South African CitiesNetwork

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STATE OF CITY FINANCES

Acknowledgements

Contributing Authors:	**Chapter 1**	Carmen Abdoll
	Chapter 2	Jonathan Carter
	Chapter 3	Simon Halvey and Geoff Bickford
	Chapter 4	Lerato Shai
	Chapter 5	Jugal Mahabir
	Chapter 6	Simon Halvey
	Chapter 7	Zanie Cilliers
	Chapter 8	Kamleshan Pillay and Srinivasan Pillay
	Inserts	Carl Stroud (page 34)
		Jonathan Carter (page 62)
		Indra de Lanerolle (page 138)
		Khumo Sello (page 184)
Project Manager:	Cornerstone Economic Research	
Project Coordinator:	Danga Mughogho	
Editor:	Kristina Davidson (Write to the Point)	
Photo Credits:	As indicated	
Technical Reviewers:	Krish Kumar, Walter Fieuw and Malango Mughogho	
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Executive Summary

The Changing State of City Finances

Tepid economic growth and rising unemployment directly affect city residents and businesses, and their ability to pay municipal bills. With the deteriorating national fiscal position, cities will need to rely more on their own revenue sources. City revenues appear to be quite resilient, growing at an average annual rate of about 8%, and most of the cities collect within 5% of their originally budgeted revenue. However, most of the cities increased their provisions for debt impairment, indicating an expected deterioration in their ability to collect revenue. Own revenues make up over 75% of total income, with the main sources being property rates and service charges.

Of concern are the rapid increases in bulk tariffs, which are squeezing out the surpluses that cities have historically used to cross-subsidise other services; the low level of expenditure on repairs and maintenance of infrastructure; and the under-spending of city budgets – cities spent on average 84% of their capital budgets in 2016/17 compared to 94% in 2013/14. Another concern is that between 2013/14 and 2016/17, the growth in employee costs outstripped the growth in number of employees in nearly all the nine cities. In addition, all the cities, except for Tshwane, had a worse cash position in 2016/17 than in 2015/16.

Positive developments include the increase of internally generated and borrowed funds by smaller cities to finance capital expenditure, reducing their reliance on national transfers; and sound management of borrowing across the nine cities, as indicated by long-term liabilities growing at a similar rate to that of own revenues. None of the cities received a clean audit in 2016/17, although the new administrations (elected following the 2016 elections) have taken active steps to investigate suspect contracts entered into by previous administrations. It is too early to assess the impact of the change in city administrations – the 2017/18 annual financial statements and audit reports will provide an assessment of these administrations' first "full year" at the helm.

Key Messages

- City revenues appear to be quite resilient, growing at an average annual rate of about 8% and with collection rates of about 95%, although most cities have increased their provisions for debt impairment.
- The rapid increase in bulk tariffs is squeezing out the surpluses that cities have historically used to cross-subsidise other services, while cities are underspending on both repairs and maintenance and their capital budgets.
- Only with the 2017/18 financial statements and audit reports will it be possible to assess the impact of the new administrations elected in the 2016 local government elections.

CHAPTER 2

Sustainability and Equity – the Tariffs Story

Each city faces unique challenges in structuring its tariffs to ensure the municipality is funded, while keeping municipal bills affordable for the full spectrum of ratepayers and customers. The nine cities may have different tax and tariff strategies that respond to the different mixes of business and domestic customers, and household incomes, but they share some common characteristics.

As the 2015 State of City Finances Report noted, the unaffordability of municipal bills is a threat to the sustainability of city finances. Between 2015 and 2017, the average cost of municipal bills for the different service packages grew annually by between 1.19% and 2.13%, compared to 5.1% and 7% between 2010 and 2014. Increases in bulk tariffs are driving most of the increases in municipal bills; between 2015 and 2017, higher electricity and water costs accounted for 73% of the growth in municipal bills. Despite a slower real growth in cost, municipal bills remain unaffordable for poorer households. An affordability analysis, which used an affordability threshold of 10% maximum of household income spent on tariffs, found that most Type A and B service packages are unaffordable, supporting the finding that cities have generally regressive tariff structures. This means that municipal bills account for a proportionally greater share of the income of poorer households than that of wealthier households. Flat-rate connection and/or service fees are the main reason that bills are regressive. Ekurhuleni has the most progressive tariff structure, largely because the city's electricity tariffs' stepped structure increased the cost of the Type D service package.

Cities could improve the progressiveness of their municipal bills through seemingly simple changes that nevertheless require greater administrative capacity. For instance, they could eliminate basic levies or monthly connection fees (especially to lower-income households), have inclining block tariffs that increase progressively (especially for very high levels of consumption) and offer special service packages to indigents (provided consumption is capped). However, cities have no control over increases in electricity and water charges, which are set by national government. These increases are not only making municipal bills unaffordable, but also constraining the ability of cities to fund services that do not appear on municipal bills such as roads, public transport, environmental health and safety, storm water management and public parks. A national debate is needed on whether national and provincial governments are leaving sufficient tax room to enable local government to raise enough revenue.

Key Messages

- Between 2015 and 2017, increased electricity and water costs accounted for 73% of the growth in municipal bills, but real growth in the cost of municipal services has slowed.
- Most metros have regressive tariff structures, i.e. households with lower incomes pay proportionally greater shares of their income on tariffs than those with higher incomes. To improve the progressiveness of bills, cities can eliminate basic levies or monthly connection fees, and make use of inclining block tariffs.
- A debate is needed about whether or not national and provincial government are leaving sufficient tax room for local government to raise revenue to fund services such as environmental health and safety, storm water management, public parks, and building and maintenance of infrastructure.

CHAPTER 3

Financing Spatial Transformation

South Africa's urban agenda, expressed through the Integrated Urban Development Framework (IUDF), is premised on spatial transformation through densification. However, although the policy promotes compaction, the over-reliance on property rates as the primary discretionary revenue source for municipalities promotes sprawl. Property rates may represent a good local tax (being relatively stable and non-distortionary, and inherently fair), but they also drive a perverse incentive to facilitate new peripheral development.

Property rates contribute on average 16.8% of total revenues and 22.4% of own revenues in South Africa's metros. Municipalities can increase the revenue from property rates by rezoning properties and land parcels to a higher cent-in-the-rand rate. Such increases are greatest off a low base, as when agricultural land is rezoned. Hence cities prefer greenfield development, most often resulting in sprawl, as the evidence shows; there is an inherent contradiction between compact cities and the financial incentive for municipalities to promote greenfield development.

The contradiction between policy intent and the incentives created by property rates as the core source of local government revenue needs to be addressed. The over-reliance on property rates must be included in any investigation of alternative financing mechanisms for municipalities. The financing of spatial transformation can no longer be seen as separate to the core revenue model of cities. An alternative revenue model is needed that rewards cities for developing and densifying brownfield sites and restricting greenfield developments. This will require finding ways of bridging the gap between financial practitioners and spatial practitioners.

Key Messages

- South Africa's national urban agenda prioritises urban densification, but the municipal revenue model, which is dependent on property rates, incentivises urban sprawl.
- The gap between city finance (core revenue model) and spatial transformation needs to be bridged, to ensure that the desired spatial objectives are incentivised and built into the day-to-day running of cities.
- While property rates are a good local tax and should remain, an alternative revenue model is needed that rewards cities financially for developing brownfield sites and restricting peripheral greenfield development.

CHAPTER 4

The Growing Funding Gap

Cities are the engines of growth in the South African economy, but their budgets are under pressure. With rapid urbanisation, demand has risen for services, but the revenue sources available to cities are insufficient to cover their core expenditure mandates. Over the next ten years, this funding gap is likely to grow, given the current economic and demographic outlook. While metros continue to generate surpluses on their operating accounts, they do not have enough revenue to fund capital expenditure, even after grants from national treasury are taken into account. Metros have a funding gap of between 10% and 38% of capital expenditure needs. In 2017, this funding gap was estimated at R18-billion and projected to grow to R83-billion by 2026 – a total gap of R569-billion over the next 10 years. The funding gap is the result of several factors, including:

- Unfunded mandates where cities incur expenditures on functions for which they do not receive revenues, e.g. healthcare and libraries.
- Expenditure inefficiencies, e.g. losses through non-revenue water.
- Inadequate transfers from national government.
- Insufficient fiscal efforts by metros, resulting in a failure to maximise own revenues.

To close the funding gap will require multiple interventions, some of which are within the metros' control, while others fall within national government's purview. Cities can improve expenditure efficiency and fiscal effort, and increase revenue extracted from city services and assets, including increased borrowing. National government may need to make policy changes in terms of powers and functions of metros, increasing transfers or introducing a new revenue source for cities. It is essential that the gap be closed, so that cities can continue to contribute to the country's economic growth.

Key Messages

- Metros have a funding gap of between 10% and 38% of their capital expenditure.
- Unless this funding gap is closed, metros will not be able to meet their core mandates over the medium to long term.
- Cities can and should take steps to close the gap but need policy support at national level.

CHAPTER 5

Localising Taxation

Since 2000, the local government sphere has constantly evolved, due to social, political and economic pressures that are most profound at municipal level. Home to 40% of South Africa's population, cities are key to meeting the National Development Plan and the sustainable development goals, and need to balance developmental and social needs with the demands of being the country's engines of economic growth. Under the current local government fiscal framework, metros are allocated a lower per-household equitable share and conditional grants than other municipalities because they have higher levels of economic activity. However, despite better revenue management and debt collection than other municipalities, metros have a funding shortfall, or a structural funding gap, which means that metros would not have sufficient funds to fulfil their mandates even if they collected all revenues owed to them.

One solution is to assign greater powers to metros, to give them greater autonomy to manage and fund their mandates. The SACN, in partnership with National Treasury and the City of Tshwane, has conducted research into alternative financing models for metros. The principle underpinning revenue assignment in a decentralised fiscal system is "finance follows function", whereby expenditure is assigned before revenue instruments are assigned to a sphere of government. Five revenue options were assessed, based on their potential revenue and administrative impacts on city governments, as well as the economic rationale and ease of implementation within the current legal and policy framework.

The five options were: a surcharge on personal income tax (PIT), a surcharge on corporate income tax (CIT), a surcharge on transfer duties (property taxes), an occupancy tax/tourism levy and a local business tax. The PIT, CIT and transfer duties would be fairly easy to administer but the PIT and CIT would require a constitutional change and would have a negative economic impact, while transfer duties would be unlikely to be assigned to local government because of national fiscal constraints. Of all the options, the occupancy tax is the most viable one, while the local business tax requires further research. The recommendation is to pursue a tourism levy in the short term and explore options for implementing a business tax in the longer term.

Key Messages

- Cities need to be sustainably financed in order to meet the National Development Plan objectives and the sustainable development goals.
- Under the current local government fiscal framework, metros are allocated a lower per-household equitable share and conditional grants than other municipalities.
- An assessment of five possible revenue options found that cities should pursue a tourism levy in the short term and business tax in the long term.

CHAPTER 6

Financing Public Transport

In most South African cities, poorer residents mostly use the public transport system, while wealthier residents drive private vehicles. Over the past decade, some cities have developed new public transport systems, which require high levels of upfront capital investment in order to reach a critical network density. Despite heavy investment in public transport networks, ridership remains below capacity, fare-box revenues are inadequate and operating costs are higher than expected. Private vehicle use is the fastest growing mode of transport, increasing by 24% in the metros over the past decade, while bus and rail travel has decreased. In 2013, 38% of commuters used private cars to get to work, compared to 8% using public buses; 27% using minibus taxis; 5% using the train and 21% walking to work. At the same time public transport remains expensive (two-thirds of households from the lowest income quintile spend on average over 20% of their income on transport).

The public transport systems rely heavily on subsidies from national government, which is unsustainable, especially as national government is reducing funding because of fiscal constraints. Cities need to find a reliable revenue source to borrow against for capital expenditures and to continue to subsidise operations. Private vehicle-use charges are the most logical alternative source of funding for public transport, and would address the private-public imbalances that currently exist in the transport system at large. Vehicle charges provide a stable revenue source, while charging car users more accurately for the social and environmental costs of choosing to drive. The primary goal is to ensure financing for improved public transport service for the poor, with a secondary impact of a potential shift from private to public transport.

Seven potential charges were assessed against eight criteria: revenue generation, behaviour change, public/political acceptability, flexibility, complexity, redistributive alignment, legislative environment and policy alignment. They were then ranked according to their suitability. The two top-ranking charges were parking charges and congestion charges, which were then assessed using Johannesburg as a case study. The charges most suitable were found to be a single congestion charge, a parking sales tax and a parking levy. The congestion charge would have the largest impact on car use, and all of the charges would accomplish the dual tasks of shifting commuter behaviour to an environmentally sustainable means of transport, while also raising revenue to both maintain and grow the public transport system.

Key Messages

- The current public transport financing model in cities does not provide just and equitable, or sustained financing for improving the travel experience of poorer public transport users.
- Private vehicle charges can provide a significant contribution to the costs associated with cities' increasing public transport responsibilities, and ensure that these costs are not passed on to the users of public transport.
- Implementing parking or congestion charges, and ringfencing the revenue is the most effective way in which cities can ensure the continuous improvement of public transport is sustainably financed.

CHAPTER 7

Cities and Energy Diversity

Electricity is a major energy source, fuelling city economies and generating revenues for city service delivery. Electricity sales contribute on average over a quarter (26.8%) of municipal revenue, while the surplus generated from these sales is the third-largest contributor to city budgets after property rates and grants from national government. Surcharges on the sale of electricity to certain commercial, industrial and high-use residential customers cross-subsidise the free basic electricity that is provided to low-income households.

However, since 2007, electricity sales in metros have declined, driven by decreasing use among certain industrial customers and high-use residential customers in response to higher electricity prices. At the same time the cost of renewables has been declining. Cities need to be able to respond to the twin disruptions in the energy sector: the uptake in renewable energy and changes in consumer demand. The surplus that municipalities get from residential electricity sales (and use to cross-subsidise other households) comes from a very small pool of high-use customers. These are the customers who are most likely to install rooftop photovoltaic (PV) systems. These disruptions have an impact on city finances and affect the ability of municipalities to cross-subsidise low-income residential customers.

Cities need to decrease losses from theft and expenditure on bulk electricity purchases by buying from cheaper independent power producers than Eskom (improved internal efficiency); generate revenue through electricity trading (wheeling), grid charges, and time-of-use charges; and get into alternative energy services, with support for solar water heater and rooftop PV rollouts. They also need a new business model to stay relevant in the face of fast-changing customer demands for energy service. Such a model needs to be built on a transparent cost of supply and take into account revenue losses, energy service, infrastructure costs, current tariff structures and cross-subsidies, new technologies and business opportunities, and escalating Eskom tariffs.

Key Messages

- Electricity is both a major energy source and a central component of big-city finances. Therefore, the increase in uptake of renewable energy and changes in consumer demand for electricity affect not only city finances but also a city's ability to cross-subsidise low-income residential customers.
- Cities need a new business model to stay relevant in the face of fast-changing customer demands for energy and should be taking on a more dynamic role within the national electricity sector.
- Cities need to decrease losses from theft and expenditure on bulk purchases (buy from independent power producers), generate revenue through electricity trading and grid/time-of-use charges, and exploit alternative energy sources.

