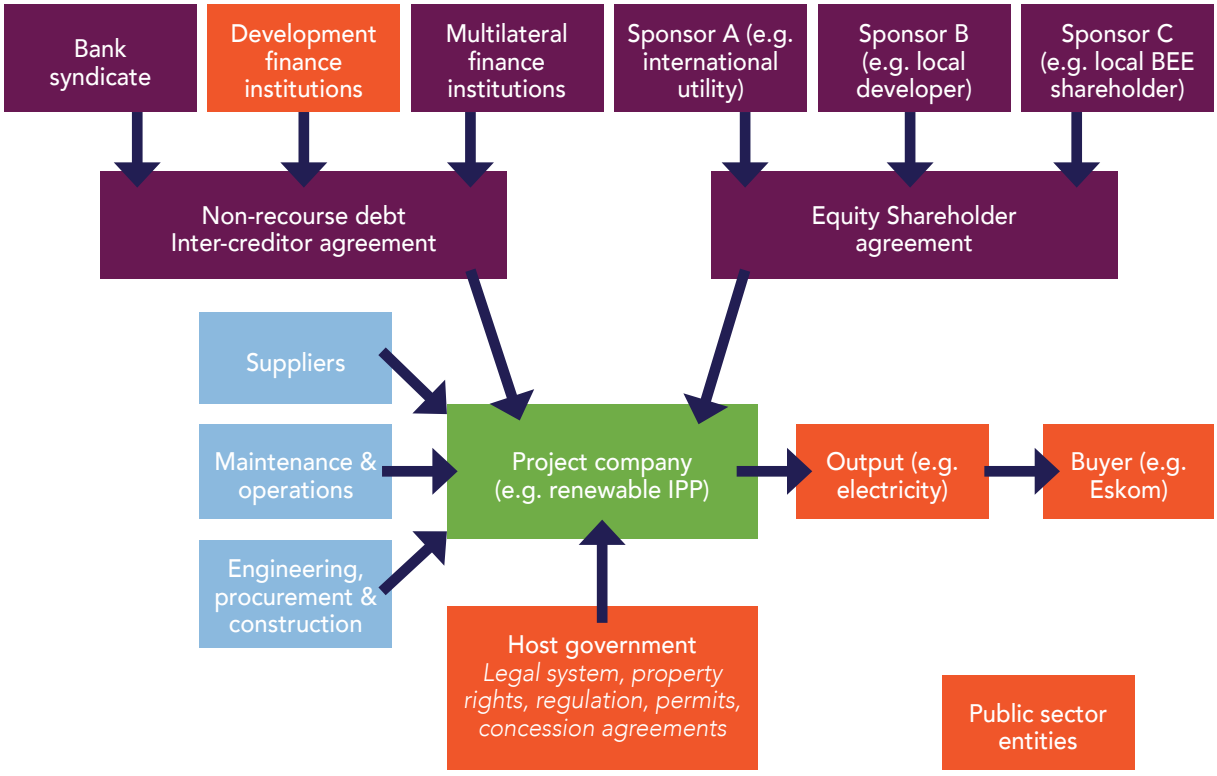
Private infrastructure is owned and operated usually by for-profit firms with a view to generating profits. The prospect of positive economic returns is critical to the decision to invest. Projects are assessed to determine whether they offer a net present value. Investors consider positive cash flows after taxes, the costs of investment and the cost of capital. They will invest in positive net present value projects. Companies can either invest in projects using internal cash resources or raise funding from outside investors. Investors can provide cash to the companies as a whole or to individual projects on a non-recourse basis.

Net present value is determined by calculating the difference between positive cash flows (income) and negative cash flows (costs) over time. Each of these cash flows is discounted by the cost of capital and the risks surrounding those cashflows. Any investment represents an opportunity cost – the cash invested can't be used for alternative purposes (e.g. deposited to earn interest in a bank) and decision makers must be confident that the benefits of investment will outweigh the costs.

Project finance, the approach used for many forms of infrastructure including in public-private partnerships, has well-established principles. Positive and negative cashflows must be estimated at the outset for the project life, with a discount rate applied that reflects both the risks to those cashflows and the cost of capital. Many risks need to be considered including construction risks, operating risks, financial risks and political risks.

A project finance structure will include several entities that contribute finance including lenders and shareholders (see Figure 13). Public sector entities play important roles, including as funders through DFIs and acquirers of output. Ultimately, governments set the laws and assign rights that are critical to the success of projects.

Figure 13: Typical project finance structure

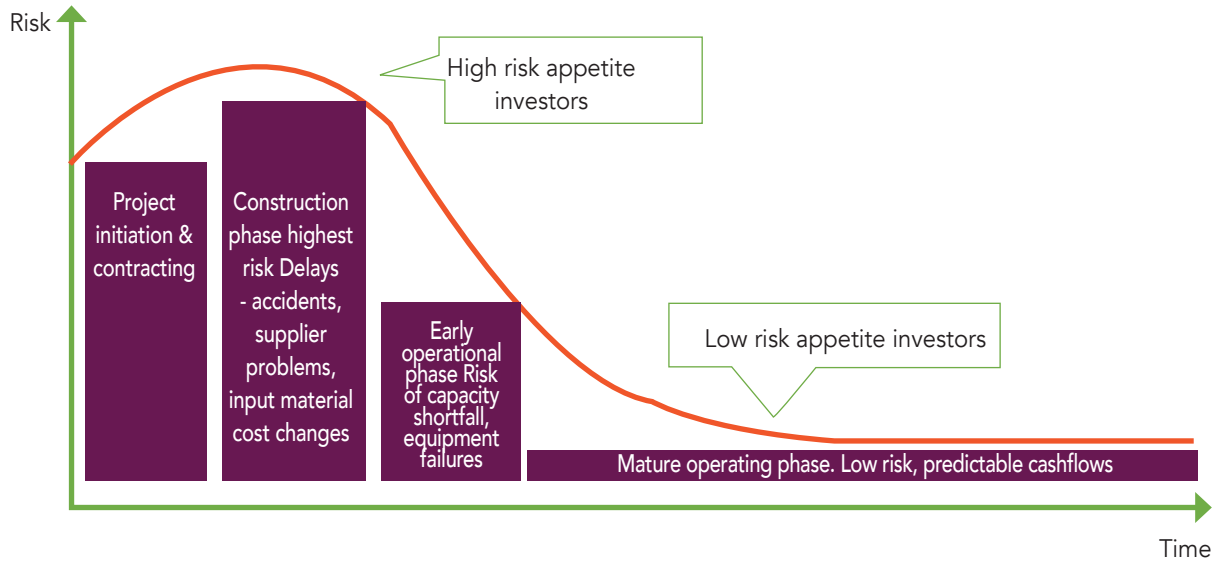


Source: Adapted from Sorge (2004)

3.1 The infrastructure risk cycle

Political risk can affect a project throughout its life, but other risks are factors at different points in the lifecycle. This is depicted in Figure 14. Before a project starts while it is being evaluated, risks are high that it may not be initiated. Once it begins, contracting with all relevant parties must be concluded which presents several risks of failure. During the engineering, procurement and construction (EPC) phase, risks are high of accidents, design flaws, bad weather, coordination failures between multiple suppliers and service providers, and other issues during the construction period that may lead to delays and cost overruns. The construction phase is also when there is greatest need for funding as there are large capital expenditures but not yet any revenue. As the project construction concludes and it enters the early operations and maintenance phase, there are risks that performance will fall short of expectations and equipment will fail on first use. For infrastructure that depends on user payments, there is risk that the public will reject the infrastructure or demand will otherwise fall short of projections. However, as operation and maintenance proceed, output and failures become predictable and manageable and the project enters a long-term, low-risk phase.

Figure 14: The infrastructure risk cycle



Source: Intellidex research

This risk cycle means that different investors are interested in backing different phases of projects. As we show in the next section, higher risk phases tend to be borne by project developers, private equity investors, banks and DFIs. In the longer run, investors include institutional investors like pension funds and insurance companies who require low-risk yield assets. Correspondingly, the returns that investors require match the level of risk they face.

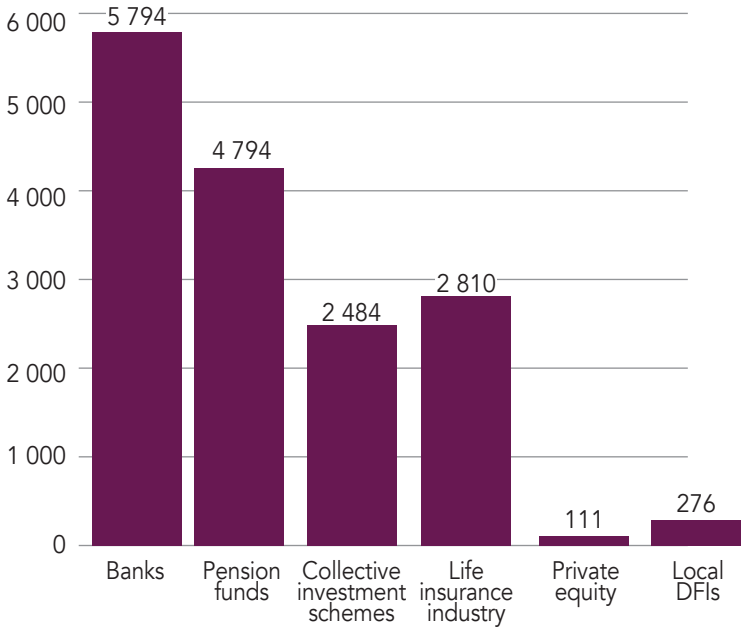
The availability of investment will depend on the appetite of the market for the risks at different phases of the cycle. In a country like South Africa which is looking to enter a major phase of new infrastructure construction, it is the early phase that requires the greatest volumes of investment. However, as we will make clear in the next section, in South Africa the majority of private capital is focused on the low-risk phase where pension funds and insurance companies are concentrated.

4. Understanding private infrastructure investment

South Africa has a large and sophisticated financial system. Credit extension by the private sector matches high-and medium-income country levels (139% of GDP; 66% of GDP by banks compared to high-income country average of 145% and 82% respectively). South Africa's pension fund industry is the eighth largest in the world by assets as a percentage of GDP. The insurance industry is the largest in the Europe/ Middle East/Africa region by premiums as a percentage of GDP. As shown in Figure 15, this has allowed the industry to develop significant capital resources, with banks controlling R5.8-trillion in assets and pension funds R4.6-trillion.

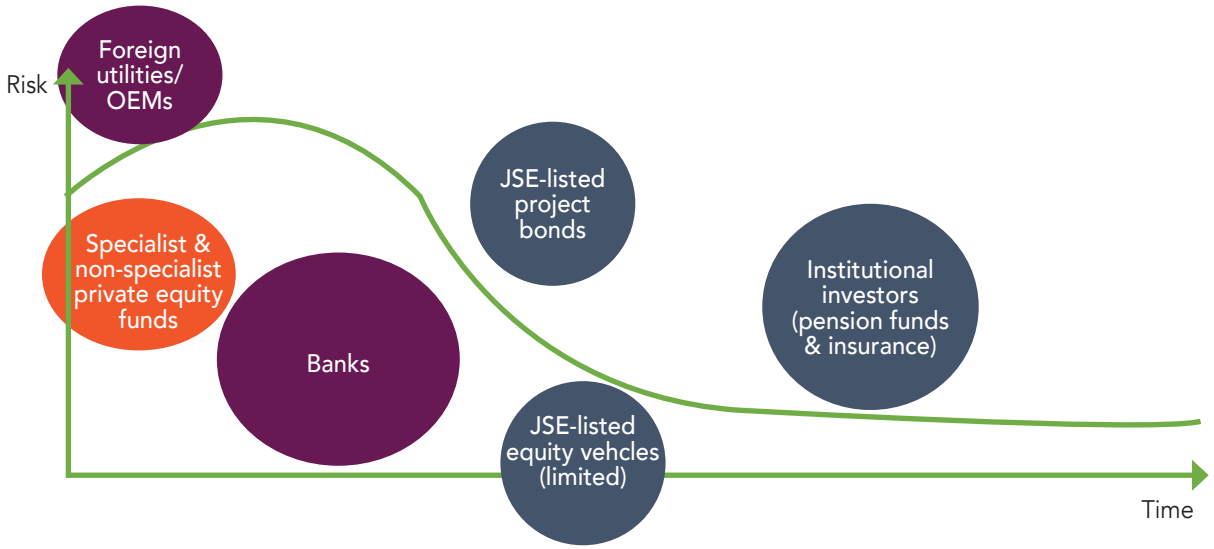
In this section we consider the key features of the main categories of institutions and their appetite for investment in infrastructure. In order to mobilise these private sector funds for investment in infrastructure, it is important to understand these features to ensure that project design is appropriate. A key issue is the risk that different investors are willing to take. We depict this in a South African context in Figure 16 (which can be compared to Figure 14).