CHAPTER 8

Financing Climate Change Adaptation and Resilience in South African Cities

South Africa is one of the countries most likely to be affected by climate change (changes in weather patterns due to the increase in greenhouse gas emissions). The required transition to a low carbon, climate resilient economy will require a combination of mitigation, adaptation and resilience measures. The key climate risks faced by South African cities are floods, drought and heat stress, while economic losses in South Africa due to climate hazards are projected to increase.

Investing in adaptation and resilience can reduce risks and losses, and this is amplified in cities which are centres of economic growth and where high-value assets are located. The lesson from the Cape Town drought of 2017 is that proactive climate change adaptation and resilience through risk reduction and prevention could have pre-empted the need for costly, last-minute interventions. However, it is difficult for cities to access finance because international funds are typically directed at national governments, while private capital sources usually consider adaptation and resilience to be public goods. In addition, risk data is not readily available for metros, which also lack the capacity to plan, implement and monitor projects. City administrations also tend to be risk averse, and are subject to the restrictions of the Municipal Finance Management Act.

Recommendations include enhanced public infrastructure management and planning (to reduce risk and impacts of climate hazards); climate mainstreaming; consistent, continuous and proactive climate adaptation and resilience; private sector financial instruments and innovative solutions, such as green bonds and insurance products; demand-side policies for adaptation and resilience investments; and tracking adaptation and resilience finance and capacity issues through engaging with sector departments and service providers; identifying resilience-building projects; and collaborating with academic institutions, NGOs, think-tanks and international organisations that specialise in adaptation economics and finance.

Key Messages

- South Africa is one of the countries most affected by climate change, facing climate risks of floods, drought and heat stress, resulting in economic losses, which are amplified in cities.
- Investing in adaptation and resilience can potentially reduce these losses by up to 80%, but cities find it hard to access finance for this purpose.
- To access multilateral climate funds, cities need to partner with national and regional governments, and National Treasury should integrate climate change objectives into future infrastructure and development grants to cities.

Author Profiles

Carmen Abdoll has experience in public sector finance management, budget analysis and tax policy issues including value-added tax, excise duties and sub-national taxes. She has also worked on various projects related to the structure of the intergovernmental fiscal system in South Africa.

Geoff Bickford is a programme manager at the SACN for the built environment thematic area and previously managed the municipal finance research portfolio. Transit oriented development in the South African context is at the core of his research interests. He holds a Master's in Transport Studies and a BSc in urban and regional planning.

Jonathan Carter is a policy researcher and policy cost modeller. His experience lies in the design of intergovernmental fiscal funding mechanisms and fiscal relations, public sector training and costing of policies and legislation. Much of his costing work is related to services for children.

Zanie Cilliers, from Sustainable Energy Africa, has 10 years of experience in the municipal energy space in South Africa, covering strategy development, state of energy reporting, and energy efficiency and renewable energy interventions. Her focus areas include energy data collation and analysis, greenhouse gas inventory reporting and cost modelling energy interventions.

Indra de Lanerolle is a visiting researcher at the University of the Witwatersrand, Johannesburg and Director of the Journalism and Media Lab at Tshimologong Digital Innovation Precinct. He is a founding member of the Civic Tech Innovation Network.

Simon Halvey is a development economist and researcher with experience in quantitative research, policy analysis, public sector financial management, monitoring and evaluation, and the costing of policies and legislation. He has a particular interest in social development, economic inequality and the environment.

Jugal Mahabir is the Deputy Director at the Public and Environmental Economics Research Centre (University of Johannesburg). His work includes the impacts of grants on sub-national behaviours and the expenditure efficiency and revenue potential of sub-national governments. He holds a BSocSc (Honours) degree in Economics and an MCom.

Kamleshan Pillay, from the Global Change Institute (University of Witwatersrand), is a climate and adaptation finance specialist who has undertaken projects for various national, regional and international organisations, including the Norwegian Government, SACN, UNDP, NORAD and The Commonwealth.

Dr. Srinivasan Pillay is the Managing Director of Parisari Consulting Pty (Ltd) and has lectured for the past 20 years at the University of KwaZulu-Natal. He has 25 years of experience in environmental consulting, specialising in water management, climate change and wetlands. He holds a PhD in Environmental Geology.

Khumo Sello is a researcher at the SACN in the well-governed cities programme. She holds a Master's of Management in Innovation Studies from Wits Business School and a BSc Honours in Urban and Regional Planning from University of Witwatersrand.

Lerato Shai is an economist and consultant at PDG. She has worked on local government financial modelling and assessment, tariff modelling, designing social development policy, and qualitative and quantitative analysis for implementing and evaluating the impact of government programmes. She holds a MCom specialising in Applied Economics.

Carl Stroud is Managing Director at Sebata Municipal Solutions. His experience includes financial management reform development and implementation at all three spheres of government in South Africa, and facilitating change in the workforce to support reengineering initiatives.

Foreword

The SA Cities Network 2016 State of South African Cities Report made the case for cities as effective drivers of local and national development. It predicts that cities will be the sites of engagement of the key social challenges of poverty, inequality and unemployment identified in the National Development Plan, and detailed in the Integrated Urban Development Framework.

Cities need resources to become urban spaces that are productive, inclusive, sustainable and well-governed. However, they are limited in their ability to fulfil their developmental local government role because of insufficient budgets for new infrastructure (which is needed to transform the space economy), inadequate revenue-raising opportunities and threats to current revenue sources.

The theme of this year's State of City Finances Report is that citizens and cities are in financial crisis. Immediate challenges to municipal financial health include inadequate finance for delivering required infrastructure and services, and the affordability of municipal services for consumers in a worsening macro-economic environment.

At the same time, cities face long-term financial challenges. Yet this narrative can be changed by addressing the systemic problems identified in this report that limit the ability of cities to meet the two crucial urban policy goals of developmental local government and spatial transformation.

Spatial objectives are neither incentivised nor built into the day-to-day running of the cities because of the current revenue model. Therefore, the gap between the core city revenue model and the financial demands of urban policy goals needs to be bridged. If the financial function is to enable cities to realise spatial transformation, municipal budgets must be aligned with policy, and urban planning should reflect that orientation. The municipal finance model needs to be reformed, so that cities can have more autonomy in raising and allocating the funding required to achieve their objectives of resilience, sustainability and shared growth.

This report offers some recommendations and innovative suggestions for tackling the challenges facing cities, especially systemic issues. Cities need to be more assertive about their role in planning and directing investment in the urban space, if they are going to drive the country's development.

SITHOLE MBANGA,
CEO of South African Cities Network

Introduction

The State of City Finances Report is one of the flagship publications of the South African Cities Network. It reports on the finances of the nine largest cities in South Africa: Johannesburg, Cape Town, eThekwini, Ekurhuleni, Tshwane, Nelson Mandela Bay, Buffalo City, Mangaung and Msunduzi. This is the fourth State of City Finances Report following previous issues in 2011, 2013, and 2015.

The 2015 State of City Finances Report called on cities to get the basics of public financial management right. In other words, cities need to collect revenue efficiently and spend effectively on budgeted activities, and to put in place systems and processes to manage billing, revenue, and expenditure. It also highlighted how cities have to be innovative and develop new ways of addressing the challenges that face municipalities, including the need to increase municipal revenues and improve the delivery of basic services.

The theme of this year's publication is that cities have to address the systemic problems that affect their ability to achieve the policy goal of developmental local government. The financial function should enable cities to realise spatial transformation, meaning that municipal budgets should be aligned with policy, and urban planning should reflect that orientation. Cities need to find a way to bridge the capital funding gap that prevents their meeting the infrastructure requirements of a steadily increasing urban population.

To increase own revenues, cities can – and should – implement some of the alternative financing solutions that have been suggested. Cities also need to think of innovative ways of tackling the growing challenges to urban finances posed by the diversification of the energy sector and the growing impact of climate change.

The sustainable financing of cities, which was the theme of the 2013 State of City Finances Report, remains critical. The macro-economy within which cities operate has worsened, as the slowdown in economic growth has constrained tax revenues and the national fiscus. As a consequence, national government transfers are unlikely to remain at their current levels. In addition, the National Treasury and the Department of Cooperative Governance and Traditional Affairs are now focused on addressing the problems of failing municipalities.

The time is now for cities to seize the initiative, to place themselves firmly at the centre of the nation in a way that reflects the reality of the country's demographics and economy.

This report is divided into three parts. Part A consists of two legacy chapters that examine city financial performance over time, as well as the sustainability and affordability of municipal tariffs. Part B argues the case for fiscal transformation across four chapters, which analyse the misalignment of policy, budgets and planning, and the contradictions between the municipal revenue and funding model and local government's mandate to promote spatial transformation and achieve desired developmental objectives. Part C looks at the rising costs of cities, within the context of fundamental changes within the energy sector and the need to transition to a climate-resilient economy, and what this means for the sustainable funding of cities. A series of emerging innovations in urban governance and finance are detailed in inserts across the publication.

PART A

FINANCIAL PERFORMANCE

CHAPTER 1

THE CHANGING STATE OF CITY FINANCES

Key Messages

City revenues appear to be quite resilient, growing at an average annual rate of about 8% and with collection rates of about 95%, although most cities have increased their provisions for debt impairment.

The rapid increase in bulk tariffs is squeezing out the surpluses that cities have historically used to cross-subsidise other services, while cities are underspending on both repairs and maintenance and their capital budgets.

Only with the 2017/18 financial statements and audit reports will it be possible to assess the impact of the new administrations elected in the 2016 local government elections.

Two events have had a direct impact on city budgets and expenditure since the 2015 report: the economic downturn and the 2016 local government elections. The economy has performed poorly, going into recession briefly in mid-2017, in large part as a result of the unstable political environment, turmoil at state-owned enterprises (SOEs) and allegations of widespread corruption across government and SOEs. The economic slowdown has had various spillover effects, including a rapidly deteriorating national fiscal position, declining per-capita income and high unemployment at 26.7% (National Treasury, 2017b; 2018a: Chapter 2). On the back of downgrades in the country's sovereign debt rating, national government's debt service costs are projected to increase from R163-billion in 2017/18 to R213-billion in 2020/21 (i.e. from 10.5% to 11% of consolidated government expenditure), reducing the funds available for service delivery and transfers to local government (National Treasury, 2018c). These developments suggest less scope for future transfers from national government to local government, meaning that cities will need to rely more on their own revenue sources. Cities will also have to deal with the spillover effects of the rating downgrades, and the possibility that allegations of corruption may have a negative impact on tax morality at a local level.

The 2016 local government elections resulted in hung councils in Johannesburg, Tshwane, Ekurhuleni, and Nelson Mandela Bay. The ANC succeeded in forming a coalition to retain control of Ekurhuleni. Control of the other three cities – Johannesburg, Tshwane and Nelson Mandela Bay – shifted to opposition parties led by the Democratic Alliance (DA) who formed coalition or minority governments. These governance changes resulted in a shift in political control over the spending of R77-billion of the R287-billion total local government operating budget and R15-billion of the R57-billion total local government capital budget for 2016/17 (Barberton et al., 2016). It is too early to say whether these changes in control will mean a change in the direction of spending, as the new administrations elected in August 2016 spent their first year in office implementing the previous administrations' budgets, although the new administrations' plans will be reflected in the 2017/18 Medium Term Expenditure Framework (MTEF) numbers.

This chapter looks at what has happened to city revenue and expenditure since the *2015 State of City Finances*, taking into account the impact of the continued deterioration of the national fiscal position and what bearing it has on city finances in terms of transfers to cities, as well as whether the changes following the 2016 local government elections have had an impact on city budgets. Unlike previous State of City Finance reports, which used a dataset compiled from cities' annual financial statements by SACN, this year's publication uses the National Treasury Local Government Database, which enables the analysis to be expanded to include the budgets and the MTEF of cities. The expenditures are compared with budgets, as holding municipalities accountable for implementing their budgets is key to ensuring public funds are spent for authorised public purposes and not diverted to unauthorised purposes or private accounts. The chapter covers cities' actual revenue and expenditure for the period 2013/14 to 2016/17, and the budget/MTEF for 2017/18 to 2019/20.[1]

City revenue

Cities need funds to deliver services, which means they need to collect the budgeted-for revenue. Table 1 shows the actual and budgeted revenue, as well as the over-/under-collection of revenue, which is calculated by subtracting actual revenue collected from the original budgeted revenue.

TABLE 1: City revenue performance and budgets (2013/14–2019/20)

A – REVENUE COLLECTED AND BUDGETS								AVERAGE ANNUAL GROWTH	
R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2013/14 – 2016/17	2016/17 – 2019/20
	AUDIT OUTCOMES				BUDGET	MTEF			
JHB	35 950	38 436	41 373	42 978	48 850	53 043	56 618	6.1%	9.6%
CPT	26 241	29 485	33 027	36 383	38 293	41 649	45 033	11.5%	7.4%
ETH	24 424	26 873	29 043	30 571	33 385	36 157	39 061	7.8%	8.5%
TSH	21 235	23 134	25 646	28 091	30 226	31 964	33 968	9.8%	6.5%
EKU	23 549	25 573	27 501	29 592	32 295	35 211	38 485	7.9%	9.2%
NMB	7 503	8 138	8 734	8 919	9 364	10 198	11 054	5.9%	7.4%
MAN	5 121	4 858	4 919	6 801	6 276	6 784	7 432	9.9%	3.0%
BCM	4 553	4 980	5 478	5 628	6 200	6 633	7 024	7.3%	7.7%
MSU	3 492	3 841	4 008	4 342	4 938	5 186	5 493	7.5%	8.2%
TOTAL	152 067	165 317	179 731	193 304	209 825	226 826	244 169	8.3%	8.1%
B – OVER/UNDER COLLECTION AGAINST ORIGINAL BUDGETS									
JHB	98%	98%	94%	93%					
CPT	101%	104%	104%	105%					
ETH	97%	101%	98%	98%					
TSH	96%	93%	98%	93%					
EKU	95%	97%	93%	91%					
NMB	101%	100%	98%	94%					
MAN	93%	77%	73%	102%					
BCM	102%	105%	96%	95%					
MSU	106%	108%	99%	97%					
AVERAGE	98%	98%	97%	96%					

Source: National Treasury Local Government Database (2018) – Table A4 various years

In 2016/17, the nine cities' total revenue was R193-billion, or 62% of total local government revenue, and is budgeted to grow to R244-billion by 2019/20. Cities need to continue to show fiscal effort so as to realise the potential of their fiscal capacity, especially in the current economic climate where residents and businesses are under pressure.

Since 2013/14, most cities have consistently collected within 5% of their original budgeted revenue, with Cape Town over-collecting every year and Msunduzi and Buffalo City over-collecting for two of the years. This indicates a combination of a conservative approach to budgeting for revenue and good credit control and debt management. Mangaung's decline in revenue collected, from 93% in 2013/14 to 73% in 2015/16, can be explained by over-budgeting on investment revenue and other own revenues and under-collecting (or possibly over-budgeting) on property rates and service charges. The slight over-collection in 2016/17 is a result of Mangaung reducing its budgeted revenue by around R99-million compared to 2015/16 and significantly improving revenue collections (from R4.9-billion in 2015/16 to R6.8-billion in 2016/17).

Between 2013/14 and 2016/17, cities' total actual revenue grew at an average annual rate of 8.3%. This rate of growth is expected to decline to 8.1% over the 2017/18 MTEF, indicating that city revenues are proving to be quite resilient in the face of worsening economic conditions and concerns about a decline in tax morality.

Impact of deteriorating tax morality

Economic growth is tepid, unemployment remains very high and the finances of major state-owned companies have become more precarious. The extent of corruption and wasteful expenditure in the public sector, together with governance and efficiency challenges in tax administration, have adversely affected tax morality (National Treasury, 2018: Chapter 2).

The economic environment and the fiscal position of national government are undoubtedly affecting city revenues, but are cities also having to contend with deteriorating tax morality?

Local government taxes and tariffs are far simpler than national government taxes, and so there are fewer opportunities for tax evasion and tax avoidance. Nevertheless, the social contract between municipalities and residents is taking strain, as shown by the growing number of service delivery protests, drivers' failure to pay traffic fines, the growing challenge of illegal electricity and water connections, and more residents and businesses defaulting on their municipal accounts (see Chapter 2 for an investigation into the affordability of municipal bills). It could also find expression in the wider contestation of new valuation rolls, while for many residents and businesses that install solar systems and boreholes, an important motivating factor is "cutting ties with the municipality". The net result of these actions is downward pressure on city revenues, forcing city administrations to spend more on enforcement actions, which drive up the cost of collecting revenue.

To rebuild trust, cities need to demonstrate that they are managing the public resources entrusted to them transparently, honestly and responsibly, and show that they are delivering value for money.

Over the 2017/18 MTEF, Johannesburg budgeted for revenue to grow at an annual average rate of 9.6%, compared to 6.1% between 2013/14 to 2016/17. This is the fastest expected rate of growth in revenue across all the cities. In its 2017/18 budget, the city attributed the expected increase in property rates revenue to an expanding property rates base linked to a substantial increase in the number of properties, coupled with a decrease in vacant land (CoJ, 2016:12) However, in its adjustments budget tabled in February 2018, Johannesburg reduced expected own revenues (i.e. excluding transfers) by R725-million. In contrast, Tshwane budgeted for an average annual increase of 6.5% over the 2017/18 MTEF and, in its adjustments budget tabled in February 2018, the city increased its expected own revenues by R103-million. Tshwane said the increase was driven primarily by property revenues due to supplementary valuations linked to city growth and the introduction of a new general property valuation roll on 1 July 2017. These adjustments suggest that Johannesburg adopted an overly optimistic approach to forecasting revenue in its 2017/18 budget, while Tshwane was conservative. It is important to monitor how cities forecast their budgeted revenues going forward, given the changing economic environment, which plays a pivotal role in how cities plan for services and capital – since a city's expenditure budget must be financed by its revenue budget.

Own revenue

The Municipal Structures Act (No. 117 of 1998 as amended, ss 2) allows for the establishment of metropolitan (Category A) municipalities in areas that are (among others) centres of economic activity with strong interdependent social and economic linkages and for which integrated development planning is desirable. Compared to other categories of municipalities, Category A municipalities (or cities) have greater fiscal capacity, and generally show greater fiscal effort in generating own revenues.

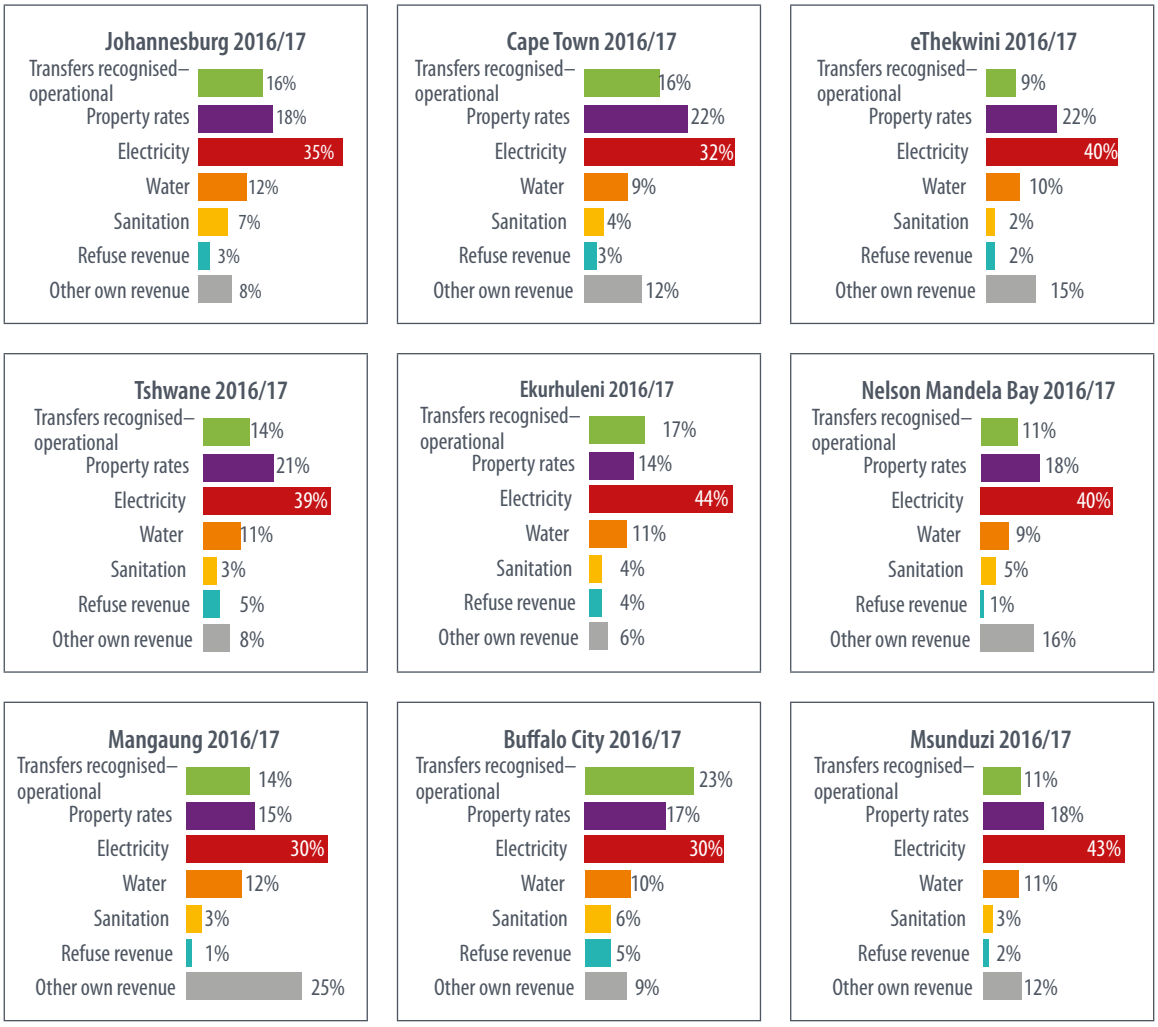
Figure 1 provides a breakdown of revenue sources for the nine cities in 2016/17.

Property rates

Property rates revenue remains the most important category of city revenue because it is the largest source of discretionary revenue, i.e. the revenue is not tied to the provision of specific services. In contrast, revenue from electricity and water services charges is linked to the provision of these services, meaning that the municipality has limited discretion over this revenue. Therefore, cities with a higher proportion of property rates revenue have greater spending discretion. In 2016/17 property rates made up between 14% (Ekurhuleni) and 22% (Cape Town and eThekwini) of total revenues.

The recent SACN urban land dialogues highlighted the importance of cities being involved in the current debates on land expropriation without compensation (SACN, 2016). Essentially, political parties have put forward two options, both of which will affect city revenue: (1) The expropriated land is transferred to the new owner with all rights and responsibilities, which would enhance the rates base, or (2) the state owns all (commercial, residential and agricultural) expropriated land and leases it back to users, which would remove the legal liability of paying property rates from the current owners, as the state would become the owner, resulting in a large source of revenue being removed from cities (and the rest of local government) if the state does not pick up the responsibility for paying property rates.

FIGURE 1: City revenues by source 2016/17 (audit outcomes)



Source: Own analysis of National Treasury Local Government Database (2018) - Table A4 2017/18

Note: "Transfers recognised – operational" are the grants/transfers for operating purposes from national and provincial government, i.e. they exclude the capital grants/transfers which are referred to as "transfers recognised – capital" and are refected in the capital budget.

Service charges

Cities generate revenue from charges on services provided, i.e. electricity, water, sanitation and refuse removal, as well as various other minor services. Although Figure 1 shows that revenues from these service charges are the largest source of city own revenue, in 2016/17 over half of this income simply flowed through city coffers to Eskom or the water boards (depending on the city).

Table 2 shows the over-/under-collection of service charge revenues, which is calculated by subtracting actual service charges collected from the original budgeted revenue.

Between 2013/14 and 2016/17, cities' service charge revenue increased at an average annual rate of 8.5%. Generally, cities' collection of service charge revenues is good, averaging between 94% and 96% across the four years, though the recent downward trends in collection levels for Msunduzi, Ekurhuleni and Tshwane are cause for concern.

TABLE 2: City service charge revenue performance and budgets over-/under-collection (2013/14–2019/20)

A – REVENUE FROM SERVICES CHARGES COLLECTED AND BUDGETS								AVERAGE ANNUAL GROWTH	
R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2013/14 – 2016/17	2016/17 – 2019/20
	AUDIT OUTCOMES				BUDGET	MTEF			
JHB	20 116	21 505	23 477	25 092	28 704	31 177	33 572	7.6%	10.2%
CPT	14 063	15 374	17 552	18 816	19 310	21 221	23 147	10.2%	7.1%
ETH	13 077	14 284	15 597	16 572	18 265	19 878	21 651	8.2%	9.3%
TSH	12 317	13 348	14 590	16 157	17 567	18 589	19 654	9.5%	6.7%
EKU	14 861	16 304	17 130	18 746	19 808	21 720	23 818	8.0%	8.3%
NMB	3 812	4 059	4 646	4 882	5 107	5 518	5 994	8.6%	7.1%
MAN	2 793	2 718	2 892	3 188	3 576	3 881	4 195	4.5%	9.6%
BCM	2 199	2 425	2 750	2 868	3 012	3 148	3 291	9.3%	4.7%
MSU	2 074	2 229	2 468	2 539	3 018	3 181	3 361	7.0%	9.8%
TOTAL	85 312	92 246	101 103	108 860	118 368	128 313	138 684	8.5%	8.4%
B – OVER/UNDER COLLECTION AGAINST ORIGINAL BUDGETS									
JHB	94%	96%	93%	96%					
CPT	97%	101%	103%	103%					
ETH	92%	97%	94%	95%					
TSH	93%	92%	92%	91%					
EKU	92%	97%	89%	89%					
NMB	93%	94%	96%	98%					
MAN	95%	78%	80%	90%					
BCM	100%	100%	102%	98%					
MSU	97%	100%	96%	88%					
AVERAGE	94%	96%	94%	95%					

Source: National Treasury Local Government Database (2018) – Table A4 various years

Between 2013/14 and 2015/16, Mangaung's service charge revenue collections deteriorated from 95% to 80%, although actual revenues grew across the period (barring a slight dip in 2014/15). This deterioration in collection levels can be attributed to the unrealistic revenue budgets Mangaung prepared in these years. For instance, in 2014/15 the city budgeted for an increase of 18% in service charge revenue, but actual collections declined by 3% – a gap of 21% between the planned budget and reality. In 2016/17, the city re-evaluated and cut its budgeted revenue from service charges by 2.5% and increased collected revenues by 10%, which resulted in the city's collection level rising to 90%. This highlights how important it is for cities to budget properly for revenues.

Historically, cities have generated a surplus from their trading services (especially electricity) and used it to cross-subsidise other services. However, data for 2016/17 indicates that cities' aggregate cost of providing the so-called trading services exceeds their aggregate service charge revenues by 1.5%, and for electricity, service costs exceed service charge revenues by 6%.[2] In other words, the rapid increases in bulk tariffs are squeezing out these surpluses, as cities seek to (and in some instances have been forced to) absorb some of the increases. The higher prices are leading to increasing bad debts and lower consumption by customers. This trend is likely to be accentuated by the higher water tariffs that are being introduced to manage the effects of drought, especially in Cape Town and Nelson Mandela Bay. In addition, the higher electricity tariffs provide commercial and upper-end domestic consumers with a powerful incentive to install solar electric systems, thus eroding cities' electricity revenues more quickly. In addition, as more consumers move off-grid, cities lose a very important debt collection tool because they can no longer cut off these consumers' electricity to leverage payment of other charges. (For more on the funding gap facing cities, see Chapter 4, and for deeper analysis of the impact of increased electricity prices, see Chapter 7.)

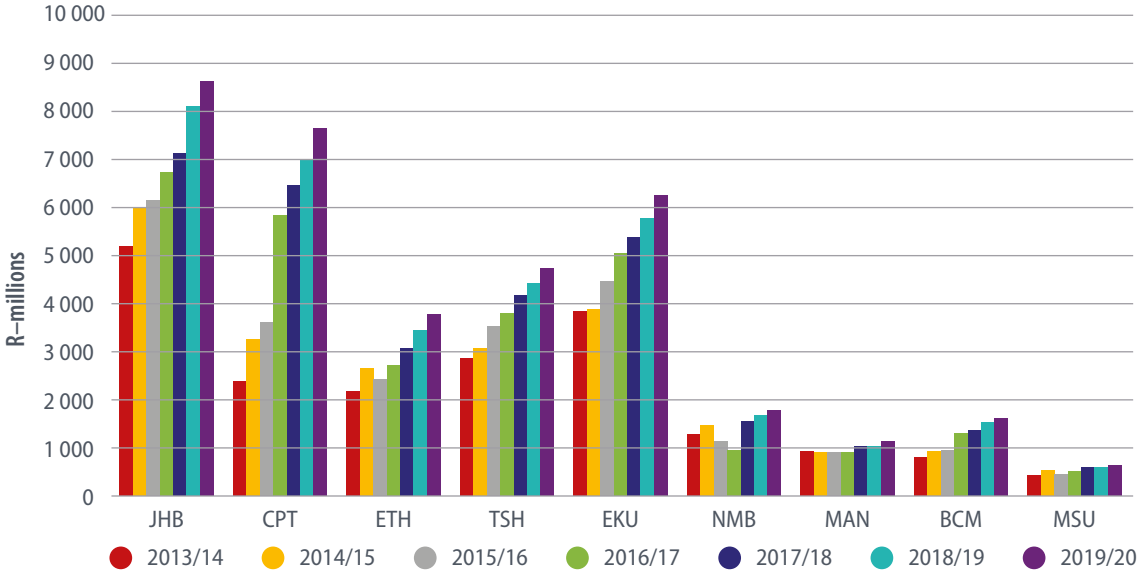
Transfers and grants

Over the 2018/19 MTEF, an additional R3.4-billion is allocated to the local government equitable share (LGES) to cover increased bulk services costs for municipalities, thus enabling "poor households to continue receiving free basic services such as water and sanitation, refuse removal, and electricity" (National Treasury, 2018d: 41). However, at the same time, direct local government conditional grant allocations have been reduced by R13.9-billion, with the majority of the cuts being made to infrastructure conditional grants, and indirect grants cut by R2.2-billion (National Treasury, 2018a: 76). These cuts are not reflected in Figure 2 because the cuts were announced in February 2018, whereas the data used is from the 2017/18 MTEF produced in June 2017. The cuts are a direct consequence of the current economic climate and national government's decision to prioritise free higher education (National Treasury, 2018d: 6)[3]. In 2018/19, national government is projected to spend more on interest payments on debt (R180.12-billion) than on transfers to local government (R125.25-billion) (National Treasury, 2018a: 89, 77).