Figure 15: Total assets in South African savings industry (Rbn)



Sources:
Banks – SA Reserve Bank, BA900 returns, January 2020
Pension funds – Registrar of Pension Funds annual report, 2017 (latest available)
CISs – ASISA, Dec 2019
Insurance – ASISA, Dec 2019
Private equity – SAVCA, Dec 2018
Local DFIs – per DFI annual report latest years
Note: These cannot be summed as there is some double counting as pension funds and life balance sheets may hold CISs, insurance policies, and private equity investments

Figure 16: Investor risk appetite through the infrastructure project lifecycle



Source: Intellidex research

It is difficult to assess just how much institutional investors hold in infrastructure assets as it is not assessed as a separate asset class on its own. The Association of Savings and Investment of South Africa (Asisa) conducted two informal surveys on members. The results show that 1.4% of assets and 2.5% of assets were invested in infrastructure in 2014 and 2017 respectively.

Key features of different funders of infrastructure

Type of institutional investor	Assets under management	Investment horizon	Risk appetite	Investment objective	Risk and constraints	Type of infrastructure likely to appeal	Financial instruments used currently
Pension funds	R4.3trn with about R30bn estimated to be invested in infrastructure	Long term	Medium	Meet their liabilities funding cost calculated by actuaries	Asset liability mismatch risk. Restrictive regulatory environment: Regulation 28.	Brownfields: ramp up, operational and expansion stages	Direct debt, infrastructure funds, mezzanine financing
Banks	Total assets of R5.8tn but not clear how much is invested in infrastructure	Short term. About 70% of SA bank's deposits are short term and banks subject to Basel 3 liquidity ratios	Low	Generate net interest margin (and arranging fees)	Asset/liability mismatch risk Stringent regulatory environment: Basel 3	Have the capacity to lend into greenfields at construction phase	Direct bank loans, and later shifting off balance sheet into infrastructure/ green bonds
Life insurers	Have assets worth approximately R2.7trn at the end of June. About R1bn is invested in infrastructure funds. But exposure to infrastructure could be indirect too	Long term	Medium	For own balance sheet capital, generate returns within regulated risk parameters. For client funds, generally long term investment mandates	Asset/liability mismatch risk Intense regulatory environment	Greenfields: interests in private equity funds with own capital. Brownfields: ramp up, operation and refinancing stages	Infrastructure private equity funds, own balance sheet for debt including listed and unlisted
Collective investment schemes	Total assets worth R2.4tn	Short to medium term	Depends on fund's mandates	Maximise investor returns	Require liquidity due to risk of beneficiary redemption at any point	Listed debt and equity	Infrastructure-related listed equity and debt
Private equity	Industry manages R111bn in funds	Five to seven years	Medium to high	Maximise investor returns. Some funds have specific green or impact themes	Can lock up capital for longer periods but require exit mechanism in the medium term.	Green fields projects	Equity, occasionally mezzanine
Development Finance Institutions	IDC and DBSA have approximately R75bn in infrastructure assets	Long term	High	Promote development of infrastructure	Very few constraints	DFIs can invest throughout the life span of an infrastructure project	Mostly senior loans, mezzanine debt and occasionally equity
Social security funds – PIC	Total assets over R2.1trn, of which GEPF is R1.9trn and double counted in pension funds, above	Long term	Medium	Meet their liability funding and liquidity requirements, determined actuarially	ALM mismatch risk	Brownfields: ramp up, operation and refinancing stages	Mostly listed debt, equity, mezzanine debt, potentially infrastructure funds

4.1 Banks

Banks have been extensive investors in infrastructure in South Africa and the wider region. Projects include both renewable and traditional power plants, toll roads, rail, ports and airports, broadband and mobile networks and undersea cables, bulk water management, student accommodation, hospitals, prisons, government office buildings and low-cost housing.

The Renewable Energy Independent Power Producers Programme (REIPPP) was a more recent landmark series of transactions in which banks were sizeable funders. In the first three rounds of REIPPP, banks provided R57bn in debt funding (Eberhard, Kolker and Leigland 2014).

Banks have proved particularly important at the early stages of infrastructure projects, having developed capacity to analyse project risks and commit upfront funding. Banks also absorb additional risks by providing performance guarantees of other private parties including construction firms, underwriting their exposure to penalties for missed deadlines and other commitments. Over time, as projects evolve and enter the low-risk operating phase, banks can shift their exposures off balance sheet, into less risky instruments such as green bonds which can subsequently be sold to pension funds and other institutions that require stable, long-term cash flows. (For example, Nedbank has listed a green bond locally for this purpose and Standard Bank has listed a bond in London following a private placement with the International Finance Corporation.)

In financing infrastructure, banks have the following relevant features to their risk appetites:

- The Basel 3 capital accord requires banks to meet liquidity ratios that encourage them to shorten the duration of their asset relative to their funding. This means banks only have appetite for shorter-term lending and require the option to then refinance, for example by issuing green bonds.
- Banks will impose covenants on project owners requiring them to meet certain requirements, including the ratio of debt:equity in a project and minimum cashflow requirements. Equity holders take the primary risk and the larger the equity tranche, the lower the risk for lenders.
- Banks impose standardised prepayment penalties to ensure they can manage the liquidity of their balance sheets appropriately.
- Banks can access concessionary funding lines from multinational development institutions (MDI) that can support their risk appetites. MDIs provide such funding lines in terms of their mandates to support development.

These are in addition to standard credit risk assessments. These factors are important in project finance risk:

- What balance sheet is ultimately callable by the bank (the obligor)? In the case of non-recourse projects, only the project itself is available to lenders. This is the highest risk option, though it allows for focus on the particular risks of the project that the bank might be well equipped to assess. Alternatively, a parent company may issue guarantees for the project, in which case its balance sheet becomes the main point of reference.
- What is the revenue source for the project? Revenues can either be from users (e.g. toll road) or from government itself (e.g. office accommodation). Different risk factors will apply in these cases including wider economic risks in the case of user fees or political risks when government is the contracted buyer.
- What is the concentration risk presented by the project and how correlated is it to the bank's existing portfolio? How large is the ticket and are there other lenders in a consortium to share risk? Consortia help spread risk but cannot be too large so as to dilute the control a lender is able to exercise.

These factors feed into whether a potential loan will meet the banks' needs. Importantly, both factors about the bank, such as its existing exposures to the economic risks and the capital and liquidity features of its balance sheet and features of the infrastructure project, will be relevant to banks' decisions.

To maximise the ability to attract bank finance, infrastructure projects should:

- Have reliable and credible owners with strong balance sheets that banks can call in the event that the project becomes distressed.
- Have stable and predictable cash flows, for example through an offtake agreement or a user pay structure with guarantees from the state for minimum revenue.
- Clear risk management of construction with EPC contractors able to bear risk and penalty structures in the event of non-delivery.
- Clear lifespan for the project through licensing and other protections from future competition.
- Minimal environmental or social risks.
- Open bidding processes with full transparency.
- Minimal exchange rate and interest rate risk.
- Optionality to refinance at the bank's discretion at certain milestones.
- Early payment penalties to protect the bank's liquidity position.
- Political risk mitigation such as co-investment with DFIs and MFIs, and in some cases, political risk cover from international institutions.

Government can play a substantial role in mitigating the risks faced by banks and therefore the availability of bank funding and pricing. This will be maximised if:

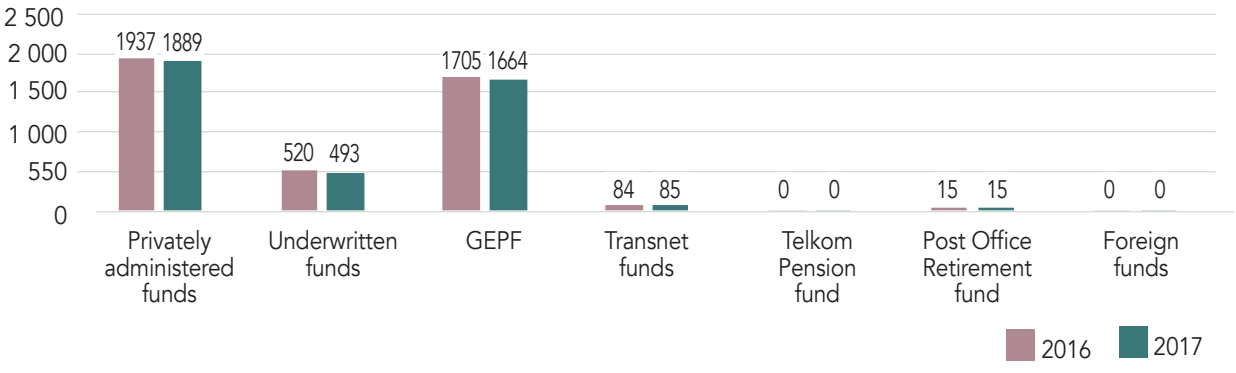
- Projects are not restricted in which construction contractors they use.
- Projects can use large multinational sponsors with large balance sheets.
- There are minimal constraints on refinancing of projects during their lifespan.
- Government guarantees are in place to protect the cashflow outlook for the project, either guaranteeing the output will be bought (e.g. IPPs), or as a guarantor of minimum usage (e.g. Gautrain).

Not all of these are appropriate, all things considered. For example, it may be important to impose local content requirements on project developers and to insist on BEE ownership minimums. These are important socioeconomic objectives that are worthwhile to accept less attractive funding from banks.

4.2 Pension funds

South Africa has a well-developed pension funds industry with workers contributing to their retirements though tax-incentivised contributions to pension funds. The R4.3-trillion of assets managed by the 5,000 registered funds in the country are widely invested but particularly in JSE-listed equities, bonds and foreign securities (often via intermediary fund managers). The market consists of private funds regulated under the Pension Funds Act and a handful of state funds, by far the largest of which is the Government Employees Pension Fund (GEPF) with over R1.8-trillion of assets. Despite the large number of private pension funds, the market is highly concentrated with R800bn held by the top 10 funds and R1.2-trillion in the next 100 funds (based on data from the Financial Services Conduct Authority).

Figure 17: Aggregate assets of retirement funds in SA at the end of FY17 (Rbn)

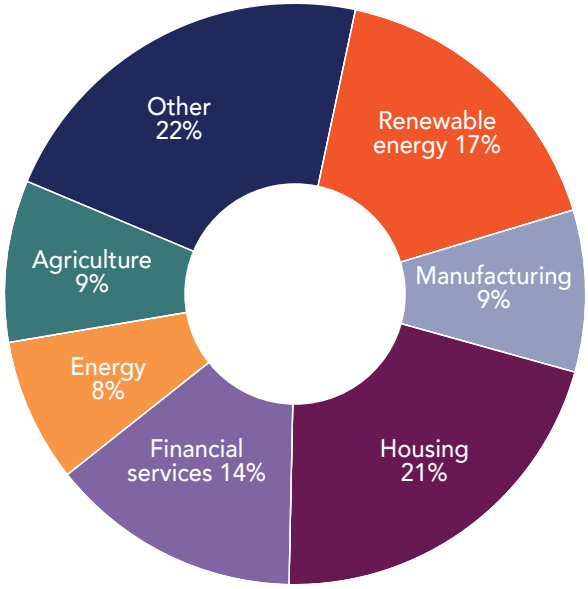


Source: Registrar of Pension Funds (2017 is the most recent available data)

It is difficult to determine how much of the pension fund industry is currently invested in infrastructure assets as infrastructure is not a reportable asset class in any regulated disclosures. Portfolios are dominated by listed assets which include debt issued by the Development Bank of Southern Africa (DBSA), Industrial Development Corporation (IDC), Transnet, Eskom, the Tran-Caledon Tunnel Authority and the SA National Roads Agency (Sanral), all of which contributes to funding infrastructure. According to the 2017 Registrar of Pension funds Annual Report (the most recent available), privately administered pension funds held 8.7% of their assets directly in debt assets, but a further 42% were invested in insurance policies which would include further debt asset exposure.

The GEPF is by far the largest pension fund in the country. At R1.8 trillion, its portfolio is 13 times the next largest portfolio, namely, the Eskom Pension and Provident Fund. The GEPF is widely invested across the economy, with a third of its portfolio invested in local bonds (GEPF 2019). Approximately R76bn (4%) is invested in unlisted investments through its Isibaya portfolio, which includes several infrastructure assets (see Figure 18).