Between 2013/14 and 2016/17 direct transfers to cities grew at an average annual rate of 12%, but this is expected to decline to 9% over the 2017/18 MTEF. A further decline is likely on the back of national government's cuts to conditional grants.

Between 2015/16 and 2016/17, Cape Town's revenue from transfers from national and provincial government shows a rapid increase, but the increase shown does not equate to more revenue for the city. This is because in 2016/17, the city reclassified its transfer revenue in accordance with the stipulations of the Municipal Standard Chart of Accounts without adjusting the historical figures. For instance, the fuel levy revenue was added to this specific category, having been grouped under a different revenue category for reporting purposes previously.[4]

FIGURE 2: Transfers recognised (2013/14–2019/20)

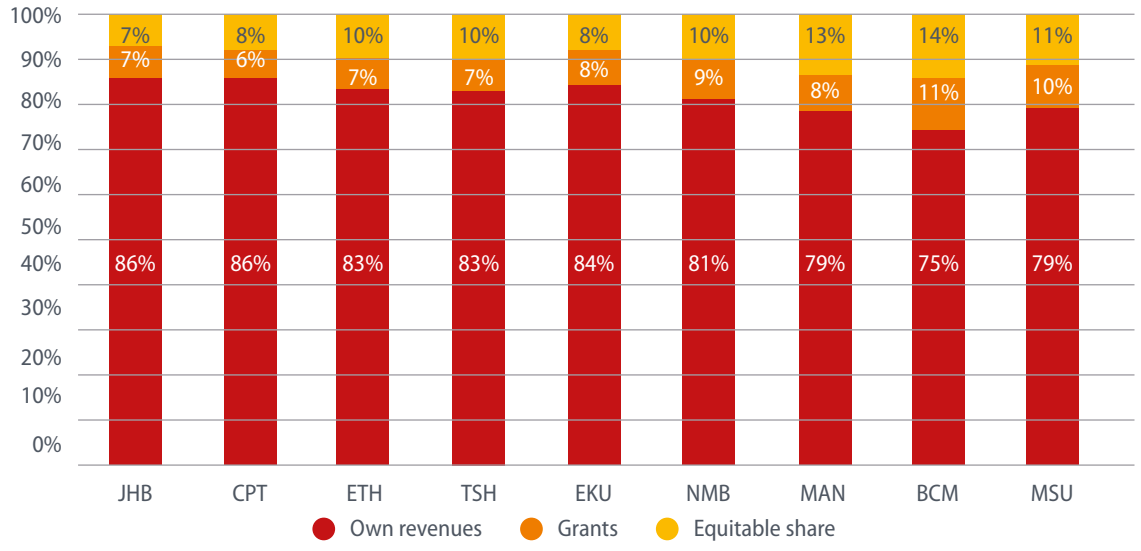


Source: National Treasury Local Government Database (2018) – Table A4 various years

Equitable share

The current LGES formula, used to divide among the country's 257 municipalities the portion of government revenue allocated to local government, was introduced in 2013/14. The formula is more redistributive towards poorer and rural municipalities; "transfers per household to the most rural municipalities are more than twice as large as those to metropolitan municipalities" (National Treasury, 2018a: 30) Figure 3 illustrates how the proportion of revenue from transfers and own revenues varies across cities; it shows that Nelson Mandela Bay, Mangaung, Buffalo City and Msunduzi are more reliant on the equitable share and conditional grants than the larger cities.

FIGURE 3: Equitable share relative to other revenue sources (2016/17)



Source: Own analysis of National Treasury Local Government Database (2018) and 2017 Division of Revenue Act

Conditional grants

Cities receive four types of local government conditional grants from national government, as defined in the Schedules of the Division of Revenue Act:

- General grants that supplement various programmes partly funded by municipalities (Schedule 4, part B). For example, the Urban Settlements Development Grant (USDG).
- Grants that fund specific responsibilities and programmes implemented by municipalities (Schedule 5, part B).
- Grants that provide in-kind allocations through which a national department implements projects in municipalities (Schedule 6, part B).
- Grants that provide for the swift allocation and transfer of funds to a municipality to help it deal with a disaster or housing emergency (Schedule 7, part B).

Since the last State of City Finances Report, there have been some important developments regarding the structure and management of conditional grants affecting cities (National Treasury, 2018b).

- Built environment reporting for metropolitan municipalities has been rationalised and streamlined. Therefore, from 2018/19, reporting on urban infrastructure grants, including the USDG, will be simplified. This will help reduce the reporting burden on cities going forward.
- As part of incentivising cities to spatially transform, in 2017/18 an additional indicator was introduced to the Integrated City Development Grant's performance measures that assess a city's built environment performance plan (BEPP). It is aimed at rewarding cities that improve the quality of their BEPPs, which provide a strategic overview of their plans to transform spatial development patterns through infrastructure investments.
- From 2018/19, the Public Transport Network Grant formula changes, whereby the bulk (75%) will be allocated based on three demand-driven factors: the number of people in a city, the number of public transport users in a city and the size of a city's economy. The remaining 20% will be divided among all participating cities, and 5% will be earmarked for a performance incentive which will take effect in 2019/20, once an approach for measuring performance has been finalised. In addition, strict eligibility conditions are being introduced, including requirements that cities demonstrate that their plans fully meet the criteria of the grant and that the planned public transport systems will be financially sustainable.
- In an effort to incentivise spatial transformation, in 2019/20 National Treasury will introduce a new infrastructure grant – the Integrated Urban Development Grant (IUDG). Unlike the Municipal Infrastructure Grant, which links the grant to specific projects and years, the IUDG "will fund municipalities against a long-term (10-year) capital expenditure framework aligned to their Spatial Development Framework (SDF)" (SACN, 2018). The grant will also have an incentive component that will use performance indicators to reward good performance across certain areas. Municipalities applying for this new grant will have to comply with minimum conditions in areas such as management stability, audit findings and reporting in terms of the Municipal Finance Management Act (MFMA). These minimum conditions highly favour city governments. The intention is to combine progressively most local government infrastructure grants into this grant for those municipalities that qualify.

As noted, in February 2018 the national government announced a R13.9-billion cut to the baselines of local government conditional grants to fund priorities in higher education (National Treasury, 2018b). Over the 2018/19 MTEF, the baseline allocations were reduced for the following city infrastructure grants: the USDG (R2.2-billion), the Public Transport Network Grant (R2.1-billion) and the Neighbourhood Development Partnership Grant (R347-million).

City operating expenditure

A city's operating expenditure is a function of its constitutional mandates, priorities and revenue-raising capacity and effort. It is how the city spends its revenues in order to deliver the services to the households and businesses within its boundaries. Just as cities have a responsibility to collect budgeted revenue, they are also legally obliged to spend according to their budget – over-spending constitutes unauthorised expenditure.[5] Table 3 shows the over-/underspending of the operating budget, which is calculated by subtracting actual operating expenditure from the cities' original operating budgets.

TABLE 3: City operating expenditure performances and budgets (2013/14–2019/20)

A – OPERATING EXPENDITURE AND BUDGETS								AVERAGE ANNUAL GROWTH	
R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2013/14 – 2016/17	2016/17 – 2019/20
	AUDIT OUTCOMES				BUDGET	MTEF			
JHB	34 437	37 916	40 410	43 837	47 344	51 376	55 021	8.4%	7.9%
CPT	26 680	27 506	30 850	33 024	38 322	40 879	44 219	7.4%	10.2%
ETH	24 478	26 699	28 114	31 342	32 697	35 251	38 007	8.6%	6.6%
TSH	22 740	24 884	27 790	27 361	29 995	31 705	33 688	6.4%	7.2%
EKU	23 208	25 393	27 478	30 128	32 773	35 865	39 190	9.1%	9.2%
NMB	7 436	8 217	8 776	9 154	9 489	10 173	10 785	7.2%	5.6%
MAN	5 035	5 479	5 965	6 592	6 148	6 494	6 933	9.4%	1.7%
BCM	4 629	5 226	5 464	6 045	6 198	6 631	7 021	9.3%	5.1%
MSU	3 619	4 150	4 260	5 021	4 905	5 045	5 327	11.5%	2.0%
TOTAL	**152 262**	**165 470**	**179 106**	**192 502**	**207 871**	**223 418**	**240 191**	**8.1%**	**7.7%**
B – OVER/UNDER SPENDING AGAINST ORIGINAL BUDGETS									
JHB	101%	103%	95%	97%					
CPT	102%	97%	97%	95%					
ETH	98%	99%	96%	102%					
TSH	103%	104%	108%	97%					
EKU	94%	97%	94%	93%					
NMB	98%	99%	100%	96%					
MAN	94%	92%	96%	100%					
BUF	103%	110%	96%	102%					
MSU	112%	119%	106%	113%					
AVERAGE	**100%**	**101%**	**97%**	**97%**					

Source: National Treasury Local Government Database (2018) – Table A4 various years

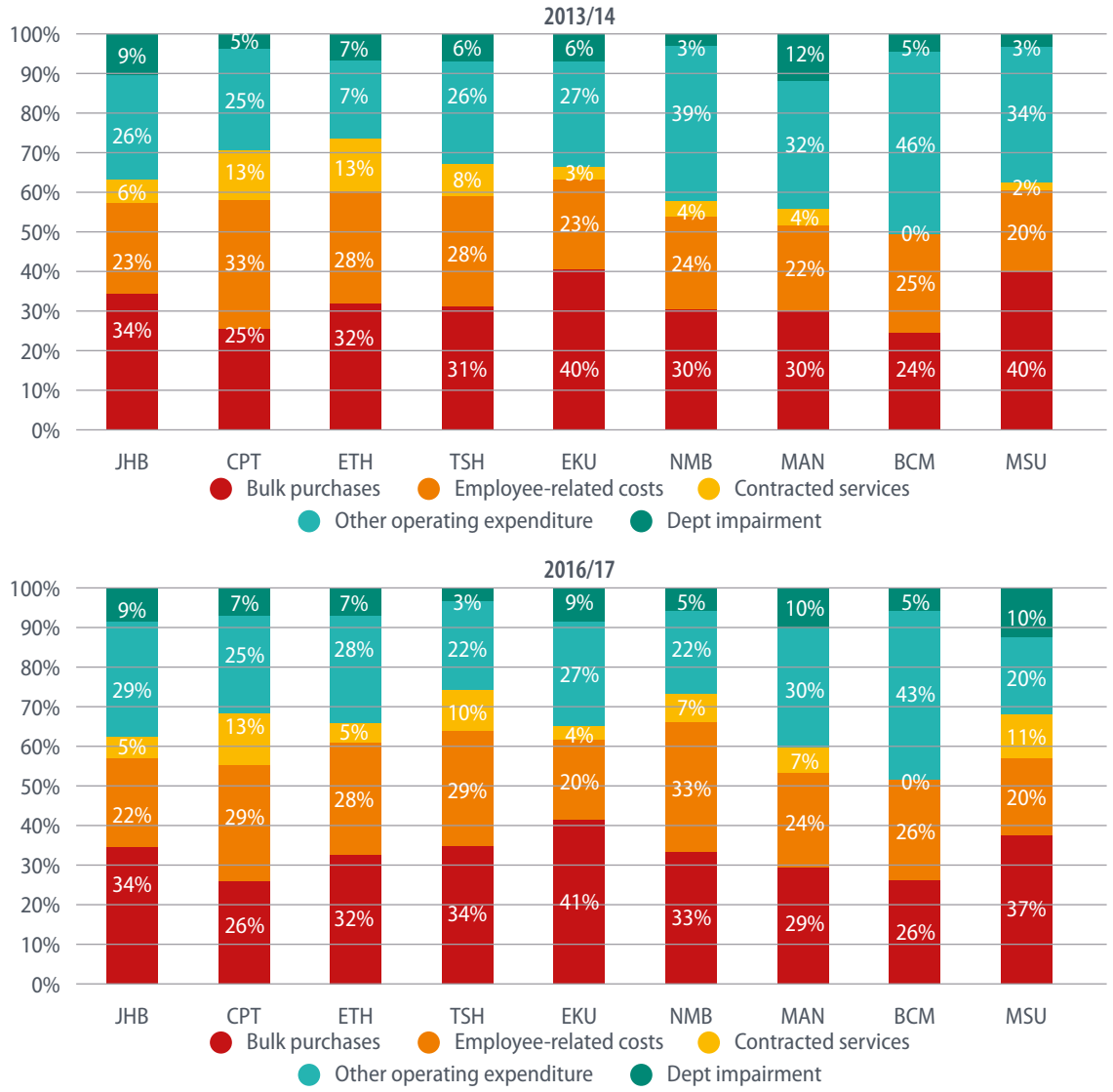
Between 2013/14 and 2016/17, operating expenditures by the cities grew by an annual average rate of 8.1%. Over the 2017/18 MTEF, growth in expenditure is set to slow down to an annual average rate of 7.7%. Mangaung, Buffalo City and Msunduzi are expected to see the biggest decline in growth rates between the two periods, whereas Johannesburg, Tshwane and Ekurhuleni have similar growth rates.

In 2016/17, the nine cities spent between 93% and 113% of their original budgeted expenditure. According to National Treasury, overspending in excess of 15% is a sign of high risk[6]. Msunduzi consistently spends more than it budgets, which suggests an inherent inability to budget accurately or ensure spending remains within budget.

Operating expenditure breakdown

Figure 4 shows cities' spending on major spending item categories in 2013/14 and 2016/17.

FIGURE 4: Breakdown of city operating expenditure (2013/14 and 2016/17)



Source: Own analysis of National Treasury Local Government Database (2018) – Table A4 various years

The largest expenditure items on city operating budgets continue to be bulk purchases of electricity from Eskom and water from the different water boards. Five of the nine cities spent more on bulk purchases in 2016/17 than they did in 2013/14. In 2016/17, Ekurhuleni's bulk purchases were the highest, at 41% of total expenditure, which is mainly driven by the high level of industrial activity in the city.

The pressure from bulk purchases has subsided since the 2015 State of City Finances Report, which found that bulk purchases increased by up to 14% between 2009/10 and 2013/14 across cities. Since then there has been a big push by government to get consumers to reduce their use of water and electricity. In addition, Eskom's bulk electricity tariff increases have been lower than in the preceding period, taking the pressure off cities and consumers. Looking forward, Tshwane's 2017/18 budget shows that bulk purchases as a percentage of operating expenditure are expected to decline from 34% in 2016/17 to 25% in 2019/20, suggesting that consumers are responding to higher tariffs and the unreliability of Eskom supply.

The drought also plays a role in the reduction of water use, as there is no expense if no water is available to purchase. However, this may be off-set by higher bulk tariffs and higher expenditure on water infrastructure. Cape Town has budgeted to spend R5.7-billion over the 2018/19 MTEF on its new water plan (COCT, 2017: 10). It is not yet clear what will be the combined effects of reduced water consumption, higher water tariffs and increased infrastructure spending on the revenue and spending ratios in cities' budgets.

As Figure 4 shows, Nelson Mandela Bay and Mangaung not only increased the proportion being spent on employee costs, therefore reprioritising funds away from other services, but also expanded their use of contracted services. This means that even with a growing (or more costly) human resource base, these cities are outsourcing the actual provision of services to an increasing extent. In contrast, for eThekwini the decline in contracted services is associated with an increase in other operating expenditures, indicating either that certain expenditures have been reclassified or the city has brought the delivery of certain services in-house and is now spending more on the materials to enable its own staff to deliver such services.

Debt impairment for Johannesburg and Mangaung is relatively high, and most cities increased the proportion allocated for this category between 2013/14 and 2016/17. Over the 2017/18 MTEF, Cape Town budgeted for rapid growth in items such as Debt Impairment, Finance Charges, and Other Materials. It is widely known that Johannesburg has had issues with their debt collection over a number of years and having to provide for the write-off of outstanding debts is a direct consequence of these problems. Increasing provisions for debt impairment is not a positive development, as it indicates the cities are anticipating a deterioration in their ability to collect billed revenue.

Employee-related costs

Employee-related costs are mainly driven by the number of staff, the management of overtime, salary levels and salary increases. The first three lie within the direct control of cities, while salary increases for local government employees are determined in the South African Local Government Bargaining Council. During the period of review, the Council entered into a three-year Salary and Wage Collective Agreement covering 1 July 2015 to 30 June 2018.[7] The agreement is summarised below (SALGBC, 2016; 2017):

AGREEMENT	CPI AS MEASURED BY THE RESERVE BANK	ACTUAL INCREASE AWARDED
2015/16 – 7%	not applicable	7%
2016/17 – average CPI (Feb 2015 – Jan 2016) + 1%	4.73% (rounded up to 5%)	6%
2017/18 – average CPI (Feb 2016 – Jan 2017) + 1%	6.36%	7.36%

Table 4 shows the actual cost of employment from 2013/14 to 2016/17 and the budgeted cost of employment for the 2017/18 MTEF.

TABLE 4: City employee costs (2013/14–2019/20)

R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	AVERAGE ANNUAL GROWTH 2013/14 – 2016/17	AVERAGE ANNUAL GROWTH 2016/17 – 2019/20	Growth in headcount between 2013/14 and 2016/17 (*)
	AUDIT OUTCOMES				BUDGET	MTEF				
JHB	7 943	8 589	8 999	9 857	11 806	13 286	14 395	7.5%	13.5%	–4%
CPT	8 691	8 178	9 416	9 729	12 146	13 069	14 222	3.8%	13.5%	5%
ETH	6 894	7 158	8 252	8 860	9 824	10 555	11 297	8.7%	8.4%	0%
TSH	6 338	6 553	7 472	8 035	8 779	9 439	10 072	8.2%	7.8%	3%
EKU	5 432	5 587	6 338	6 051	7 467	7 926	8 435	3.7%	11.7%	4%
NMB	1 762	2 164	2 343	3 061	2 842	3 078	3 329	20.2%	2.8%	0%
MAN	1 109	1 261	1 424	1 606	1 707	1 826	1 953	13.1%	6.7%	–45%
BCM	1 135	1 233	1 352	1 561	1 748	1 936	2 084	11.2%	10.1%	3%
MSU	742	833	942	996	1 152	1 239	1 332	10.3%	10.2%	1%
TOTAL	40 044	41 556	46 538	49 755	57 472	62 353	67 118	7.5%	10.5%	–1%

(*) headcount number of permanent and contract employees
Source: National Treasury Local Government Database (2018) – Table A4 and Table SA24 various years

From 2013/14 to 2016/17, total employee costs grew at an average annual rate of 7.5% for the nine cities, with Cape Town and Ekurhuleni growing at 3.8% and 3.7% respectively, and Nelson Mandela Bay, Mangaung and Buffalo City growing at 20%, 13% and 11% respectively. For nearly all cities, the growth in employee costs does not correlate well with the growth in the number of employees over the three years. For instance, Msunduzi increased its employee costs by 10.3% annually but increased its number of employees by 1%, whereas Johannesburg increased its employee costs by 7.5% annually but decreased its number of employees by 4%. This suggests that either Johannesburg

gave existing staff significant salary increases over and above the normal cost of living increases, or increased spending on overtime dramatically. Similarly, Nelson Mandela Bay kept its number of employees more or less constant, but the average annual increase in employee costs was over 20%. The 2017/18 MTEF figures indicate that the new administration in Nelson Mandela Bay is aiming to cap employee costs at 3% average annual growth, which implies reducing the number of employees.

For the period 2013/14 to 2016/17, total operating expenditure across all cities grew by an average of 8.1% (Table 3), while spending on employee-related costs grew by 7.5% (Table 4). However, in 2016/17 to 2019/20 the trend is reversed, with total operating expenditure across all cities budgeted to grow by an average of 7.7%, and employee costs by an average of 10.5%. As Table 5 shows, with the exception of Nelson Mandela Bay, all the cities have budgeted for the proportion of operating expenditure spent on employee-related costs to increase by between 0.4% (Mangaung) and 5.2% (Msunduzi). This faster growth is projected to cause employee costs' share of total expenditure to increase by 2%, which in 2019/20 translates into R4.7-billion less available to allocate to other types of spending. Cities need to strike a balance between employee-related costs and other categories of expenditure that ensures effective service delivery, and not allow employee-related costs to squeeze out other expenditures.

TABLE 5: City employee costs as a proportion of total operating expenditure

	ACTUAL CHANGE IN PROPORTION SPENT ON EMPLOYEE COSTS			BUDGETED CHANGE IN PROPORTION SPENT ON EMPLOYEE COSTS		
	PROPORTION IN 2013/14	PROPORTION IN 2016/17	DIFFERENCE 2013/14 – 2016/17	PROPORTION IN 2016/17	PROPORTION IN 2019/20	DIFFERENCE 2016/17 – 2019/20
JHB	23%	22%	–0.6%	22%	26%	3.7%
CPT	33%	29%	–3.7%	29%	32%	2.7%
ETH	28%	28%	0.0%	28%	30%	1.5%
TSH	28%	29%	1.5%	29%	30%	0.5%
EKU	23%	20%	–3.0%	20%	22%	1.4%
NMB	24%	33%	9.7%	33%	31%	–2.6%
MAN	22%	28%	5.7%	28%	28%	0.4%
BCM	25%	26%	0.9%	26%	30%	3.9%
MSU	20%	20%	–0.7%	20%	25%	5.2%
TOTAL	**26%**	**26%**	**–0.3%**	**26%**	**28%**	**2.0%**

Source: National Treasury Local Government Database (2018) – Table A4 various years

Between 2013/14 and 2016/17, Cape Town and Ekurhuleni reduced the proportion of total operating expenditure they spent on employee-related costs by 3.7% and 3% respectively, which in 2016/17 translated into R1.2-billion and R898-million more being available for other types of expenditure. By contrast, Nelson Mandela Bay and Mangaung saw the employee-related costs, share of total operating expenditure grow by 9.7% and 5.7% respectively, which in 2016/17 meant R892-million and R352-million respectively was shifted from other items to employee costs. These changes reflect the extrapolation of the growth trends in employee costs reflected in Table 4.

In the period 2016/17 to 2019/20, Nelson Mandela Bay is the only city that has budgeted for a decrease in the share of employee-related costs, from 33% to 31%. Despite this, the city is still a long way from the 24% in 2013/14. After reducing the proportion spent on employee costs in the previous period, Msunduzi, Johannesburg, Cape Town and Ekurhuleni are expecting these costs' share of total operating expenditure to grow by 5.2%, 3.7%, 2.7% and 1.4% respectively.

Repairs and maintenance

The level of spending on repairs and maintenance is a good indicator of a city's efforts to protect its infrastructure base and ensure the sustainability of services. Table 6 shows city spending on repairs and maintenance as a percentage of Property, Plant and Equipment (PPE), which are the tangible (illiquid) assets of the city that are integral to service delivery and the running of the city. According to National Treasury, this is an appropriate indicator of spending on repairs and maintenance, as it measures spending against the value of the assets that need to be maintained. National Treasury has set a national norm that municipalities should budget for: to spend at least 8% of the value of PPE on repairs and maintenance (National Treasury, 2016).

TABLE 6: Repairs and maintenance as a percentage of PPE (2013/14–2019/20)

R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
	AUDIT OUTCOMES				BUDGET	MTEF	
JHB	5.0%	6.0%	5.8%	2.8%	5.9%	5.9%	6.1%
CPT	9.2%	8.6%	8.6%	9.0%	8.8%	8.9%	8.9%
ETH	6.3%	7.2%	6.4%	5.3%	7.3%	7.2%	7.1%
TSH	4.8%	4.8%	4.4%	2.7%	0.0%	0.0%	0.0%
EKU	3.1%	3.0%	3.5%	4.1%	0.0%	0.0%	0.0%
NMB	3.6%	4.0%	2.8%	2.2%	2.0%	3.4%	3.5%
MAN	2.4%	1.8%	2.7%	2.2%	2.8%	2.8%	2.8%
BCM	2.3%	2.2%	2.6%	2.4%	3.1%	3.1%	3.1%
MSU	39.4%	36.6%	31.4%	1.4%	1.8%	1.7%	1.8%

Source: National Treasury Local Government Database (2018) – Table A9 various years

Note: The figures for Msunduzi for the period 2013/14 to 2015/18 are very high due to erroneous PPE numbers which were corrected from 2016/17 onwards.

Between 2013/14 and 2016/17, Cape Town was the only city to spend more than the national norm of 8% of PPE on repairs and maintenance, and the 2017/18 MTEF numbers indicate that this is likely to remain the case. This confirms the city's consistent budgeting processes and ability to "protect" the repairs and maintenance budget from other budget pressures – showing the priority it places on this expenditure.

In 2016/17, Johannesburg budgeted to spend R4.8-billion or 7% of PPE on repairs and maintenance, but its actual expenditure was R1.9-billion or 2.8% of PPE. In its Adjustment Operating Budget for 2017/18 (tabled on 22 February 2018), the main reason given for this R2.9-billion under-performance is the need to bring "expenditure in line with revenue performance" (page 9). In other words, the city's

failure to collect budgeted revenues in 2016/17 (as shown in Table 1, on page 4) resulted in lower repairs and maintenance expenditure. This highlights the vulnerability of spending on repairs and maintenance, which is the "easiest" place in the budget to cut spending, despite the costly medium- to long-term consequences of such cuts. Over the 2017/18 MTEF, Johannesburg budgeted to spend around 6% of PPE on repairs and maintenance, which is still below the 8% benchmark.

Table 6 shows that Tshwane and Ekurhuleni did not provide information on spending on repairs and maintenance in their 2017/18 budget documentation. The failure to do this is a serious breach of their financial management and governance obligations, as municipalities are required to reflect their spending/budgets for repairs and maintenance and the renewal of existing assets on Table A9 Asset Management in their budget documents.

Over the MTEF period, six of the nine cities have not budgeted to spend more than 5% of PPE on repairs and maintenance, showing a lack of appreciation among the politicians and managers in these cities of the importance of repairs and maintenance spending. As National Treasury noted as far back as 2011: "This is because the impact of not spending on this item is not visible and not obvious in the short term. It is also less politically sensitive than say cutting the capital expenditure programme, or reducing the entertainment budget." (National Treasury, 2011: 19). However, the medium- to long-term consequences of underspending on repairs and maintenance are serious. It results in deteriorating reliability and quality of services; more expensive crisis maintenance, rather than planned maintenance; higher future costs of maintenance and refurbishment; shorter useful lifespan of assets, necessitating earlier replacement; and reduced revenues due to the failure to sell water, electricity and other services

City capital expenditure

Spending on capital is a key tool in improving service delivery to residents and transforming the urban environment. Between 2013/14 and 2016/17, the nine cities budgeted to spend R138-billion on capital and spent R122-billion, or 89% of budget. This is a reasonable performance. Over the 2017/18 MTEF, cities have budgeted R120-billion for capital, which is 67% of the total capital budget for local government, and 13% of total public sector infrastructure budget for the period.[8] This highlights the important role cities play in the country's overall effort to deliver infrastructure.

As Table 7 shows, over the 2017/18 MTEF, capital budgets are projected to grow at an annual average rate of 9.1%, whereas between 2013/14 and 2016/17, actual capital expenditure grew at an annual average rate of 5.4%. Msunduzi is the only city that plans to cut back on capital spending over the MTEF, while Cape Town and Mangaung are planning to grow capital spending at more modest rates. Buffalo City has set itself the very ambitious target of growing capital spending at an average annual rate of 23%. An important development is the announcement in February 2018 by national government of R13.9-billion cuts to the baselines of local government conditional grants to fund priorities in higher education (National Treasury, 2018b). These cuts will place downward pressure on capital spending by cities.

Table 7 also shows the over-/underspending of the capital budget, which is calculated by subtracting actual capital expenditure from the amounts budgeted for in the cities' original budgets for the relevant years.

While aggregate spending has been relatively good, between 2013/14 and 2016/17, the cities' ability to spend their capital budgets declined from an average of 94% to 84%. Of greater concern is that Tshwane, Nelson Mandela Bay and Johannesburg spent less on capital in 2016/17 than they did in 2013/14. This weakening of delivery performance may have in part informed national government's decision to cut allocations for city infrastructure grants, as there is no point budgeting for allocations that are going to be returned unspent to the national fiscus.

TABLE 7: City capital expenditure performance (2013/14–2019/20)

A – CAPITAL EXPENDITURE AND BUDGETS								AVERAGE ANNUAL GROWTH	
R MILLIONS	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2013/14 – 2016/17	2016/17 – 2019/20
	AUDIT OUTCOMES				BUDGET	MTEF			
JHB	7 779	8 930	8 942	7 732	8 589	9 451	8 959	–0.2%	5.0%
CPT	4 545	5 339	5 875	6 273	7 023	6 724	7 007	11.3%	3.8%
ETH	4 202	4 717	4 903	5 466	7 340	7 225	7 750	9.2%	12.3%
TSH	4 229	4 115	3 969	3 195	3 860	3 824	4 406	–8.9%	11.3%
EKU	2 612	3 069	4 094	4 703	6 716	6 939	7 441	21.7%	16.5%
NMB	1 581	1 451	1 352	1 431	1 602	1 614	1 691	–3.3%	5.7%
MAN	1 210	1 304	1 647	1 267	1 139	1 252	1 302	1.6%	0.9%
BCM	835	930	1 184	1 281	1 646	2 217	2 391	15.4%	23.1%
MSU	353	529	483	648	698	561	570	22.5%	–4.2%
TOTAL	27 344	30 384	32 448	31 996	38 615	39 807	41 518	5.4%	9.1%
B – OVER/UNDER SPENDING AGAINST ORIGINAL BUDGETS									
JHB	102%	82%	90%	81%					
CPT	83%	86%	102%	93%					
ETH	77%	83%	81%	81%					
TSH	97%	99%	103%	72%					
EKU	88%	81%	92%	92%					
NMB	134%	104%	84%	101%					
MAN	140%	89%	92%	70%					
BCM	111%	99%	93%	82%					
MSU	80%	88%	68%	89%					
AVERAGE	94%	86%	92%	84%					

Source: National Treasury Local Government Database (2018) – Tables A5 various years

National Treasury (2017a: 21) notes that municipalities' ability to implement their capital budgets might be negatively affected by weak multi-year budgeting, limited planning, poor project preparation and project management, supply chain management (SCM) inefficiencies, poor asset management and poor contract management. However, factors leading to underspending of capital budgets vary from city to city and from project to project, as illustrated by the following examples:

- Between 2013/14 and 2016/17, eThekwini and Msunduzi both spent on average 81% of their capital budgets, but their actual capital expenditure grew by 9% and 22% respectively. This impressive growth demonstrates that these municipalities have been expanding infrastructure delivery capacity and that the level of underspending can be largely attributed to the municipalities consistently preparing over-ambitious capital budgets. The same can be said of Ekurhuleni, which spent on average 88% of its capital budget and grew actual capital spending by 22% between 2013/14 and 2016/17.
- Johannesburg (CoJ, 2017: 57) notes that 21 projects of Johannesburg Water were delayed by excessive rains, lack of capital funding, liquidation of service providers and protests by local communities. The fact that the city lists lack of capital funding as a challenge for underspending indicates that the 2016/17 budget was not properly funded, or that the city was not able to execute its plans to raise the necessary debt finance.
- Nelson Mandela Bay (NMB, 2017: 51) notes that underspending of its capital budget was due to certain projects being delayed by protracted SCM processes, the unavailability of certain stock/asset types and having to return sub-standard materials to suppliers. R3.1-million remained unspent in respect of the rolled-over Public Transport Infrastructure Grant, which was returned to the national revenue fund, as grant funds cannot be rolled over for a second financial year (ibid: 53).