Figure 18: Distribution of assets in the GEPF's Isibaya Fund



Source: GEPF 2019

Privately administered pension fund investments are governed by Regulation 28 of the Pension Funds Act, which sets ceilings on certain asset class exposures. The main categories are shown in the table below[1] .

Regulation 28 main categories Categories that include infrastructure finance are in **bold**		
	Total limit	**Per issuer**
Cash	100%	
Debt instruments	100%	
SA government	100%	
SOEs, munis, provinces guaranteed by state	25%	5%
Bank guaranteed debt	75%	25%
Other listed debt instruments	25%	5%
Other unlisted debt instruments	15%	5%
Equities	75%	
Listed companies	75%	25%
Unlisted preference and ordinary shares	10%	2.5%
Unlisted foreign companies preference and ordinary shares	5%	2.5%
Commodities	10%	
Property	25%	
Alternative investments	15%	
Hedge funds	10%	2.5%
Private equity funds	10%	2.5%
Other	5%	2.5%

[1] *As this report was going to press, a draft new regulation 28 was released which proposes a specific category for infrastructure investments and an increased limit for private equity.*

Pension funds can access infrastructure in several ways through regulation 28. Bonds issued by DFIs can be purchased within the debt instrument categories, which provide significant exposure ceilings. While specialised listed infrastructure companies are rare, there are some (e.g. Gaia Infrastructure Capital, Montauk Holdings) that can be held in the equities category. Unlisted shares can also be held up to 5% of a portfolio. The property category can hold listed and unlisted property assets which can include housing and office accommodation infrastructure. Finally, private equity funds can form up to 10% of a portfolio.

There are several specialised private equity infrastructure funds (e.g. Old Mutual's IDEAS fund, Pembani Remgro Infrastructure Managers, Stanlib Infrastructure Private Equity Fund, Investec Emerging Africa Infrastructure Fund) that have included pension funds as investors.

The concentrated structure of South Africa's pension fund industry has pros and cons for infrastructure finance. The large funds (e.g. Eskom Pension and Provident Fund) have specialist teams that can undertake assessment of infrastructure investment opportunities. As a large fund, the ticket size of most opportunities is far below regulation 28 limits and feasible, though some funds have accumulated assets that bring them close to regulation 28 limits.

For the long tail of small funds, however, infrastructure is very difficult to invest in because of large ticket sizes and the resources required to undertake due diligence. Most of these funds hold vanilla listed assets. They rely heavily on consultants to advise them on investment strategies and most consultants develop vanilla mean-variance optimised portfolio strategies that focus on mainstream listed instruments.

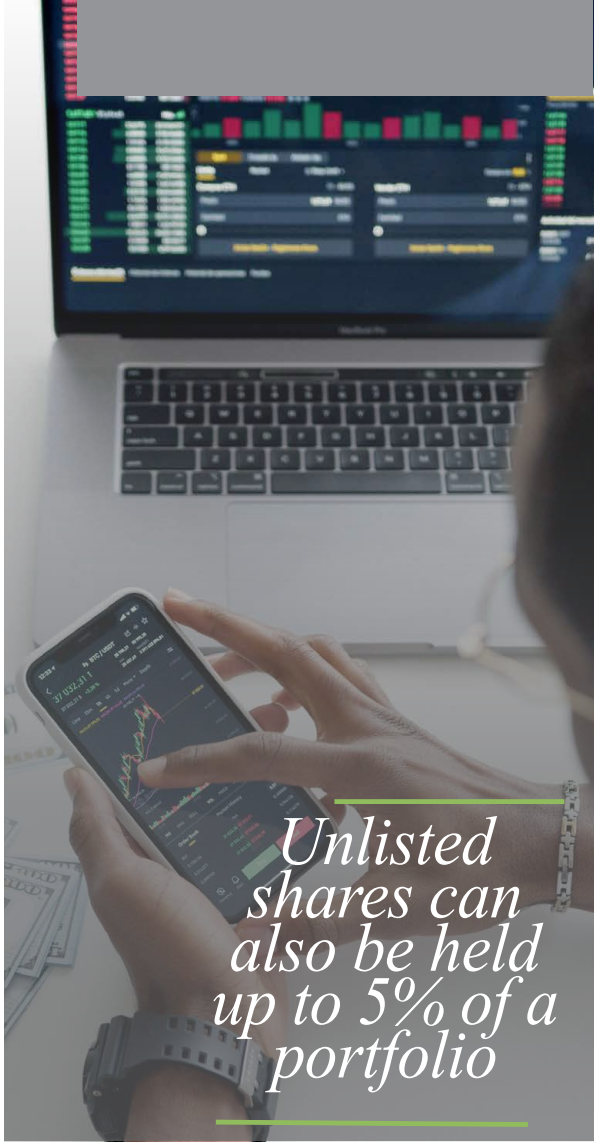
Pension funds have long-term liabilities so long-term assets that provide predictable cash flows like infrastructure are ideal investments. However, pension funds usually do not have the specialised project finance and due diligence skills to assess infrastructure assets directly. They therefore rely primarily on indirect access to infrastructure, through listed debt instruments or, to a lesser extent, private equity funds.

Amending regulation 28

National Treasury announced that it is considering amending regulation 28 to include explicit allocations for infrastructure assets (National Treasury 2020). Reports have indicated that one proposal is to amend the existing property allocation to become a broader category for property and infrastructure[2].

In our view, the challenge is how to define infrastructure assets that are not already covered by debt or equity classes in regulation 28. There is some debate internationally on whether infrastructure should be considered a separate asset class. This turns on whether infrastructure has a unique set of risk-return properties that is unrelated to other asset classes. In more mature markets, this may be the case where the overall stock of infrastructure assets is large and has a high correlation. In South Africa, however, infrastructure assets are usually seen as correlated more to debt or to equity, depending on which form of capital is being used. The mix of infrastructure ranges from private sector projects like cellular towers to DFI debt which exhibit low correlations. With the development of infrastructure investment, in time it may become appropriate to see it as a single asset class.

We think an amendment to regulation 28 would have a useful signalling effect, requiring asset consultants to develop a specific strategy for infrastructure investment for their clients, which currently gets lost in wider asset allocation strategies. However, specific infrastructure assets must be narrowly defined to be useful. Definitions should include specialist private equity infrastructure funds as well as focused infrastructure debt assets such as green bonds and project bonds.



[2] *As noted above, as this report was going to press, a draft new regulation 28, including these changes, was published.*

In addition, there is potentially scope for new specialist infrastructure assets that would allow pension funds to invest without extensive due diligence costs. For example, Colombia financed a massive toll road investment programme partly by creating specialist debt funds and running training programmes for pension funds on the infrastructure asset class to make it easy and cheaper to invest (IDB & World Bank 2016). Innovative new infrastructure assets can be developed through partnerships between government and the private sector that could fit well in an amended regulation 28 category. Crucially, any such development must match the risk and return characteristics that pension funds seek. Infrastructure easily lends itself to the long-run, low-risk form of asset that pension funds seek, though this characteristic means the bias is for brownfields investments.

In summary the best mechanisms for attracting pension fund assets are:

Infrastructure type	Asset type	Key features/ constraints
Greenfields new infrastructure equity	Private equity funds	Limited to larger funds that invest in private equity to increase overall risk and reflecting low liquidity of private equity.
Greenfields new infrastructure debt	SOE debt instruments and project bonds	Pension funds can invest in SOE debt issued. Scope for other instruments such as project bonds and even unlisted debt but due diligence costs typically too high.
Brownfields infrastructure debt	Green bonds, project bonds, sustainable bonds	Mature projects that have been funded by banks or DFIs can be placed into listed debt vehicles that pension funds then invest in.
Brownfields infrastructure equity	Listed equity portfolios	Listed vehicles can hold multiple interests in infrastructure assets, particularly alongside operations and maintenance functions.

The funding challenge is most acute for greenfields funding. We discuss private equity further in 4.4 below. It has potential for greater scale and currently holds R30.1bn in undrawn commitments from investors. More can be done, however, on the debt side to include pension funds early in the infrastructure value chain. This would require a diverse portfolio of assets from the start with stable risk and return characteristics, which could only be created from a comprehensive programme jointly developed between the public and private sectors.

One further avenue open to mobilise funding from pension funds is for government to place existing infrastructure assets into portfolios that can be sold to the market (effectively privatising them). This route has been used extensively in Australia, for example, where the government maintains a pipeline of creating infrastructure assets that are sold into the market continually to use the proceeds to fund new infrastructure. With much of South Africa's economic infrastructure already held by SOEs, an adaptation of this model would be for SOEs to continually dispose of assets to the market for brownfields investors in order to finance new greenfields projects. For example, Eskom could dispose of old power stations near end-of-life and Sanral could dispose of toll roads that are currently on balance sheet.

4.3 Insurance companies

South Africa's substantial insurance industry provides a wide variety risk and savings products. Policies are either market-linked or non-market linked. Market-linked policies are invested in portfolios with returns driven by those portfolios. Non-market linked policies have a guaranteed return, though these may include bonuses subject to performance. The assets that back non-linked policies are invested by insurers to meet expected liabilities, guided by regulation. Insurers also invest their own capital, which is calibrated to meet solvency requirements.

Within these wider portfolios, insurers can invest in infrastructure assets (and within linked policies too where the investment product accommodates infrastructure). Many of the liabilities that insurers aim to meet are long-term, allowing insurers to take liquidity risk presented by private equity and requiring long-term assets with predictable cashflows to match liabilities (such as living annuities).

South Africa's insurance companies have long been invested in infrastructure via private equity, with the oldest dedicated infrastructure fund, Ideas, founded in 1997. It is one of the funds managed by African Infrastructure Investment Managers (which manages R28bn in total, including client money), an Old Mutual subsidiary. Insurers have also used debt instruments to invest directly into the greenfield stages of some projects with Old Mutual, Liberty and Sanlam all having provided initial debt in the REIPPP programme. This approach allows insurers to combine both debt and equity into projects. Insurance companies also hold a variety of SOE debt in line with their risk/return and liquidity needs.

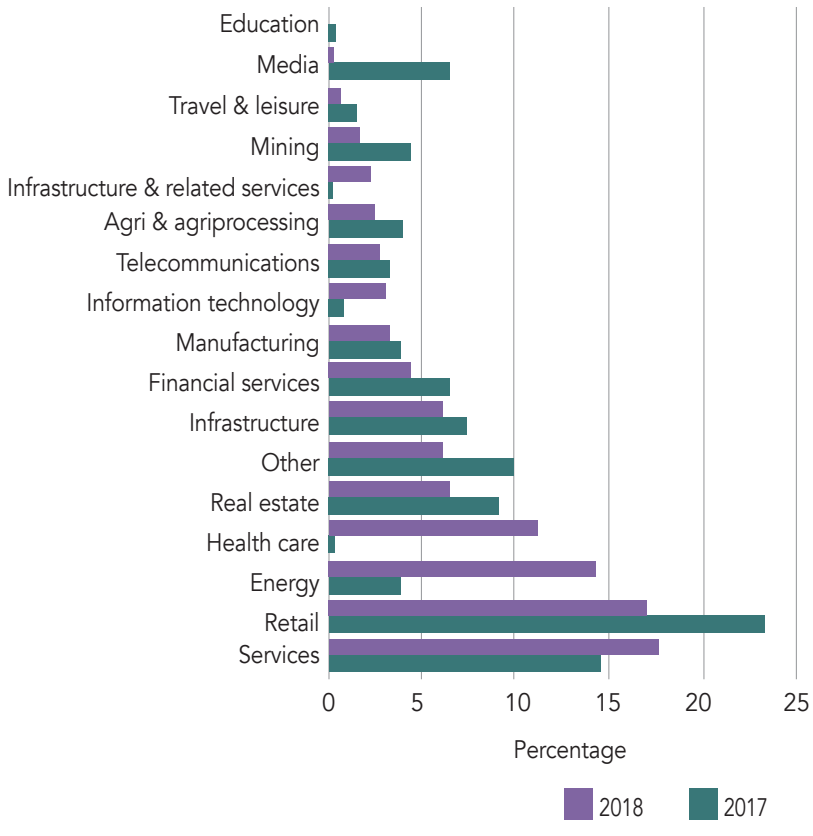
Insurance company investments are regulated through Solvency Assessment Management 2 (SAM 2), modelled on Solvency 2, a global risk-based capital management regime that has been adopted in South Africa. This has implications for infrastructure assets in that it encourages better diversification in insurance assets in order to reduce volatility and correlation with equity markets. Infrastructure debt and equity assets, particularly through private equity, would likely contribute to this investment objective.