These examples highlight that implementing multi-billion Rand capital budgets is fraught with challenges, and therefore cities need to ensure they have excellent project managers and systems in place to plan and manage projects to ensure they remain on track. However, there also needs to be a greater measure of understanding that sometimes delivery delays are caused by factors beyond the control of managers, such as excessive rain.

Areas of capital spending

Table 8 presents a breakdown of aggregate capital expenditure by main category for 2013/14 to 2016/17.

On average, the nine cities spent R42-billion or 35% of their total capital spending on infrastructure for the trading services (electricity, water, waste water management and waste management). A further breakdown is provided in Table 9. Spending on economic and environmental services was R41-billion or 33% of total spending, of which R36-billion was for road transport. Cities spent R23-billion on infrastructure for community and public safety, which includes spending on housing, as well as sport and recreation facilities and infrastructure for the delivery of community and social services.

TABLE 8: City aggregate capital expenditure by main category (2013/14–2016/17)

R MILLIONS	GOVERNANCE & ADMINISTRATION	COMMUNITY & PUBLIC SAFETY	ECONOMIC & ENVIRONMENTAL SERVICES	TRADING SERVICES	OTHER	TOTAL
JHB	5 146	6 632	10 813	10 790	0	33 382
CPT	1 989	3 873	5 468	9 827	874	22 031
ETH	1 162	2 038	7 424	8 533	131	19 287
TSH	1 487	3 694	5 648	4 567	110	15 507
EKU	2 391	3 474	4 184	4 325	51	14 425
NMB	341	969	1 721	2 785	0	5 816
MAN	1 012	1 365	2 821	230	0	5 428
BCM	1 103	425	1 700	996	6	4 230
MSU	205	269	734	776	29	2 012
TOTAL	14 837	22 739	40 514	42 829	1 201	122 119
% SHARE OF TOTAL EXPENDITURE						
JHB	15%	20%	32%	32%	0%	100%
CPT	9%	18%	25%	45%	4%	100%
ETH	6%	11%	38%	44%	1%	100%
TSH	10%	24%	36%	29%	1%	100%
EKU	17%	24%	29%	30%	0%	100%
NMB	6%	17%	30%	48%	0%	100%
MAN	19%	25%	52%	4%	0%	100%
BCM	26%	10%	40%	24%	0%	100%
MSU	10%	13%	36%	39%	1%	100%
AVERAGE	12%	19%	33%	35%	1%	100%

Source: National Treasury Local Government Database (2018) – Table A5 various years

Table 9 presents a breakdown of aggregated capital expenditure on key categories of infrastructure.

According to Table 8, Mangaung spent only R230-million on infrastructure for trading services, and Table 9 shows that since 2013/14 the city has not invested in any infrastructure for electricity and water services. However, cross-checking these figures with other information, and according to Mangaung's report to National Treasury's Local Government Database 2018 (Table A5 and A9), between 2013/14 and 2016/17 the city spent R842-million on electricity infrastructure, R736 million on water infrastructure and R1.1-billion on waste water management infrastructure. So, it would appear that the city has reported consistent numbers on total capital spending over the period, but it has not allocated the spending to the different categories of infrastructure consistently in its different reporting documents.[9] This highlights the importance of cities putting in place robust financial management reporting systems.

TABLE 9: City aggregate capital expenditure by key sub-categories (2013/14–2016/17)

R MILLIONS	ROAD TRANSPORT	HOUSING	ELECTRICITY	WATER	WASTE WATER MANAGEMENT	WASTE MANAGEMENT
JHB	8 067	4 803	7 058	2 467	901	364
CPT	5 177	2 340	4 248	2 617	2 173	790
ETH	6 673	1 299	2 420	2 861	2 916	336
TSH	5 557	2 758	1 962	528	1 979	98
EKU	3 844	1 317	2 019	1 244	625	438
NMB	1 393	763	975	753	974	83
MAN	2 821	–	–	–	78	152
BCM	1 622	204	504	172	289	32
MSU	614	35	384	225	138	29
TOTAL	35 768	13 518	19 568	10 866	10 073	2 321
% SHARE OF TOTAL EXPENDITURE						
JHB	24%	14%	21%	7%	3%	1%
CPT	23%	11%	19%	12%	10%	4%
ETH	35%	7%	13%	15%	15%	2%
TSH	36%	18%	13%	3%	13%	1%
EKU	27%	9%	14%	9%	4%	3%
NMB	24%	13%	17%	13%	17%	1%
MAN	52%	0%	0%	0%	1%	3%
BCM	38%	5%	12%	4%	7%	1%
MSU	31%	2%	19%	11%	7%	1%
AVERAGE	29%	11%	16%	9%	8%	2%

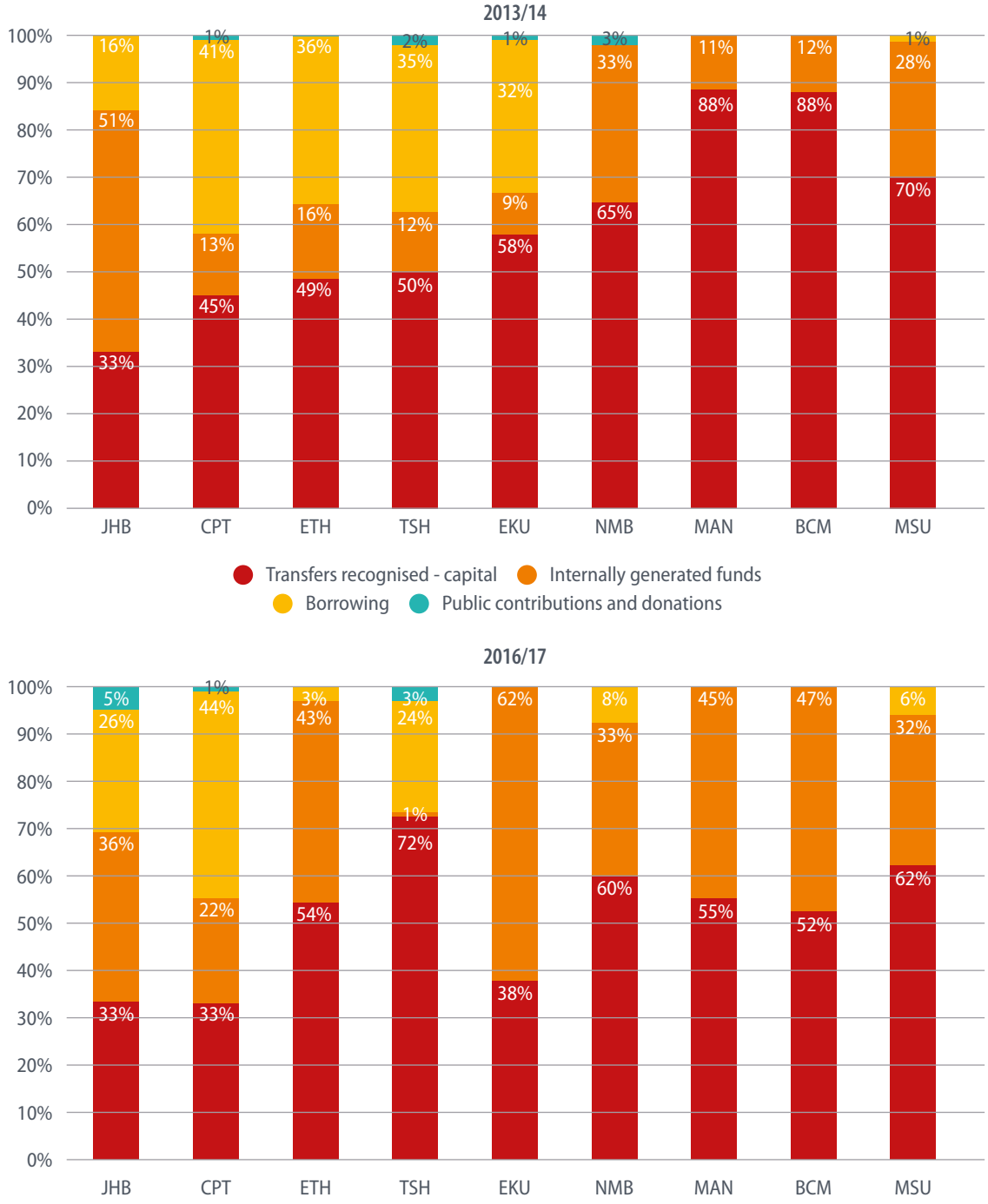
Source: National Treasury Local Government Database (2018) – Table A5 various years

Between 2013/14 and 2016/17, eThekwini's spending on housing increased from R64-million to R1.2-billion, as a result of the city delivering housing on behalf of the province – the city is not funding this expenditure but receives a transfer from the province (EMM, 2016: 20). Over the same period, Cape Town's spending on housing declined – it is the only city whose spending on housing is declining. The city has come under fire lately for not providing enough low-cost housing in its jurisdiction. However, it should be noted that housing is a provincial function and to get a true picture of spending on housing requires interrogating the provincial budgets as well.

Funding capital expenditure

Cities typically fund their capital budgets from four sources: internally generated funds, borrowing, transfers from national and provincial government, and donations. Figure 5 shows how the funding of city capital budgets has changed between 2013/14 and 2016/17.

FIGURE 5: Capital funding breakdown (2013/14 and 2016/17)



Source: National Treasury Local Government Database (2018) – Table A5 various years

A positive development is that Nelson Mandela Bay, Mangaung, Buffalo City and Msunduzi have significantly increased their use of internally generated and borrowed funds to finance their capital expenditure (although the 2013/14 borrowing data for Mangaung and Msunduzi may be incomplete). This means that these cities have been able to generate surpluses on their operating budgets for funding capital expenditure. As these sources of finance have grown, the cities' reliance on transfers from national and provincial government to finance capital expenditure has declined.

Between 2013/14 and 2016/17, Johannesburg and Cape Town increased their use of borrowing to fund capital expenditure, while eThekwini, Tshwane and Ekurhuleni reduced theirs. In 2016/17, internally generated funds constituted only 1% of Tshwane's capital funding, which is not a healthy situation and indicative of poor operational budgeting. In contrast, eThekwini increased its use of internally generated funds from R660-million in 2013/14 to R2.3-billion in 2016/17. eThekwini's funding from transfers has also increased, as a result of transfers from the KwaZulu-Natal provincial government for the provision of housing on behalf of the province.

The National Treasury has announced regulatory changes to help municipalities make better use of development charges. Proposed amendments to the Municipal Fiscal Powers and Functions Act (2007) will clarify the rules for levying development charges. The aim is to enable municipalities to use development charges to require that developers pay the full costs of the additional infrastructure needed to supply them with municipal services (National Treasury, 2018b: 14).

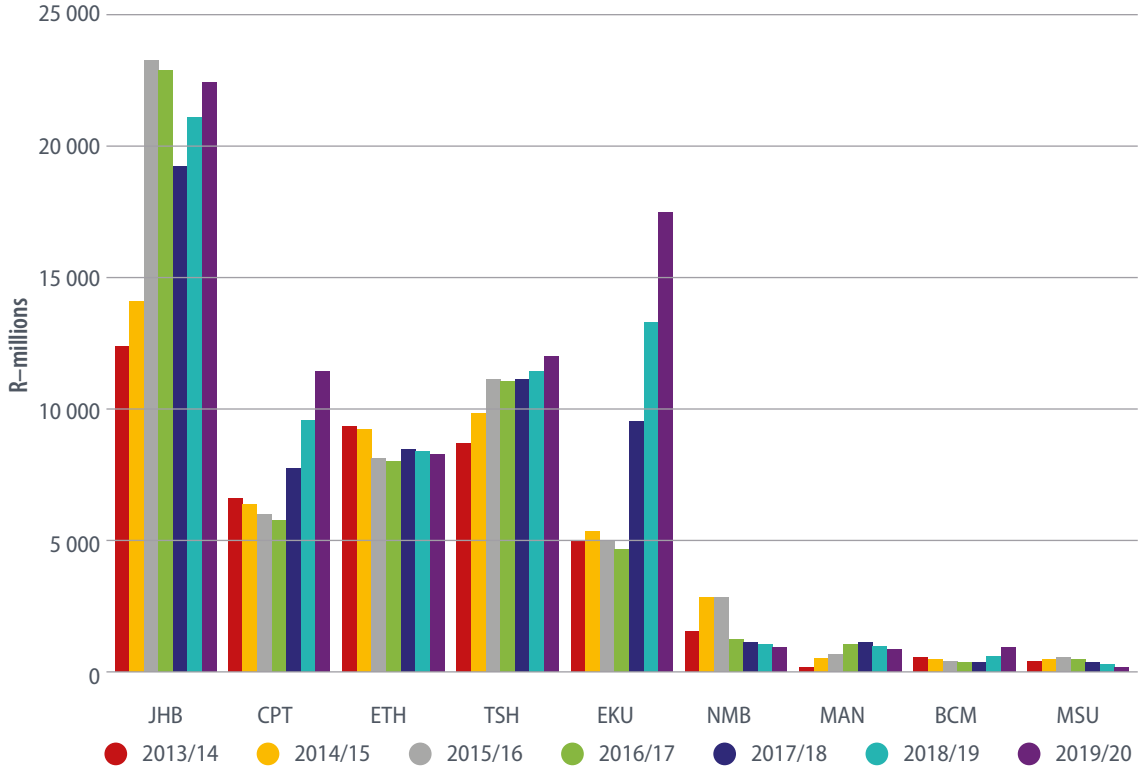
City borrowing

In recent years, South Africa has been affected by political turmoil that has resulted in the downgrade of the national government's sovereign debt by ratings agencies. This is having a ripple effect on the credit ratings of cities, as any sub-sovereign entity within a country cannot have a higher rating than the sovereign. For example, on 17 June 2017, Moody's downgraded Cape Town, Ekurhuleni, Johannesburg, Tshwane, Mangaung and Nelson Mandela Bay, noting that these actions "follow the weakening of the South African government's credit profile, as captured by Moody's similar rating action on the sovereign rating on 9 June 2017".[10] This means an increased cost of borrowing for cities, as a direct consequence of poor economic and fiscal management by national government.