4.4 Private equity – taking risk and catalytic capital

Infrastructure projects are typically financed with a blend of equity and debt. The equity portion can be provided by several entities ranging from project developers and equipment manufacturers to asset managers. However, the most active source of equity funding, particularly for greenfield projects, is the private equity industry.

Energy, infrastructure and related services added up to 22.7% of investment in 2018 – or R8bn. Because of the leveraged nature of infrastructure finance, this is catalytic and can be leveraged between two and five times. Private equity investors are often co-investors in the equity, alongside project developers, BEE investors, international utility firms and others. The R8bn invested therefore catalyses a significant larger investment volume.

Figure 19: Distribution of private equity investments per sector



Source: Savca (2019)

Since the first specialised fund, Ideas, was set up in 1997, several others have entered the market including:

- Harith Pan African Infrastructure Development Fund
- Mergence Infrastructure & Development Equity Fund
- Pembani Remgro Infrastructure Managers
- Stanlib Infrastructure Private Equity Fund
- Investec Emerging Africa Infrastructure Fund
- Vantage GreenX

These funds back a variety of infrastructure projects, both for private infrastructure and public infrastructure, within South Africa and beyond. They have built up skills to be able to manage infrastructure risks and opportunities. The Ideas fund holds interests in IPP solar PV, wind, government office complexes, prisons, hydroelectric, Airports Company South Africa, the Mozambique-SA gas pipeline, Zimbabwean railway and thermal power (Mozambique). It has historically held and exited interests in Neotel and the Kelvin Power Station, the first IPP in South Africa. Private equity investors are active managers of their portfolios and aim to grow and improve their investments.

Savca (2019) reports that the industry held R30.1bn in committed capital from investors that was available to invest in 2019. That indicates significant capacity for further expansion into infrastructure if investment opportunities are made available.

Private equity firms are most likely to be committed investors where:

- Risks are well managed with government absorbing undiversifiable financial risks
- Shareholder responsibilities are clearly understood through clear contracting
- The PE firm can partner with appropriate investors bringing specialist infrastructure capabilities to the project
- Suitable exit opportunities. A private equity firm will usually have a time horizon of five to seven years. Projects need to have some exit roadmap, either a sale to another utility firm or into a listed infrastructure portfolio.

Constraints on firms' ability to partner with other shareholders or weak contractual rights in a project will all diminish private equity appetite for infrastructure or increase the cost.

4.5 Infrastructure as an ESG asset

Environment, social and governance (ESG) factors have become important in investment decision-making by institutional investors and private equity firms. A recent survey of South African pension funds (Intellidex 2020) found that in their investment objectives, pension funds rank sustainability higher than generating high risk-adjusted returns. Among asset classes that respondents consider important for sustainability considerations, infrastructure was rated highest, followed by alternatives (which includes private equity), credit, equities and real estate.

ESG strategies draw on globally recognised environmental and social standards to guide investment decision making. This can be implemented through several techniques including:

Technique	Application	Impact for SA infrastructure
Negative screening	Excluding companies, industries and projects based on poor ESG records.	Limited funding for coal-based energy generation, less so for gas-based energy.
Best in class screening	Actively including sectors, companies or projects that perform positively on ESG.	Positive for projects that stand out for their environmental and social impact, including renewable energy, labour-intensive projects.
Integration strategies	Integrating analysis of ESG risks into fundamental analysis process to result in a balance between risk/return and ESG considerations.	Projects must have good reporting on their ESG features to allow investors to incorporate the projects into their standard decision-making framework.
Thematic strategies	Investing in megatrends related to global sustainability (e.g. climate change, just energy transition).	South Africa's just energy transition can tap into a global impact theme giving access to specific investment funds.
Impact strategies	Solving particular social or environmental problems through investing strategies.	While limited in scale, high-impact projects that address serious social or environmental problems may be able to access grants and concessional finance.

Generally, negative screening and best-in-class approaches do not affect the yield that such assets offer. Infrastructure projects that can demonstrate environmental or social impact, such as renewable energy plants or social infrastructure that addresses poverty, will be able to access ESG tranches within traditional investment funds. South African pension funds, for example, are now strongly encouraged (through FSCA guidance) to incorporate ESG decision making into their wider framework so infrastructure will be able to access deeper pools of capital. More impactful investment strategies put a greater weight on social and environmental outcomes and will sacrifice yield to achieve these. These may include grants (effectively -100% financial return on capital) as well as concessionary funding that offers discounted rates.

By the same token, the ESG movement means certain types of infrastructure will struggle to raise funding, for example, coal-based energy generation.

These factors apply to investment funds but also to some extent to banks that are now signatories of various global accords to incorporate environmental and social concerns into funding decisions. For many banks, these are critical to their ability to access global funding lines themselves.

In the case of debt issuance, ESG plays well into the creation of green bond and social bonds, within the broader category of sustainable finance. Bonds that comply with global ESG standards such as the International Capital Markets Association's social bond principles will attract greater international investor interest. These require that bonds have the following features (Theobald and Attard Montalto 2020):

1. **The use of proceeds.** Eligible expenditure categories must be defined, with categories tied to recognised social objectives such as those of the Sustainable Development Goals. For example, in the case of a Covid-19 bond:

Theme of Impact	Alignment with SDG
Confronting the health challenge (preparation, treatment, testing)	**Goal 3:** Good Health and Well-being
Protecting the economy (saving jobs, poverty relief, saving companies)	**Goal 8:** Decent Work and Economic Growth **Goal 10:** Reduced Inequality **Goal 11:** Sustainable Cities and Communities

2. **The process for evaluation and selection.** Projects and procurement should be aligned with the eligible expenditure categories. For example, in a recent issue of a Green Bond by Nedbank, a special committee was put in place to identify potential projects for financing. A process that is clear, transparent and accountable must be determined to allocate the proceeds of the bond to particular expenditure items.

3. **Management of proceeds.** Clear policies must be formulated to manage the proceeds of the bond issue. Proceeds should "be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer in an appropriate manner, and attested to by the issuer in a formal internal process…" (ICMA 2018). A high level of transparency is encouraged and it is recommended that an auditor be used to verify internal tracking of proceeds and allocations of funds.

4. **Reporting.** Identify a project leader to gather data from different agencies and prepare reports; allocate and budget for personnel, IT systems, co-ordinate line ministries. Reporting should be done semi-annually.

South Africa's infrastructure drive should embrace ESG. While it does not necessarily reduce the cost of funding, it widens the funding marketplace and, in some cases, will allow access to concessionary funding and grants. The trade-off is that the use of proceeds is narrower and there are higher reporting requirements. But given that these are positive features of project discipline, this aligns with wider best practice.

5. Historic and current mechanisms for private investment in public infrastructure

South Africa has long drawn on private capital to fund infrastructure development. There have been two distinct conduits for private savings to be invested in infrastructure: SOEs and their debt; and PPPs, which may include financing for a private operator to create the infrastructure and operate it in partnership with the public sector.

5.1 Through debt

The largest conduit has been through SOEs that issue bonds into the market, raising funding from both domestic and international investors. It is also possible for central government to issue bonds to finance infrastructure, but this is difficult in terms of constitutional prohibitions on ring-fencing proceeds. All debt raised by the central government must be paid into the general revenue fund and the general revenue fund is the obligor. This makes it difficult for the government to issue project bonds, for example, which ringfence proceeds from debt issuance for specific projects. This is not an obstacle for SOEs, however.

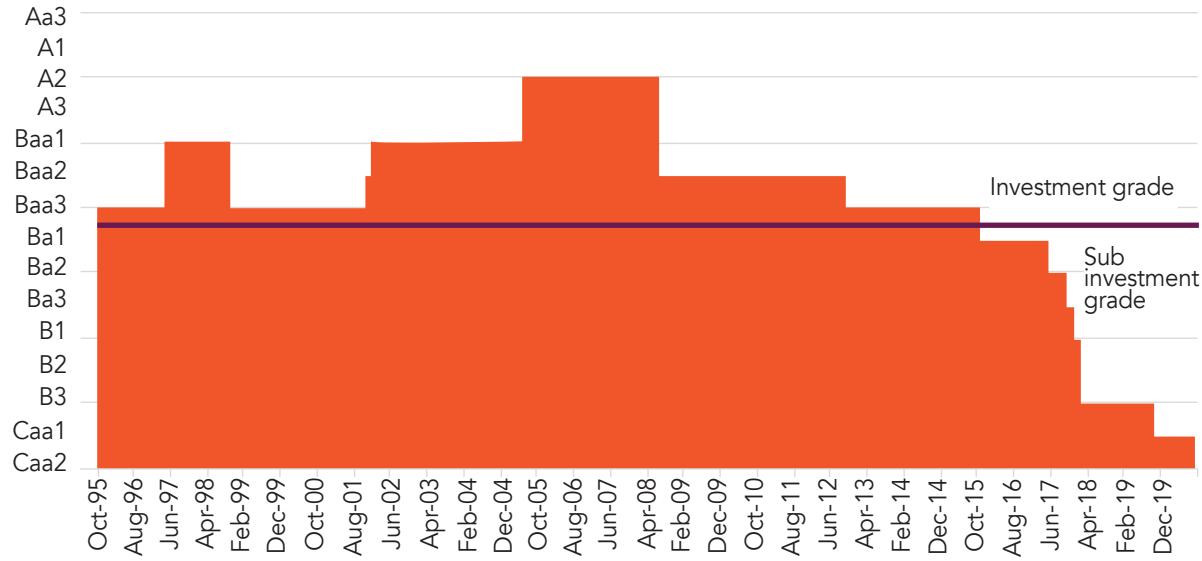
While SOE debt funding was not necessarily ring-fenced to infrastructure investment as opposed to operating costs, it was generally the case that SOEs accessed the debt markets to fund investment while operating costs were funded from operating cashflows. However, as some SOEs encountered financial distress in recent years, the line between investment and operating costs has blurred.

The SOEs include three broad categories:

- Those directly responsible for installing and maintaining infrastructure such as the SA National Roads Agency (Sanral) and the Trans-Caledon Tunnel Authority (TCTA).
- Those responsible for capital and infrastructure-intensive services to the public such as Transnet, Eskom, the Airports Company South Africa.
- Financial SOEs that invested in both public and private infrastructure such as the DBSA and the IDC.

The ability of SOEs to raise debt depends on their credit worthiness, which is signalled to the market through credit ratings. At times certain SOEs have boasted very strong balance sheets, with Eskom in 2006 obtaining a higher credit rating for its foreign borrowings than the government itself (Moody's 2006). However, as SOE balance sheets deteriorated with extensive capital build programmes at the same time as weaker operating conditions, most saw downgrades.

Figure 20: Eskom foreign currency debt credit rating (Moody's)

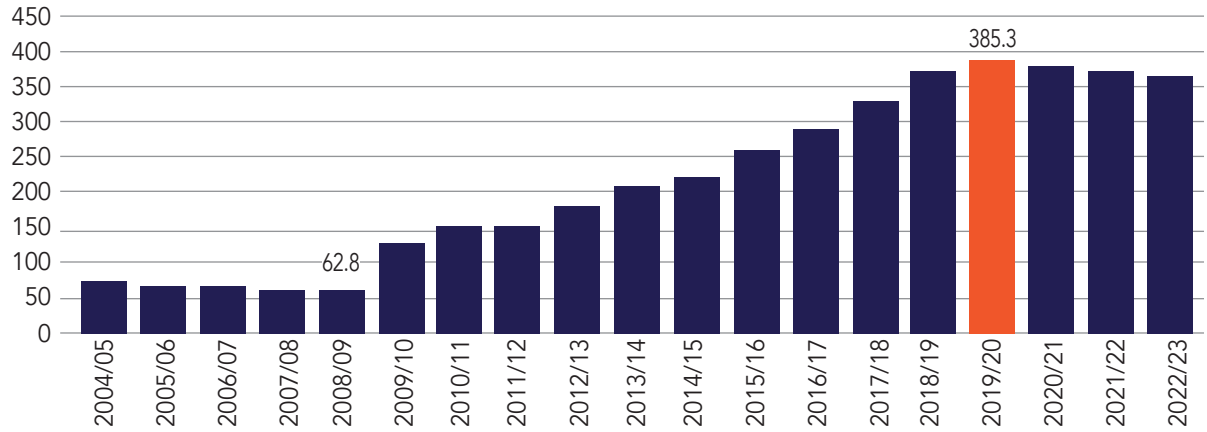


Source: Moody's, Intellidex

Eskom fell from six notches above junk status in 2006 to sub-investment grade in October 2015. Eskom is an extreme case of rapid balance sheet deterioration as it battled with delays and cost overruns with its new build programme while plant failure led to load shedding and revenue pressure. However, other SOEs have experienced deterioration too. Transnet fell from four notches above junk status in 2005 to junk status in April 2020 following the downgrade of the South African sovereign to junk. Sanral fell into junk status in mid-2017 and is now two notches below investment grade.