On the positive side, the National Treasury announced that it will be updating the policy framework on municipal borrowing (ibid: 53). The changes include removing provisions that only allowed municipalities to borrow against future grant transfers for three years. In the future, municipalities will be able to borrow against all their future revenues, subject to the requirements of the MFMA. This development will favour cities in particular, and it will be interesting to see how cities take advantage of this in years to come.

Figure 6 shows city borrowing (non-current liabilities) for the period 2013/14–2016/17 and over the 2017/18 MTEF.

FIGURE 6: City borrowing (non-current liabilities) (2013/14–2019/20)



Source: National Treasury Local Government Database (2018) – Table A6 various years

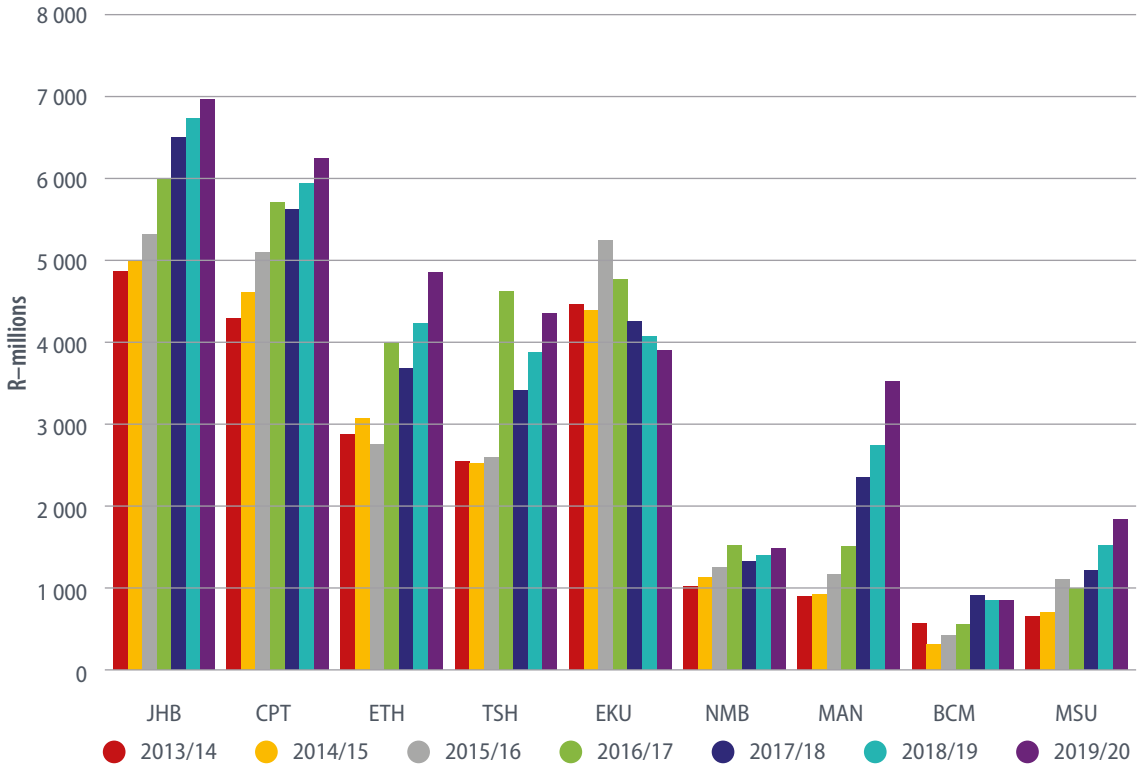
Between 2013/14 and 2016/17, long-term liabilities across the nine cities grew at an annual average rate of 9%, reaching a total of R54.6-billion. This growth is in line with the growth in city own revenues, indicating sound management of borrowing. Mangaung shows the largest growth in borrowing, which is largely due to starting from a low base, reaching about R839-million in 2016/17 (MMM, 2017: 183). The funds from this borrowing were mainly used for infrastructure, including water reticulation, reservoirs and road and storm-water projects.

Consumer debtors

Consumer debtors show the amounts owed to the municipality by businesses, institutions and residents. A high debtor figure may indicate that the city's systems for collecting debt are ineffective, or that ratepayers are unwilling to pay due to the persistence of (or growth in) the non-payment culture, or are unable to pay as a result of increasing poverty and unemployment. It could also result from a city failing to write-off bad debts that are clearly uncollectable.

Figure 7 shows cities' consumer debtors for the period 2013/14–2016/17 and over the 2017/18 MTEF.

FIGURE 7: Cities' consumer debtors (2013/14–2019/20)



Source: National Treasury Local Government Database (2018)

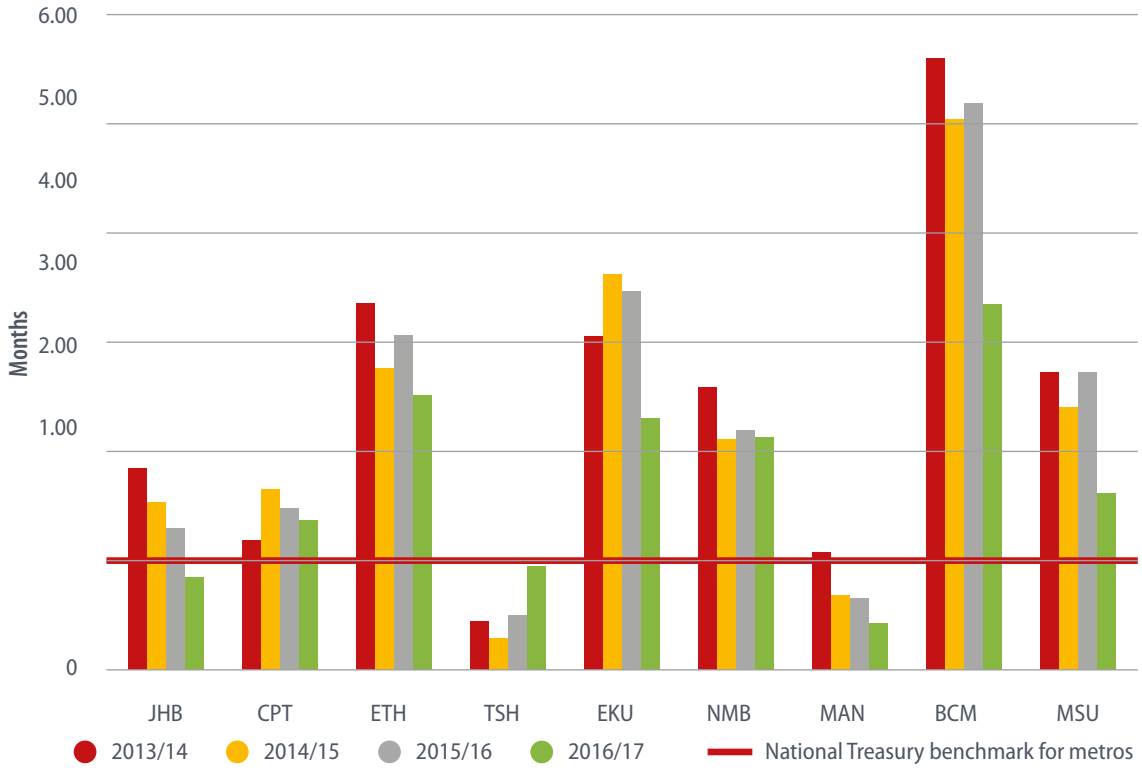
In 2016/17, unpaid electricity and water accounts made up 74% of Johannesburg's outstanding debtors. The city notes that the sharp rise in consumer debtors (13%) from the previous year is due to the prevailing economic conditions (CoJ, 2017: 139). In other words, consumers are finding it increasingly difficult to cope with rising costs.

From 2015/16 to 2016/17, Ekurhuleni's debt came down by 9%, and this trend will continue into the 2017/18 MTEF, which projects debtors declining by 6% per year from 2016/17 to 2019/20. Buffalo City is also projecting that outstanding debtors will decline over the 2017/18 MTEF.

Cities' cash management

A good measure of cities' ability to meet their financial commitments is the number of months of cash coverage they have. This is determined by dividing the monthly cash expenditure requirement into the total cash and cash equivalents available. According to the National Treasury, a prudent level of cash coverage is one month of average operating expenditure for metropolitan municipalities and three months for other municipalities. It should be noted that year-end figures are used in this analysis.

FIGURE 8: Cash and cash equivalents as a percentage of average monthly operating expenditure



Source: National Treasury Local Government Database (2018) – Table A7 various years

Of concern is that three cities – Johannesburg, Tshwane and Mangaung – ended 2016/17 with less than one month's cash or cash equivalents available to cover their monthly operating expenditure. All the cities (apart from Tshwane) had a worse cash position in 2016/17 than in 2015/16.

Audit outcomes

Table 10 shows the audit opinions for the nine cities since 2010/11. In 2016/17, Cape Town moved down, from a clean to an unqualified audit outcome, and Johannesburg, eThekwini, Tshwane and Ekurhuleni maintained their unqualified audit outcomes, with all having findings related to legislative compliance.

In 2016/17, Buffalo City achieved an unqualified audit for the first time since 2010/11, while Mangaung moved down to qualified after three years of unqualified audits, and Nelson Mandela Bay continued to receive a qualified audit. The deterioration in audit outcomes for Msunduzi is cause for concern.

TABLE 10: City audit opinions (2010/11–2016/17)

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
JHB	Qualified	Qualified	Qualified	Unqualified	Unqualified	Unqualified	Unqualified
CPT	Unqualified	Unqualified	Clean	Clean	Clean	Clean	Unqualified
ETH	Unqualified	Unqualified	Unqualified	Unqualified	Clean	Unqualified	Unqualified
TSH	Unqualified	Unqualified	Unqualified	Unqualified	Unqualified	Unqualified	Unqualified
EKU	Unqualified	Unqualified	Unqualified	Clean	Clean	Unqualified	Unqualified
NMB	Unqualified	Qualified	Qualified	Qualified	Qualified	Qualified	Qualified
MAN	Disclaimed	Disclaimed	Qualified	Unqualified	Unqualified	Unqualified	Qualified
BCM	Adverse	Qualified	Qualified	Qualified	Qualified	Qualified	Unqualified
MSUI	Unqualified	Unqualified	Unqualified	Unqualified	Unqualified	Qualified	Disclaimed

Source: Audit reports on the National Treasury website http://mfma.treasury.gov.za/Documents/Forms/AllItems.aspx
Note: Definitions of these audit opinions are found at https://www.agsa.co.za/AuditInformation/AuditTerminology.aspx

An unqualified audit simply means that the annual financial statements prepared by the municipality fairly represent the financial position and transactions of the municipality, which is why a municipality can receive an unqualified audit but still have high irregular expenditure and fruitless and wasteful expenditure. Provided the municipality reports accurately and transparently on all transactions, it will receive an unqualified audit opinion from the Auditor-General. Therefore, it is important to look beyond the audit opinion and examine the number and scale of incidents of irregular, unauthorised and fruitless and wasteful expenditure.

Table 11 provides more details of the outcomes for the 2015/16 and 2016/17 audits.

TABLE 11: Details of city audit outcomes (2015/16 and 2016/17)

R MILLIONS	2015/16 AUDIT OPINION	UNAUTHORISED EXPENDITURE	IRREGULAR EXPENDITURE	FRUITLESS AND WASTEFUL EXPENDITURES	2016/17 AUDIT OPINION	UNAUTHORISED EXPENDITURE	IRREGULAR EXPENDITURE	FRUITLESS AND WASTEFUL EXPENDITURES
JHB	Unqualified	692.6	155.6	2.2	Unqualified	502.2	705.9	0.9
CPT	Clean	0	0.002	0	Unqualified	–	47.0	0.02
ETH	Unqualified	0	208.3	0	Unqualified	–	513.7	–
TSH	Unqualified	1 913.9	652.8	0.41	Unqualified	620.0	1 824.6	41.5
EKU	Unqualified	67.1	167.2	2.4	Unqualified	–	591.3	8.3
NMB	Qualified	0.52	1 286.1	57.8	Qualified	431.9	8 183.6	110.1
MAN	Unqualified	654.8	32.7	0	Qualified	722.2	6.4	7.5
BCM	Qualified	22	370.2	0.07	Unqualified	95.9	583.6	0.1
MSUI	Qualified	0	217.7	0.24	Disclaimed	400.1	150.1	11.3
TOTAL		3 350.9	3 090.6	63.1		2 772.3	12 606.2	179.7
% OF TOTAL OPERATING EXPENDITURE		1.81%	1.67%	0.03%		1.44%	6.55%	0.09%

Source: AGSA (2016; 2017) Auditor General's General Reports for 2015/16 and 2016/17 and individual audit reports

The total unauthorised expenditure for cities was R3.4-billion in 2015/16 and decreased to R2.8-billion in 2016/17, largely due to improved budget controls and monitoring in Tshwane (AGSA, 2018: 58). However, irregular expenditure increased from R3-billion in 2015/16 to R12.6-billion in 2016/17 largely because of irregular expenditure by Nelson Mandela Bay (R8.2-billion), Tshwane (R1.8-billion) and Johannesburg (R705-million). However, the Auditor-General pointed out that much of this irregular expenditure was not incurred in 2016/17 but was rather related to "legacy contracts" from previous financial years (ibid: 4, 58) and, in the case of these three cities, from previous administrations.

Although it is important to be concerned about these types of expenditure, it is also important to keep in context the magnitude of these items in relation to the overall city budgets. In 2016/17, fruitless and wasteful expenditure amounted to less than 0.1% of the total combined operating budgets, unauthorised expenditure constituted 1.4% of the combined operating budget and irregular expenditure was 6.6% (but covering several years). Nevertheless, cities need to work on reducing these types of expenditure down to zero.

Unauthorised expenditure

This is expenditure incurred outside the budget approved by the council or not in accordance with the conditions of a grant.

- Tshwane overspent by R620-million, of which 27% related to non-cash items. The expenditure can mainly be attributed to employee-related costs, debt impairment, depreciation, finance charges, bulk purchases, contracted services, transfers and grants, and losses on the disposal of property, plant and equipment.
- Johannesburg overspent by R502-million, of which 22% related to non-cash items.
- Nelson Mandela Bay overspent by R432-million, all of which was related to non-cash items.

These three cities have incurred unauthorised expenditure in these areas for the past three years (five years in the case of Tshwane). However, most of the over-spending is on non-cash items and (for Tshwane) finance charges and bulk purchases, which indicates that the over-spending is very likely the result of poor budgeting – which means that not enough funds were available for certain expenditure categories. Another reason for over-spending could be poor expenditure management, which results in the underspending of budgets. Nevertheless, if properly managed through duly approved adjustments budgets, most unauthorised expenditure can be avoided. The continued unauthorised expenditure among the metros is of concern and points to possible political interference in the implementation of budgets, poor systems for managing budget implementation and poor management of adjustment budget processes. Municipal managers and chief financial officers need to be held accountable in this regard.