The deterioration of SOEs' balance sheets means they have had to rely increasingly on sovereign guarantees to raise funding. This means lenders are exposed ultimately to the national balance sheet rather than the SOE's. Guarantees rapidly grew after 2008, from R63bn to R385bn in the last financial year (see Figure 21). Such credit enhancement worked while the government balance sheet was perceived as substantially stronger than the SOEs', however in March 2020 the sovereign lost its last investment grade. While it maintains a higher rating than SOEs, guarantees are no longer the simple solution to SOEs' financial predicaments. Additionally, various guarantees have been issued in support of PPPs (discussed in next section).

Figure 21: Guarantees issued on SOE debt (Rbn)



Source: National Treasury (2020)

The result is that raising debt is no longer a straightforward option for SOEs, with or without government guarantees. Recently, both Eskom and Transnet have struggled to access the bond market. This has been less the case for the DFIs, with DBSA and IDC both raising money and investing continually, though the sovereign downgrade inevitably affects their balance sheets too.

In the face of this reality, the optimal response is to create instruments that have the maximum credit enhancement possible. Options include:

- Finance through project bonds where the relevant credit exposure is to the project itself. This may insulate a project from contagion of an SOE's balance sheet. For projects that have clear cash flows attached to them (e.g. toll roads) the internal credit metrics of the project itself may provide a better risk position than an SOE balance sheet.
- Using multilateral financial institution guarantees. The World Bank Group issues guarantees that cover specific risks of a project with its AAA-rated balance sheet. These can be combined with various instruments including from the International Finance Corporation and the Multilateral Investment Guarantee Agency (Miga). Miga issues credit guarantees as well as guarantees against war and civil disturbance, expropriation and breach of contract. Other agencies also issue guarantees such as the Africa Energy Credit Guarantee Facility backed by the European Investment Bank (EIB), Munich Re, the African Export-Import Bank (Afreximbank) and the African trade Insurance Agency (ATI). Such guarantees come at a cost, but this may be more than compensated by the improvement in the cost of finance.

These can be provided over and above the use of government guarantees and offer one of the few ways South Africa has open to it to reduce the cost of financing major infrastructure projects. Guarantees can be focused on specific elements of a project including revenue guarantees to remove some of the economic risk facing the private sector, rather than guarantees on the performance of the debt itself.

The other mechanism is through public-private partnerships, which we discuss next.

5.2 Through PPPs

South Africa adopted a public-private partnership framework early in the democratic dispensation. Since then, over 300 PPPs have been undertaken, with 36 at a national government level. PPPs differ from normal on-budget infrastructure or that undertaken by SOEs because most project risk is taken on by the private parties, including operating risk, technical risks and some financial risks, while the public sector pays to consume services from the facilities (or other users do).

One of the first successful large-scale projects was the N4 Toll Road project launched in 1997 with private partners financing, building, operating and maintaining the road through a 30-year concession before transferring it back to government. The 630km road links Gauteng to the Maputo port supporting the Maputo Development Corridor project. The initial contract cost R3bn in 1996 value (PPIAF 2009). It was funded 80% by debt and 20% by equity, with tolls collected at six main toll plazas and two ramp plazas. Two of the plazas are in Mozambique and the rest in South Africa, implying that most of the funding is South African sourced. The project had no guarantees from either Sanral, the contracting party or national government. The one risk that later emerged that had not been catered for at the outset was the risk of overloading of vehicles causing a rapid deterioration to the road. This was subsequently rectified through a supplementary arrangement.

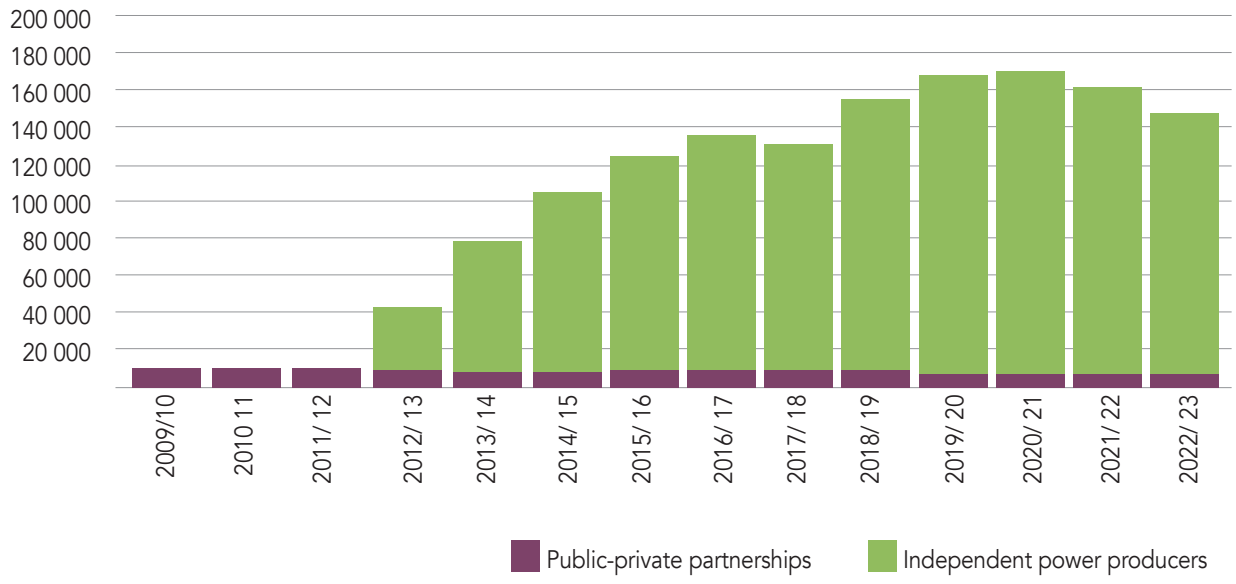
PPPs come in various types, defined by the specific role played by the private sector operator. These can include:

- Design
- Finance
- Build
- Operate
- Transfer

Projects are referred to through acronyms of these roles, with DFBOT projects being those with all roles being played. A list of the 36 PPPs undertaken in South Africa is in Annexure A.

PPPs have also been a source of contingent liabilities for the national government balance sheet. Several include guarantees by national government, particularly the renewable energy IPP programme and the Gauteng Highway Improvement Project. The REIPPP programme has contributed to the ballooning contingent liabilities line of the government balance sheet (see Figure 22: Contingent liabilities for PPPs and RE IPPs (Rm)), but usually represent a guarantee of procurement which gradually runs down through the project life as procurement takes place, or of minimum revenue amounts (as in the Gautrain). Guarantees are not all equal in terms of the probability that they will be called, with REIPPP guarantees unlikely to be called.

Figure 22: Contingent liabilities for PPPs and RE IPPs (Rm)



Source: National Treasury, Intellidex calculations

Declining volumes of PPPs

There has been a marked slowdown in PPPs coming to market. Between 1998-2004 there were 19 projects closed, but only nine projects between 2005-2007 and only six projects from 2008 to 2019. While National Treasury lists about 22 PPPs that are in various stages of being finalised, all were registered before 2017. Despite the strong political rhetoric on infrastructure and private funding of the last few years, no new PPPs have been created.

PPPs are regulated primarily through regulation 16 of the PFMA which was issued in 2004 and requires a complex set of approval steps. In the case of municipalities, a corresponding set of regulations in terms of the MFMA was issued in 2005. The timeframes for these steps are vague and projects often find themselves in limbo for years attempting to conclude a feasibility study or other step. There are various conflicts between the regulations and other legislation including the Code of Good Practice for Black Economic Empowerment and the Preferential Procurement Policy Framework Act (PPPFA). National Treasury plays a substantial oversight role in all PPPs

There is no consolidated mechanism to review infrastructure projects across government and channel them into PPPs. Government's infrastructure planning framework, the Standard for Infrastructure Procurement and Delivery Management (SIPDM), establishes an initial step. For public servants, however, the complexity of determining what delivery model would be optimal provides a strong disincentive to use PPPs when compared to on-budget infrastructure investment (as discussed in 3.2 above).

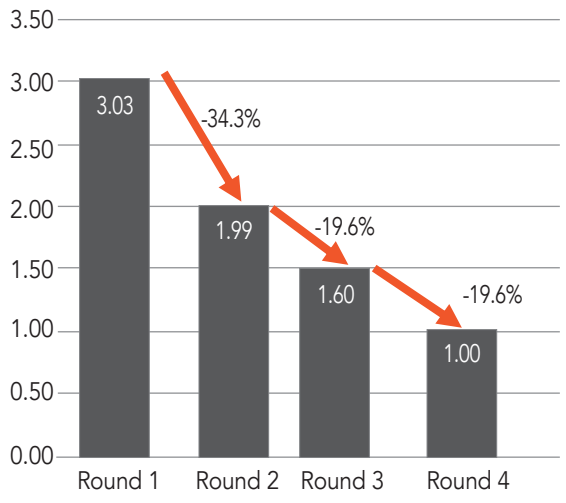
In an effort to address capacity constraints, National Treasury has built the Government Technical Advisory Centre (GTAC) to support other government departments with capacity which now includes the PPP Unit. This support is not PPP specific, but does include PPPs as a mechanism to drive infrastructure delivery. At the same time, a review is under way of regulation 16 and related regulations to ease the process of creating a PPP. We discuss the process more in the next section.

There is one major exception to the recent history of PPPs, and that is the REIPPP programme. In the first four procurement rounds of the programme (and another three small procurement rounds), conducted between 2010 and 2015, R209.7bn of investment was generated (see box alongside) of which just below 30% is in the form of equity and the balance (of almost R150bn) is debt. This quantum is more than twice the amount invested in all other PPPs combined. The programme pioneered an auction structure that has since been emulated in the rest of the world that successfully brought down bid prices. Recent auctions elsewhere in the world have generated prices of 1.3 US cents/kWh for photovoltaic solar in Portugal (Bellini 2020) and 4.8 US cents for wind in Greece (Radowitz 2020). These prices indicate that a fifth round of auctions in South Africa could bring prices down significantly further.

Renewable Energy Independent Power Producers Programme Highlights

- 6,422MW of energy capacity procured through four main auction rounds and three small rounds between 2010 and 2016.
- 112 IPPs successfully bid with 68 IPP projects already connected to the grid (as of June 2020).
- Investment of R209.7bn generated of which R41.8bn was foreign investment.
- Pricing of energy procured fell substantially through the four auction rounds, depicted below.

Figure 23: Portfolio prices achieved in REIPPP rounds (R/kWh)



Source: IPP Office (2020)

The REIPPP programme occurred outside of the framework of section 16 PPP rules. The IPP Office was structured awkwardly as a joint venture between National Treasury and Department of Minerals and Energy, with the DBSA acting as secretariat and funder, with exemptions granted from normal procurement frameworks by National Treasury. The focus was on problem solving rather than the enforcement of administrative arrangements (Eberhard, Kolker and Leigland 2014). It has to date still not finalised an appropriate long-term framework with clear reporting lines and budgets. This lack of clarity is a threat to its operations in potentially undermining its stability, a problem made clear with the departure of the founding CEO of the Office, Karén Breytenbach, in mid-2019, apparently after contractual arrangements became unworkable. The Department of Minerals and Energy has said it intends to transition the office into an

institution established through legislation that would then be compliant with the PFMA (ESI Africa 2019). Some have suggested it should be transitioned into a future independent system and market operator that would be responsible for procuring all energy for the grid (Eberhard, Kolker and Leigland 2014).

The undoubted success of the IPP Office provides lessons for the wider PPP framework. Its success was at least in part a result of being outside of the "normal" PPP framework. However, this is also a fundamental weakness as it must then operate in an institutional vacuum that is ultimately destabilising.

6. Challenges to greater use of PPPs in infrastructure

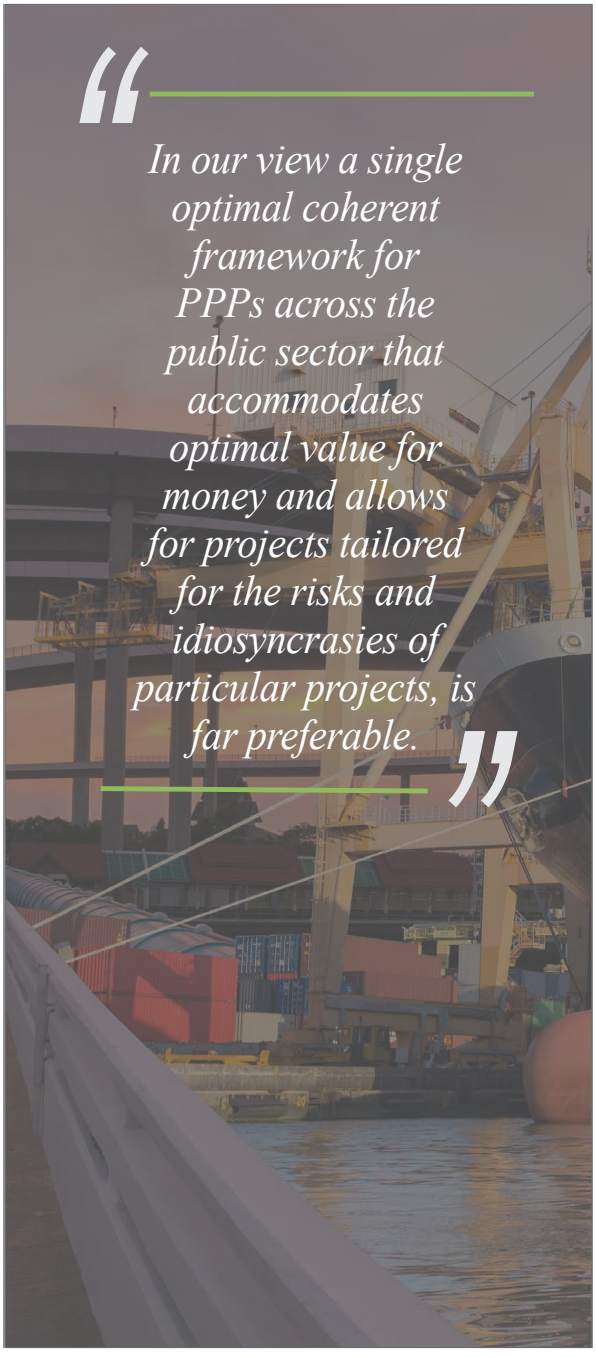
It is tempting to conclude from the REIPPP example that part of the solution to boosting infrastructure investment and PPPs should be more ad hoc exemptions from the standard framework. However, this risks creating duplication and undermining the coherence of an overall infrastructure planning approach.

Exceptions are also more likely to fail than succeed, despite the prominent example of REIPPP, because they depend for success in each case on creating a robust framework for procurement and project oversight from scratch. The IPP Office was successful in doing so because it brought in a vast amount of private sector expertise from both local and foreign sources to develop its procurement framework. It was staffed with individuals with a vast amount of experience in PPP appraisals and who were well known in the private sector. High quality documents were produced and deadlines were stuck to, which generated trust and confidence from the private sector that the IPP Office could be relied on.

However, the IPP Office was an exception that does not necessarily provide a model for the future. The ad hoc nature of it worked because of the unique circumstances and individuals involved. The temptation to establish further ad hoc structures to drive infrastructure procurement, like an IPP Office for water and sanitation infrastructure, for example, could lead to expensive failures and create hard-to-manage risks for the fiscus when ad hoc guarantees are provided. Quasi PPPs can also be created. The continuum between normal procurement and PPPs has many stops and several positive partnerships with the private sector are possible that do not amount to full PPPs. For example, producing a public facility like a hospital can be done as a PPP, or as procurement of hospital services on a long term contract that requires a provider to finance and build a hospital.

Some discussions on creating infrastructure pipelines, particularly outside of National Treasury, have suggested that this series of ad hoc interventions that aim to "make it work" may be how the pipeline is implemented. However, in our view a single optimal coherent framework for PPPs across the public sector that accommodates optimal value for money and allows for projects tailored for the risks and idiosyncrasies of particular projects, is far preferable.

National Treasury has long shared the ideal of a coherent framework for PPPs, which led to regulation 16 and its PPP Manual which sets out the details for creating PPPs by public institutions (National Treasury 2004).



6.1 Characteristics of ideal PPP frameworks

PPPs are used in many countries and their frameworks have been much studied leading to a set of best practice concepts. Much of this has been driven by the World Bank and partners which have set up the Public-Private Infrastructure Advisory Facility (PPIAF) and the PPP Knowledge Lab. These provide extensive research on historic PPPs and offer technical advice on setting up and structuring PPPs. The OECD has also provided extensive research and development support on PPPs (OECD 2008). There is now a vast literature on optimal PPP approaches that is beyond the scope of this report. We provide some key insights only.

This research and development has led to a standard model for PPPs that begins with the creation of a "PPP Unit" in governments as a centre for excellence on PPPs. There are several reasons identified for this approach (OECD 2008):

- To ensure that departments deal properly with PPPs in terms of their budgets and do not succumb to the fallacy that PPPs increase the ability of the government to spend more;
- To ensure that government departments do not engage in "free rider" behaviour whereby they commit the government as a whole to honour future payment obligations that the individual departments know they cannot honour through their own expected future budget allocations;
- To provide a knowledge centre that government departments and other government entities can use when they set up and contract for PPPs;
- To regulate the creation of PPPs by government departments and other government entities to ensure that they fulfil all requirements regarding affordability, value for money and risk transfer; and
- To separate PPP practice and policy.

A PPP Unit is not an advocate for PPPs but is rather responsible for ensuring that PPPs deliver value for money in line with broader social and economic policy objectives. This means keeping transaction costs low and overall procurement costs low through oversight and good PPP policy development and promotion. A PPP Unit can become a centre of excellence in PPP knowledge, oversight and development. Competencies that are generally seen as important include (OECD 2008):

- Develop a legal and regulatory framework conducive to PPPs;
- Project initiation and solicitation;
- Pilot programme management and evaluation;
- Attracting potential partners and investors;
- PPP valuation (value for money compared to public sector procurement);
- Political risk management through advocacy within the government and with the general public; and
- Project management, performance monitoring and contract management.

A skilled PPP Unit will earn the trust of the private sector and therefore attract greater bidding and lower prices. It will build knowledge and frameworks to implement PPPs and therefore reduce the transaction costs involved in PPPs.

PPPs can be funded in three main ways which in turn fit different types of infrastructure and models. These are shown below, adapted from (Du, Wu and Zhu (2018):

Revenue model:	Availability payments	User pay	Mixed revenue
Definition	Long-term contracts where the private sector is allocated the responsibilities of designing, building, financing, operating and maintaining the facilities on a public project. In return for their services the private sector is reimbursed through a predetermined performance-based payment plan.	Users partially or wholly pay for the infrastructure good / service they utilise. This scheme is generally popular because projects tend to be more budget neutral, where government opts not to provide capital support.	Some of these projects include a minimum revenue guarantee (MRG) / dynamic revenue insurance (DRI) to make it more attractive for private sector participation.
Appropriate infrastructure	Social Infrastructure	Economic infrastructure	"Network industry" infrastructure
Key features	Government transfers project risk (budget and delivery) to private sector. This ensures schools, hospitals etc are built to the right spec and within allocated budget.	Opens up private sector participation (finance and project delivery skills) by reducing funding burden on government.	Risk transfer towards government as an incentive for private sector participation
Recent transactions	Schools	N4 Toll Road Gautrain	REIPPP Gautrain

6.2 South Africa's PPP framework

South Africa was at the vanguard of global thinking on PPPs and developed a PPP Unit in line with best practice. This is represented in regulation 16 issued in line with the PFMA and regulation 309 issued in line with the MFMA. The PPP Manual published in 2004 provides an extensive guidance document to developing PPPs. A recent global benchmarking exercise by the World Bank rates South Africa's PPP framework highly, scoring it above average for project preparation, contract management, management of unsolicited proposals and only slightly below average for procurement (World Bank 2018).

The PPP Unit was established in 2000 to oversee PPPs at all levels of government and oversaw the 36 projects that were discussed in section 5.2. The institutional framework sets down a series of phases for the development of PPPs. These include (adapted from OECD 2008):

- An inception phase. Departments and provinces inform the PPP Unit of their intention to set up a PPP. They must establish a project officer and team and satisfy the PPP Unit that it has the capacity and skills to manage a PPP.
- A feasibility study. This must clarify the role of private parties in the PPP and analyse the options available to government. It must pass the three regulatory tests: affordability, value for money and risk transfer. The PPP Unit applies these tests in what is known as Treasury Approval I, which follows completion of the feasibility study. The study includes several stages:
    - Ascertain the need for the service that is being delivered.
    - Consider the various options through which the service can be delivered, including a "conventional" (i.e. on budget) option. Affordability is a key aspect of this stage.
    - Due diligence and value assessment is undertaken. This is a rigorous process that includes comparison with a "public sector comparator" (PSC), a risk-adjusted PSC, a PPP reference model and a risk-adjusted PPP reference model. After building these models, a budget must be established for the project. This is analysed to ascertain affordability and value for money.
- The procurement phase follows Treasury Approval I during which two more approvals take place. For Treasury Approval IIA, the PPP Unit produces the procurement documentation, including draft contracts to enable the procurement process by the relevant department. Before the department can appoint bidders, it must demonstrate to the PPP Unit that it has applied the criteria established through the feasibility study.
- The report on the bidder forms the basis for Treasury Approval IIB, after which the department or province draws up the management plan for its role in the PPP and completes due diligence on the capacity of the bidder to fulfil its function.
- Before the contract can be signed, Treasury must issue Treasury Approval III, confirming the contract meets all requirements.
- The project then enters phases IV (development), V (delivery) and VI (exit) during which Treasury applies various levels of scrutiny and monitoring.

In line with international best practice, the PPP Unit is not an active promoter of PPPs. It depends on government institutions, including local, provincial and national departments, to approach it to advocate for PPP projects. The approvals process is onerous both for public institutions that apply to launch a PPP and for National Treasury which must manage the approvals process with an already thinly stretched team.

This, fundamentally, is the reason for the slowdown in PPP volumes since 2007 after which, largely because of changes of political heads in Treasury and the

"The approvals process is onerous both for public institutions that apply to launch a PPP and for National Treasury which must manage the approvals process with an already thinly stretched team."

presidency (particularly the exit of Trevor Manual as finance minister in 2009), the political will to mobilise departments and provinces to submit PPPs dissipated, combined with the resource constraints that have grown both at departmental and National Treasury levels.

The alternative of on-budget procurement subject to the Framework for Infrastructure Delivery and Procurement Management (FIDPM) discussed in section 1.2 appears much more straightforward for government departments. There are several practical benefits such as lighter oversight from Treasury, as well occasionally ideological resistance to the prospect of working with private partners to deliver public services.

Unsolicited proposals are dealt with in terms of practice note 11 of 2008/9. Unsolicited proposals can potentially add significant value to the public sector by bringing innovative concepts for public service delivery, but can also be abused by subverting the normal infrastructure development process. Practice note 11 requires unsolicited proposals to include statements of the anticipated benefits to the public institution as well as several details about the bid. The relevant accounting officer can then decide whether to reject the proposal or consider it further. While the note covers all unsolicited bids, it specifically accommodates PPPs which must, after being received, then comply with Regulation 16 in all respects, leading to a public bidding process. Any party making an unsolicited proposal therefore must be prepared to enter a full PPP process which might result in a loss of their intellectual capital and the cost of developing the unsolicited approach.

The PPP Unit regulations are not the only relevant legislative challenge, however. Important additional legislation is the Preferential Procurement Policy Framework Act (5 of 2000), the Broad-Based Black Economic Empowerment Act (53 of 2003) and the constitution itself. Various Treasury guidance notes have also been issued over the years while specific industry level codes, such as the Construction Industry BEE Charter, can conflict with overall frameworks. Climate change policies may also influence how PPPs can be done. The Municipal Systems Act also constrains the way municipalities can use PPPs by creating an additional layer of requirements for procurement from private providers. While these constraints may maximise delivery on policy objectives overall, they add to the complexity of delivering PPPs.

Parsing of all infrastructure projects for PPPs

The PPP framework requires an extensive value assessment that compares the "normal" FIDPM procurement process with a PPP. However, the same is not required vice versa. If an infrastructure project is proposed in line with the FIDPM, there is no assessment required to determine if it is the optimal approach to maximise value compared to a PPP. In this way, on budget procurement is treated as the "norm" while PPPs are treated as the exception, requiring an extensive assessment to prove that it really does offer greater value. In contrast, FIDPM, while still rigorous, has only a perfunctory step to consider alternative procurement frameworks and not the comprehensive value assessment process for PPPs.

This imbalance between the FIDPM and PPP approach is a major contributor to the relatively small volume of PPPs. PPP regulations cannot be considered in isolation but must be assessed alongside the wider infrastructure framework to ensure that there is a consistent approach to determining the optimal approach for each project.

7. Solutions to mobilising the private sector

The pressure facing the national budget and SOEs' lack of access to debt markets, mean PPPs have become a more important option than ever before. A coherent framework that systematically identifies PPPs across government could bring private sector knowhow and capital to maximise the value for money delivered by infrastructure projects. This must be the ultimate objective.

The solution must be to consolidate all infrastructure procurement into a coherent institutional approach. This does not mean centralisation – the identification of needs particularly for social infrastructure is often best determined at local government level. However, the wider capacity constraints mean centralised centres of excellence will be important. All projects can be assessed for value for money and the optimal procurement structure, whether PPP or on budget, can be chosen. PPPs will be optimal when there are clear and predictable cashflows for a project and clear benefits from allocating risk to the private sector that maximises the value of the project. On-budget infrastructure will be optimal when government must carry all risks and the political risks are high.

The PPP Unit experience of the existing PPP framework has demonstrated that feasibility and other assessments are resource-intensive, which may not be efficient, especially for smaller projects. As it stands, the process makes no distinction for the size or risk presented by the project (although there is a narrow set of specific guidance for tourism sector projects). Projects must follow the same steps even if they are carbon copies of previous projects implemented by other government institutions. This makes it difficult to develop sector-specific approaches that can be calibrated for that sector. So, specialist PPPs such as those of the REIPPP programme cannot be delivered through the standard PPP framework. A risk-adjusted approach through which procurement approaches are standardised across the public sector should identify the best delivery approach in each case with specialised PPP industry-level solutions.

7.1 MFMA and PFMA

Regulation 16 is set out in terms of the PFMA and directly governs PPPs, however, the act has wider implications for PPPs. Sections 66 to 70 are also important because PPPs usually bind the government to future financial commitments, creating fiscal commitments and contingent liabilities. These sections set out a rigorous process for managing such commitments.

The PFMA itself is not often cited as an impediment to successful PPPs but rather regulation 16 and its onerous steps through approval and subsequent monitoring. At municipal level, where local services such as water and sanitation are provided, the MFMA does pose important challenges for PPPs. An affordability assessment requires municipalities to demonstrate that they have the financial means to meet payments in terms of the PPP, but it is difficult to encumber future cash flows using the rates that will be generated from the expansion in municipal services as a result of the new infrastructure.

Section 33 of the MFMA requires a complex process before any encumbrance of future budgets beyond three years can be undertaken. This includes a public consultation process, and consultation with National Treasury, provincial treasuries, the Department of Cooperative Governance and Traditional Affairs (Cogta) and line ministries for particular infrastructure being considered. A municipal council resolution is then required that confirms the value for money from the contract and approves the contract exactly as it is to be executed.

This additional burden on municipalities in respect of multi-year PPPs further disadvantages PPPs as a service delivery model compared to on-budget infrastructure procurement. PPPs typically have five- to 30-year project lifespans.

Further relevant regulation is in development. National Treasury has drafted a Municipal Fiscal Powers and Functions Amendment Bill that proposes new, uniform regulations for municipalities to charge developers to connect new development to municipal services (National Treasury 2020). This potentially creates a new revenue source to support infrastructure projects.

Treasury has also updated the municipal borrowing policy framework for creditworthy municipalities to borrow in the public capital markets. This aims to increase the term maturity of borrowing, improve the secondary market for the trade of municipal debt instruments and define the role of DFIs to avoid crowding out the private sector.

Wider constitutional imperatives create other issues. One is the difficulty in using project bonds. These are non-recourse debt instruments designed to finance particular projects. These are particularly useful in

developing ESG-compliant instruments that can suit specific investment themes. Constitutionally, however, the state can only accept funding that contributes to the general revenue fund when the state is acting as the obligor. This makes it difficult for national government to issue project bonds. However, they can be used through SOEs or through PPPs.

The challenges facing local government in infrastructure delivery are manifestly more complex when infrastructure is to be shared between adjacent municipalities or between provincial and local government levels. Cooperation can lead to replication processes within each government institution. For this reason, the district development model has been developed to coordinate infrastructure development across multiple public institutions.

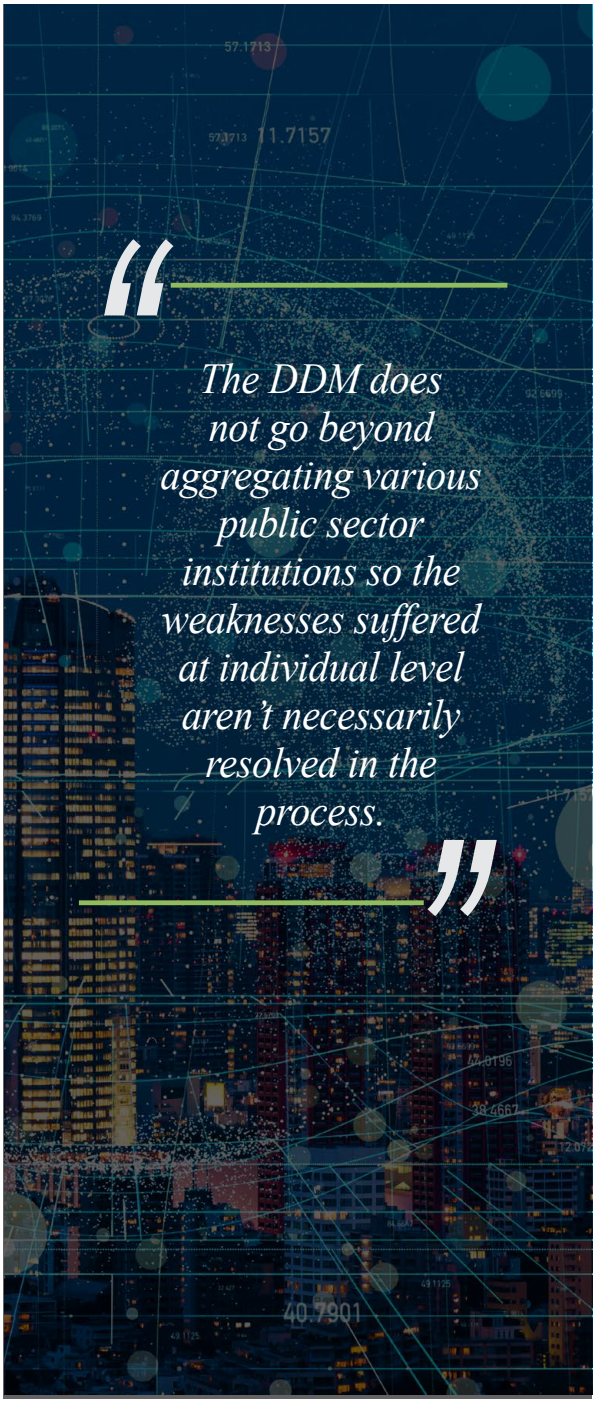
7.2 District development model as potential solution at local government level

The capacity and coordination challenges around infrastructure delivery at local level may be resolved through the "district development model" (DDM). The presidency has backed the model, announcing it during the 2019 budget vote, giving it the moniker "Khawuleza", meaning to walk or act faster.

The aim is to synchronise development planning between the eight metros and 44 districts, as well across the three levels of government – local, provincial and national. In the process, capacity gaps can be filled, projects developed and private sector technical skills drawn on where needed. PPPs with private funders can be developed where feasible. In 2020, Cogta minister Nkosazana Dlamini Zuma gave it firm backing as the model for local government coordination.

The DDM approach has been piloted with the Waterberg and OR Tambo districts and Ethekwini metro, though results have not been released. The model is being deployed for the Lanseria development district as a first major test case with the DBSA playing a key role alongside the Gauteng government working with the presidency.

The Presidential Economic Advisory Council points out that the DDM on its own will not be able to solve all problems (PEAC 2020). The DDM does not go beyond aggregating various public sector institutions so the weaknesses suffered at individual level aren't necessarily resolved in the process. However, the DDM does provide an instrument to resolve coordination and capacity problems in tandem with other efforts.



8. New state institutions in infrastructure

On taking office as president in February 2018, President Cyril Ramaphosa signalled his intention to make infrastructure a critical component of his economic development policy. In September that year, the president announced the creation of an infrastructure fund to support this effort. While initially described as a R400bn fund (Bateman 2018) in the February 2019 State of the Nation Speech this was revised to R100bn over a 10-year period. The fund was described as a mechanism to leverage financing from the private sector and DFIs.

At the same time the presidency created an Infrastructure Investment Office (IIO) to unlock blockages in infrastructure delivery. The IIO was initially positioned in tandem with the infrastructure fund, but as the concepts have developed, these have been reconciled with existing institutions and capacities. At the time of writing, the IIO was being aligned with the Presidential Infrastructure Coordinating Commission (PICC) which is now positioned within the Department of Public Works and Infrastructure (DPWI). The DPWI consolidated the infrastructure activities that had been housed in the Department of Economic Development under then-minister Ebrahim Patel in the previous administration. The IIO appeared to replicate many of the functions of the PICC as a focused effort to unlock blockages to infrastructure delivery. The PICC Council is meant to be a politically powerful mechanism to unblock infrastructure obstacles reporting directly into the presidency, so it was not clear what function the IIO was meant to perform. Both the IIO and Infrastructure Fund conflicted with the presidency's function as a policy formation body rather than implementing body. The PICC and IIO are now being consolidated into a new institution, dubbed Infrastructure South Africa, though it is as yet unclear what the legislative framework for this institution will be.

The Infrastructure Fund, in turn, has been consolidated into the DBSA as a new specialised unit of the DFI, with oversight from the DPWI. The unit will be a project initiation and development function that aims to mobilise private investment through risk mitigation strategies taken on by the government. The R100bn figure now refers to a target of main budget spending that should serve this catalysing function through risk mitigation measures. The Infrastructure Fund will therefore not amount to new budget but rather improve the effectiveness of existing government budget by crowding in private investors. The unit is being structured at arm's length from the DBSA's own balance sheet to ensure a level playing field with commercial banks in funding new projects, though many of its functions overlap with its existing Infrastructure Investment Programme for South Africa (IIPSA) that coordinates public sector infrastructure projects to access multilateral development funding. The DBSA says it will partner with National Treasury's GTAC (which houses the PPP Unit) and the PICC in deploying the fund.

8.1 Presidential Infrastructure Coordinating Commission

The National Infrastructure Development Act (24 of 2014) was driven by economic development minister Ebrahim Patel. The legislation is unusual in granting no formal powers to the PICC which it created. The Act enables the PICC to only "prioritise" and "steer" projects. It cannot usurp the constitutional responsibilities of accounting officers at municipal and provincial levels to procure, departmental political heads to revise and implement legislation and regulation, or Treasury to budget. Given that the failure to deliver infrastructure has largely been cast as a failure of coordination and capacity, the PICC was intended to identify these failures and proactively address them while delivering on a national infrastructure plan.

The PICC has operated with a secretariat provided by the DPWI and a team of contracted experts that have been housed in the IDC (which also fell into minister Patel's portfolio). As we understand it, this capacity is being consolidated into ISA under Dr Kgosientsho Ramakgopa who is the de facto CEO.

ISA will be responsible for the infrastructure policy thinking and monitoring government development of the Strategic Infrastructure Projects (SIPs) but the weakness of the Act was always that it gave the PICC no formal responsibilities. These still lie with departments and especially Treasury which must do the budgeting.

The 110/ISA structures have so far conducted a process of selecting priority projects and hosted the Sustainable Infrastructure Development Symposium (SIDS) to showcase some of these. This selection approach involved encouraging the wider public sector to pitch projects that would then benefit from the capacity and mobilisation that ISA could bring to them. Subsequently, a further 18 SIPS (some consisting of several sub projects) have been

gazetted, adding them to the existing 18 SIPS that are overseen by the PICC. The projects that have been gazetted are not new, but it is hoped that the oversight from ISA will lead to more effective delivery.

While it remains unclear exactly what the ISA will do in driving the development of these projects, there appears to be a potentially productive function to be played as the promoter of projects for PPPs. As discussed in section 6.2, the PPP Unit in National Treasury is structured to avoid being an active promoter of PPPs but rather a knowledge repository and regulator of them. This leaves open the role of parsing the public service to identify projects that can be developed and taken to the National Treasury to be delivered as PPPs in line with regulation 16.

With the political capital ISA is to be endowed with, it can drive the public sector to embrace and use the PPP framework, reversing the slowdown in PPP usage experienced since 2007. This can be complemented by the DBSA's Infrastructure Fund that can work with public institutions through the feasibility and affordability assessment stages of PPPs, structuring projects that will be bankable to the private sector. However, to date, the ISA has made little reference to the formal PPP framework in its documents. Minister de Lille recently said that "ISA is also in the process of adapting the infrastructure procurement framework to enable public-private partnerships and unlocking new funding mechanisms for major infrastructure investment", though it is unclear what this refers to. As discussed above, Treasury is reviewing its regulation 16 framework.

The concern is that ISA may instead choose to follow the ad hoc model pioneered by REIPPP, rather than supporting a coherent infrastructure framework across government.

8.2 Role of DBSA

The DBSA has long played a crucial role in in infrastructure development. It does this in several ways as a direct investor in projects, a promoter of projects and as a partner to local government in developing projects.

Among the recent steps taken to develop infrastructure capacity overall, the DBSA has been given a prominent set of responsibilities. The Infrastructure Fund will be developed through a R400m project development fund allocated by National Treasury (DBSA 2019). This should enable DBSA to work with many public institutions to develop PPPs and take them through the National Treasury process.

Additionally, the DBSA has been appointed as the "implementing agent" for the District Development Model that has been positioned as the key to unlocking better coordination between levels of government and municipalities. It will resource a "programme coordinating office" to roll out the DDM and has budgeted R67m during 2020/21 to provide diagnostic reports for 42 district municipalities and seven metros.

These responsibilities, on top of its existing functions in supporting local government projects alongside wider infrastructure delivery, positions the DBSA as an important institution in the overall infrastructure plan. The key question is how it can work with ISA and National Treasury to crowd in the private sector.

"Among the recent steps taken to develop infrastructure capacity overall, the DBSA has been given a prominent set of responsibilities."

8.3 Catalysing functions of the Infrastructure Fund

As discussed in section 4, from a private sector perspective, there is no shortage of appetite to invest in bankable projects. "Bankable" refers to projects that have a positive net present value. The projects must reliably offer a return to private sector investors to justify their involvement.

As discussed, many of the key functions the state can play is in "de-risking" a project so that it falls within the zone of bankability. There are several practical measures that can achieve this including the use of guarantees, which have featured in many PPPs.

Risk mitigations that the public sector can offer in infrastructure projects	
Risk measure	**Mechanism and outcome**
Political risk cover	Cited as a key concern, particularly for non-SA investors. Presence of DBSA with balance sheet exposure provides some mitigation. Partnerships can also be formed with multilateral institutions that provide political risk insurance.
Offtake agreements or minimum income guarantees for user pay projects	Government absorbs some or all financial risk, private sector focuses on operating risk.
Central government guarantee	Removes credit risk facing partners when facing government institutions outside of central government (e.g. SOEs).
Openly bid projects with full transparency	Private sector is conscious of corruption risks which government can mitigate through high quality bidding processes.
Mitigate and diversify exchange rate risk	Particularly with capital-intensive projects requiring large, imported components, government can partner to address exchange rate risk.
Natural monopoly or protection through licensing	By providing private partners with a level of exclusivity, removes competitor risks and improves visibility of the project lifecycle.
Quality of main contractors (construction especially)	Key risk for private sector in that weak construction contractors can fatally damage a project. Procurement model can help by reducing constraints on choices of main contractors (other than by insisting on high quality) and by taking on some construction risks (e.g. natural disasters).
Environmental sustainability	By insisting on high environment standards, government can ensure environmental sustainability and remove "race to the bottom" in environmental standards between bidders.
Viability gap funding	Some projects, particularly in user pay models, may not meet bankability standards on their own. Viability gap funding increases feasibility by covering some of the costs. This can include government taking responsibility for enabling infrastructure around the site (for example, connecting roads).

The Infrastructure Fund can potentially deliver some of the above elements, providing an important enabling role for infrastructure.

9. Conclusion: how the private sector can support delivery of infrastructure

In this report we've identified several gaps in capacity in the public sector that the private sector could look to proactively solve. The private sector is an appropriate service provider in projects where it is taking risk out of the public sector and, in terms of Irwin's rules discussed above, increasing the overall value of infrastructure projects for the country. While the private sector is often discussed specifically in terms of funding, the capacity it offers in technical legal, financial and engineering skills is also important.

The constraints include the following:

Project design

At the conception phase, public sector institutions lack the legal, engineering and market analysis capabilities to determine an optimal framework for infrastructure procurement. While private sector skills can be tapped for particular projects (for example in REIPPP when significant private capacity in legal, accounting, engineering, environmental and other skills were brought in), the private sector can proactively support projects particularly in the design phase.

The PPP framework allows for unsolicited bids to be considered by public institutions. If successful, a normal PPP framework is implemented leading to a public procurement process.

There is clear scope for the private sector, though organised business or as individual businesses that are capable of delivering through PPP partnerships, to identify PPP opportunities that fit public institution mandates (at metro, district, provincial or national level) and to approach public institutions with unsolicited offers. Theses can be designed to prove the feasibility and support the assessment process to reach public procurement phase, supplementing the public sector process. Such bids need to fit the wider infrastructure policy objectives and framework but can be done to unlock considerable private sector opportunity where crucial infrastructure bottlenecks can be undone (e.g. ports, rail).

Funding

The funding constraints discussed in section 4, are not a lack of appetite, but a lack of viable funding opportunities. This largely comes down to the ability of the public sector to develop projects that can be taken to the private sector with the appropriate instruments.

PPPs place the responsibility for instrument design largely with the private sector, but on-budget infrastructure faces multiple issues with instrument design. Additionally, investor market fragmentation, such as the long tail of small pension funds, makes it structurally impractical to engage with certain types of funding requirements such as largescale greenfields infrastructure projects. The private sector could work towards consolidated vehicles that address the transaction costs facing individual investors to invest in single projects. Investment institutions can take on due diligence responsibility and share the costs with a wide range of investors, creating vehicles to channel institutional funds into infrastructure projects. Such solutions, however, need a pipeline on the other end to meet, so will have to be developed in close coordination with the wider public sector development effort.

Similarly, South Africa's capital markets can develop capacity for solutions that fit existing regulatory constraints such as regulation 28 by innovating to accommodate new funding vehicles. Examples include the JSE's sustainability segment, which accommodates green bonds and social bonds (JSE 2020), and its project bonds segment (which has so far listed one project bond that was used in financing the REIPPP). These create avenues for instruments that support the wider funding effort and lower transaction costs for projects.

Policy-led infrastructure

By far the simplest form of infrastructure, from a national budget perspective, is that paid for and used by the private sector itself. Policy choices, such as the decision to introduce cellular networks through private licensing rather than using the state monopoly Telkom, profoundly affected the quantum of infrastructure that was delivered thereafter.

There are several policy issues that could rapidly lead to increased volumes of private sector investment including:

- Opening up own generation licensing for companies to easily build new energy generating plants of over 1MW. This could be further stimulated through a grid feed-in scheme that pays companies for their excess power.
- Licensing spectrum for cellular networks to expand capacity and grow their 5G networks. Completing digital migration of television signal would free up substantially more capacity. This has a strong leverage impact on economic growth by improving connectivity and reducing costs.
- Concessioning in the SOE segment, particularly of ports and rail, would allow private companies to use existing infrastructure to facilitate greater economic activity.
- The collapse of mining exploration investment discussed in section 1.4 reflects the long-running policy uncertainty that has constrained the mining sector. While the figures reflect this at an exploration level, the same factors will be constraining expansion investment to mine existing resources too. Finalising the MPRDA and mining charter would remove this uncertainty and allow investment to restart. Doing so on terms that reduce the costs for the private sector would maximise the impact[3].
- Finalising the expropriation bill and proposed amendments to section 25 of the constitution to recommit to property rights. The more robust the protection afforded property rights, the lower the risks facing investors and therefore the higher the volumes of investment.

Economic impact assessment

The private sector, through organised business, can work to support government's infrastructure feasibility process. A critical component is to assess value for money, where this is measured through the economic impact of infrastructure.

The private sector is well positioned to fund economic impact assessments to support the case for specific infrastructure projects. Infrastructure projects that pay for themselves through the increased revenue streams to government from increased taxes and rates are relatively fiscally beneficial. In many cases, government infrastructure is needed to catalyse private infrastructure investment, so relatively small public investment can lead to a large overall infrastructure commitment (for example, the property development that was triggered by proximity to the Gautrain stations). The private sector is well positioned to identify catalytic public infrastructure of this sort.

Government, through Infrastructure South Africa, should establish a capacity to engage with the private sector to identify such catalytic public investment projects. Where the financial case is clear, such projects will generate revenue to fund future economic and social infrastructure.

The challenge of boosting South African investment in infrastructure is enormous. There is no single solution that can substantially increase volumes of investment. Rather, a wide array of interventions are needed to stimulate both the private and public sectors to invest. We trust that this report has provided the case for several such interventions both at policy level but also that can be undertaken by the private sector itself.

[3] *As this report was going to press, it was revealed in a parliamentary briefing that over 5,000 mining and exploration rights applications are being held up by the DMRE due to inability to process them.*

10. Annexure A: PPPs undertaken in South Africa

In total, R91bn has been invested through PPPs in 36 projects, which have included:

List of PPP projects concluded in South Africa							
Project name	**Government institution**	**Type**	**Date of close**	**Duration**	**Financing structure**	**Project value R million**	**Form of payment**
Transport							
Sanral N4 East Toll Road	Sanral	DFBOT	Feb-1998	30 years	Debt: 80% Equity: 20%	3,200	User charges
Sanral N3 Toll Road	Sanral	DFBOT	Nov-1999	30 years	Debt: 80% Equity: 20%	3,000	User charges
Sanral N4 West Toll Road	Sanral	DFBOT	Aug-2001	30 years	Debt: 80% Equity: 20%	3,200	User charges
Northern Cape fleet	Northern Cape Dept of Transport, Roads and Public Works	DFO	Nov-2001	5 years	Equity: 100%	181	Unitary payment
Chapman's Peak Drive Toll Road	Western Cape Dept of Transport	DFBOT	May-2003	30 years	Debt: 44% Equity: 10% Govt: 46%	450	User charges and guarantee
Fleet management	Eastern Cape Dept of Transport	DFO	Aug-2003	5 years	Debt: 100%	553	Unitary payment
National fleet management	Dept of Transport	DFO	Sep-2006	5 years	Equity: 100%	919	Service fee
Gautrain Rapid Rail Link	Gauteng Dept of Public Transport, Roads and Works	DFBOT	Sep-2006	20 years	Debt 11% Equity: 2% Govt: 87%	31,800	User charges and patronage guarantee
Sanral Gauteng Freeway Improvement Plan Toll Road	Sanral	DBOT	Oct-2007	20 years	Debt: 100%		User charges
Water and sanitation							
Dolphin Coast water and sanitation concession	Kwa-Dukuza Local Municipality	DFBOT	Jan-1999	30 years	Debt: 21% Equity: 18% Govt: 61%	130	User charges
Mbombela water and sanitation concession	Mbombela Local Municipality	DFBOT	Dec-1999	30 years	Debt: 40% Equity: 31% Govt: 29%	189	User charges

Project name	Government institution	Type	Date of close	Duration	Financing structure	Project value R million	Form of payment
Correctional services							
Mangaung and Makhado maximum security prisons	Dept of Correctional Services	DFBOT	Aug-2000	30 years	Debt: 88% Equity: 12%	3,600	Unitary payment
Health							
Inkosi Albert Luthuli Hospital	KwaZulu-Natal Dept of Health	DFBOT	Dec-2001	15 years	Debt: 70% Equity: 20% Govt: 10%	4,500	Unitary payment
Universitas and Pelonomi Hospitals co-location	Free State, Dept of Health	DFBOT	Nov-2002	16.5 years	Equity: 100%	81	User charges
State Vaccine Institute	Dept of Health	Equity partner ship	Apr-2003	4 years	Equity: 100%	75	Once-off equity contribution
Humansdorp District Hospital	Eastern Cape Dept of Health	DFBOT	Jun-2003	20 years	Equity: 90% Govt: 10%	49	Unitary payment
Phalaborwa Hospital	Limpopo Dept of Health and Social Development	DFBOT	Jul-2005	15 years	Equity: 100%	90	User charges
Western Cape Rehabilitation Centre and Lentegeur Hospital	Western Cape Dept of Health	Facilities management	Nov-2006	12 years	Equity: 100%	334	Unitary payment
Polokwane Hospital renal dialysis	Limpopo Dept of Health and Social Development	DBOT	Dec-2006	10 years	Equity: 100%	88	Unitary payment
Port Alfred and Settlers Hospital	Eastern Cape Dept of Health	DFBOT	May-2007	17 years	Debt: 90% Equity: 10%	169	Unitary payment
Tourism							
SanParks tourism projects	SANPARKS	DFBOT	Apr-2000	Various years	Equity: 100%	270	User charges

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