Irregular expenditure

This is expenditure that was not incurred in the manner prescribed by legislation. Irregular expenditure does not necessarily imply that money has been wasted or that fraud had been committed, but it is an indicator that Council should investigate further to establish whether there was corruption or not. In most of these cases, the cities are likely to have still received some value for the expenditure.

In 2016/17, the Auditor General found that all of the cities, except for Buffalo City, had irregular expenditure of between R6.4-million (for Mangaung) and R8.2-billion (for Nelson Mandela Bay).

- In Johannesburg, 100% of the irregular expenditure was related to non-compliance with legislation on contracts.
- In Nelson Mandela Bay the irregular expenditure was related to non-compliance with procurement process requirements for water infrastructure, road infrastructure and housing.
- Most of the irregular expenditure (83%) in Tshwane was related to procurement without following competitive bidding or quotation processes, in particular the smart prepaid meter contract and the wi-fi contract. A bus rapid transit tender was also awarded to a contractor not qualified to deliver the service.
- Buffalo City's irregular expenditure related mostly to the upgrading of internal roads.

These incidents indicate a serious disregard for the very basics of good administration, namely compliance with the MFMA's SCM processes. These processes are well-known, and all municipalities have the requisite systems in place to manage them. Those politicians and officials that deliberately ignore the processes need to be held accountable, be personally liable for repaying the irregular expenditure and should be prosecuted for financial misconduct in terms of the MFMA.[11] Ongoing vigilance is needed over the management of city finances by municipal councils, the executives and managers of municipalities, the media and the residents of cities.

Fruitless and wasteful expenditure

This is expenditure that was made in vain and could have been avoided had reasonable care been taken. Such expenditure often covers interest, payment of inflated prices and the cost of litigation that could have been avoided. In 2016/17, the two cities with the most fruitless and wasteful expenditure were Tshwane and Nelson Mandela Bay.

- For Tshwane, this expenditure was mostly related to standing time, interest and a re-application for a licence at the Temba water purification plant.
- In Nelson Mandela Bay, the majority of the fruitless and wasteful expenditure related to payments to rectify faulty work and for damages awarded in court.

Most cities have adequate processes in place to detect and quantify fruitless and wasteful expenditure, as required by legislation. This is encouraging, as fruitless and wasteful expenditure means that the city suffers an actual loss. Nevertheless, cities need to investigate such instances thoroughly, with a view to recovering the money from the responsible officials as required by the MFMA.

Conclusion

National government's mismanagement of the economy has resulted in tepid economic growth and rising unemployment, which directly affects city residents and businesses, and their ability to pay municipal bills. As the national fiscal position continues to deteriorate and the economy remains stagnant, cities will need to rely more on their own revenue sources than on national transfers. Between 2013/14 and 2016/17, direct transfers from national and provincial government to the nine cities increased by 12% on average every year, but this is expected to decline to 9%. In 2018/19, national government is projected to spend more on debt-interest payments than on transfers to local government.

City revenues appear to be quite resilient, growing at an average annual rate of about 8%, and most of the cities are consistently collecting within 5% of their originally budgeted revenue. Most of the nine cities have increased their provisions for debt impairment, indicating an expected deterioration in their ability to collect revenue. The exception is Ekurhuleni, whose debtor levels dropped by 9% between 2015/16 and 2016/17 and are projected to drop by 6% per year to 2019/20.

Own revenues make up over 80% of total income in six cities, and between 75% (Buffalo City) and 79% (Mangaung and Msunduzi) of total income in three cities. The main sources of city own revenues are property rates and service charges. Although revenues from service charges are the largest source of city revenue, over half of this income was paid over to Eskom or the water boards in 2016/17. Of concern are the rapid increases in bulk tariffs, which are squeezing out the surpluses that cities have historically used to cross-subsidise other services.

Bulk purchases of electricity and water continue to be the largest expenditure item, although the pressure has subsided compared to 2009/10–2013/14, when bulk purchases increased by 14% across the nine cities. Employee-related costs have grown at an average annual rate of 7.5% since 2013/14. Of concern is the low level of expenditure on protecting city infrastructure: only Cape Town spends more than the national norm of 8% of PPE on repairs and maintenance, while six of the nine cities have not budgeted to spend more than 5%. This highlights the vulnerability of spending on repairs and maintenance, which is not visible and so is often the "easiest" place to cut spending in the short-term, despite the serious medium- and long-term consequences of insufficient spending.

Another area of concern is the underspending of city capital budgets. Although aggregate spending across the period was relatively good, cities spent on average 84% of their capital budgets in 2016/17, compared to 94% in 2013/14. The capital expenditure of three cities (Tshwane, Johannesburg and Nelson Mandela Bay) was lower in 2016/17 than in 2013/14. Many factors contribute to the underspending by cities of their capital budgets, including limited planning, weak multi-year budgeting and poor contract and project management. These are common challenges when implementing multi-billion Rand capital budgets. About two-thirds of the city capital spending goes on infrastructure for services, such as electricity, water and waste management, and on economic and environmental services (which includes road transport).

To fund their capital budgets, cities typically use internally generated funds, borrowing and transfers from national and provincial governments. A positive development since 2013/14 is that Nelson Mandela Bay, Mangaung, Buffalo City and Msunduzi have significantly increased their use of internally generated and borrowed funds to finance capital expenditure, thereby reducing their reliance on national transfers. Between 2013/14 and 2016/17, long-term liabilities across the nine cities grew at an annual average rate of 9%, which is in line with the growth in city own revenues and indicates sound management of borrowing. Funds from borrowing were mainly used for infrastructure. However, the ratings agencies' downgrade of national government's sovereign debt has resulted in borrowing becoming more expensive for cities, making it more difficult for cities to debt-finance the expansion of services.

In 2016/17, none of the cities obtained a clean audit, and six cities received an unqualified audit due to issues with legislative compliance. If a municipality reported accurately and transparently on all transactions, it receives an unqualified audit opinion, even if there was unauthorised, wasteful or irregular expenditure. Reducing such expenditure to zero is important, but keeping in context the magnitude is also important. Fruitless and wasteful expenditure amounted to less than 0.1% of the total combined operating budgets, unauthorised constituted 1.4% of the combined operating budget and irregular expenditure was 6.6% (but covered several years).

With the changes in city administrations in Johannesburg, Tshwane and Nelson Mandela Bay following the 2016 elections, all new administrations have taken active steps to investigate suspect contracts entered into by the previous administrations. While containing a measure of political gamesmanship, these investigations have led directly to high levels of irregular expenditure linked to "legacy contracts" being recorded in the 2016/17 audit findings. The Auditor-General also noted Tshwane's improved budget controls and monitoring in 2016/17. The new administration in Nelson Mandela Bay is also taking steps to bring the growth in employment costs under control.

The 2017/18 budgets reported on in this review were the first passed by the city administrations installed by the 2016 local government elections. So, the 2017/18 annual financial statements and audit reports will provide an assessment of these administrations' first "full year" of being at the helm. It is going to be interesting to assess if the heightened electoral competition at local government level results in better management of all cities' finances, given the very real prospect of being punished by voters for not doing so.

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THE MUNICIPAL STANDARD CHART OF ACCOUNTS

What is the mSCOA?

A Standard Chart of Accounts (SCOA) is a predefined set of labels, accounts and items used for classifying the budgeting, transacting, and reporting of revenue and expenditures of all accounting transactions within an organisation. Benefits of a SCOA include: the consolidation of financial and non-financial information among government institutions, benchmarking of performance, automation of reporting, greater transparency and improved public perception through increased governance and oversight.

In 1998, National Treasury started reclassifying the existing expenditure items of national and provincial departments in line with the requirements of the Government Finance Statistics developed by the International Monetary Fund. In 2014, a similar process was started for local government, with the promulgation of the Municipal Regulations on Standard Chart of Accounts (mSCOA),[A] which provided for the standardisation of the entire local government financial management accountability cycle and reporting framework. The mSCOA will enable all 257 municipalities across South Africa to budget, transact and report in a uniform way.

Prior to the introduction of mSCOA, municipalities submitted their annual budgets and in-year performance reporting to the National Treasury's Local Government Database (LG Database)[B] using standardised Excel reporting formats, but the accuracy, reliability and relevance of the consolidated information was questionable. This is mainly because of inconsistent classifications across municipalities, which makes aggregating and consolidating budgets and performance extremely difficult. In an attempt to improve the accuracy of reported performance, National Treasury introduced a requirement that municipal managers and chief financial officers sign off all submissions.[C] Such measures have undoubtedly improved the accuracy but do not address the inconsistent classification of budgets and transactions.The mSCOA framework consists of seven segments, each with its own detailed labels and accounts, as shown in Figure 9.

FIGURE 9: The mSCOA classification

The Implementation of mSCOA

As from 1 July 2017, all municipalities were required to submit their 2017/18 budgets and integrated development plans to the National Treasury's LG Database[D] according to the mSCOA prescriptions. All 257 municipalities complied with this requirement, but 54 submissions (21%) were rejected because of validation errors with the submitted data.

Municipalities are also required to submit their monthly performance against budgets in the prescribed mSCOA format. From July to November 2017, the number of successful submissions declined noticeably: while all 257 municipalities submitted their budgets, only 233 submitted their financial performance for July and only 126 (49%) submitted in November 2017. Over the five-month period, 107 municipalities did not submit financial performance reports. The number of validation errors also significantly increased, from 23 (out of 233) in July to 48 (out of 126) in November 2017. This decline in successful submissions raises serious concerns around the reliability and relevance of reported performance.[E]

Impact of mSCOA on Transparency

The introduction of mSCOA has significantly improved the ability of National Treasury to ensure that municipalities report in a uniform, consistent and reliable way, as the correctness and accuracy of the submissions can now be validated. The reliability and relevance of reported performance can be verified because all municipalities are using the same terminology, and all accounts and labels are defined in simple terms, which ensures transactions are appropriately classified. The increase in submissions that have failed validation shows that National Treasury is better positioned to verify submissions against a consistent and uniform classification framework, thereby directly enhancing the transparency of reported information.

mSCOA will significantly improve the availability of detailed information, leading to more accurate reporting of indigent household numbers and the costs associated with free basic services and infrastructure maintenance. This will mean that the appropriateness of national funding structures can be better assessed. The uniform classification provides a stable basis for both benchmarking municipal performance and eventually developing relevant performance indicators for cities. Within municipalities, improved information will enable evidence-based financial management.

Many system vendors have upgraded their systems and technology to align with the modernised and improved financial processes introduced with mSCOA. Improvements include automated statutory and management reporting, and standardised business processes and operating procedures. These improvements will reduce the cost of legislative and regulatory compliance, make the annual audit process more efficient and effective and, over time, improve audit outcomes.

The successful implementation of SCOA in national and provincial government departments has contributed to positive public perception, locally and internationally, and strengthened public sector accountability and reporting. In the 2017 Open Budget Index Survey, South Africa was ranked joint first with New Zealand, out of 115 countries.[F] While municipalities have some way to go to achieve similar performance levels, the introduction of mSCOA will significantly improve the "whole of government" reporting. And, although current performance might suggest differently, the mSCOA is one of the biggest organisational reforms currently underway in South Africa, and will take a while for municipalities to institutionalise and perfect.

CHAPTER 2

SUSTAINABILITY AND EQUITY: THE TARIFFS STORY

Key Messages

Between 2015 and 2017, increased electricity and water costs accounted for 73% of the growth in municipal bills, but real growth in the cost of municipal services has slowed.

Most metros have regressive tariff structures, i.e. households with lower incomes pay proportionally greater shares of their income on tariffs than those with higher incomes. To improve the progressiveness of bills, cities can eliminate basic levies or monthly connection fees, and make use of inclining block tariffs.

A debate is needed about whether or not national and provincial government are leaving sufficient tax room for local government to raise revenue to fund services such as environmental health and safety, storm water management, public parks, and building and maintenance of infrastructure.

This chapter asks whether cities are "pricing themselves out of the market" by imposing increasingly unaffordable municipal service charges on households,[12] and analyses how progressive (or regressive) municipal bills are relative to households' incomes. The unaffordability of municipal bills, especially for lower-income groups, is a threat to the sustainability of city finances, as noted in the 2015 State of City Finances (SOCF) report (SACN, 2015).

Affordability is not a straightforward concept, especially when dealing with city services. For example, it is reasonable to expect households to curtail their consumption so that they can afford to pay increased municipal bills. However, this is not really an option when household incomes and per capita consumption levels are already low, and many households are struggling to cope in the prevailing economic climate. With the ever-rising cost of living, which affects the ability of households to pay, household collection rates will continue to be under pressure and may even decline. And, as essential services become unaffordable for many households, the willingness to pay is likely to weaken.

Cities use income from property rates, service charges and other fees, as well as the local government equitable share and other grants, to cover their costs. When setting property rates, service charges and other fees, municipalities need to consider two principles (National Treasury, 2011):

- **The benefit principle**, which simply means that customers must feel they are getting "value for money" for the taxes and charges they pay.
- **The ability-to-pay principle**, which refers to beneficiaries paying taxes according to their income-generating capacity.[13]

The scope of this study does not include an evaluation of whether customers in the different cities feel they are getting "value for money" for the taxes and charges they pay. However, this is an important question because it directly affects customers' *willingness to pay*. Customers are more likely to be willing to pay their municipal bills if the city is generally felt to be delivering services effectively and efficiently. However, if the city is seen as failing to provide reliable, quality services, an unwillingness to pay inevitably follows, making it harder for the city to collect its income.

In this chapter, the tariffs charged by metros are compared to household income using four standard household types that are defined based on property values, electricity and water consumption, and frequency of solid waste removal. The progressiveness of municipal bills in all nine cities is then analysed by comparing the cost of a Type A package to a Type D package. The costs of the different service packages are also compared over an eight-year period (2010–2017) to assess whether the cities have restructured their tariffs, and to identify the sources of growth in the cost of service packages. Finally, the chapter looks at the affordability of municipal bills, and changes since 2010, using a payment-income ratio and an affordability threshold of 10%, and then concludes with some recommendations to improve the progressiveness of municipal bills.

Household Incomes and Municipal Bills

The tariffs charged by metros are compared to household income, using four standard household types. The sample comprises households that pay tariffs, and so the analysis does not include indigent households. The chapter does not delve into cost-recovery issues, which are covered in Chapter Four.

The household types are defined according to four key characteristics:

- property values.
- electricity consumption (monthly consumption in kilowatt hours, kWh).
- water consumption (monthly consumption in kilolitres, kl).
- frequency of solid waste removal (of a 240-litre bin).

Standard service packages

First, using the same methodology as for the previous two SOCF reports, four standard "baskets of services" or service packages for household types A to D are identified (Table 12).

TABLE 12: Standard service packages

SERVICE PACKAGES	PROPERTY VALUE (R)	ELECTRICITY CONSUMPTION (kWh/month)	WATER CONSUMPTION (kl/month)	SOLID WASTE (weekly removal of a 240l bin)
TYPE A	100 000	400	20	1
TYPE B	250 000	500	25	1
TYPE C	500 000	800	30	1
TYPE D	1 000 000	1500	40	1

Then, to calculate a "total municipal bill", the following charges, which are taken from the cities' annual tariff tables, are added to these standard packages.

- Sanitation: the methodology may vary across municipalities, but the charges are generally linked to water consumption.
- Other standard monthly service charges added to household bills.
- VAT on service charges (i.e. excluding rates).

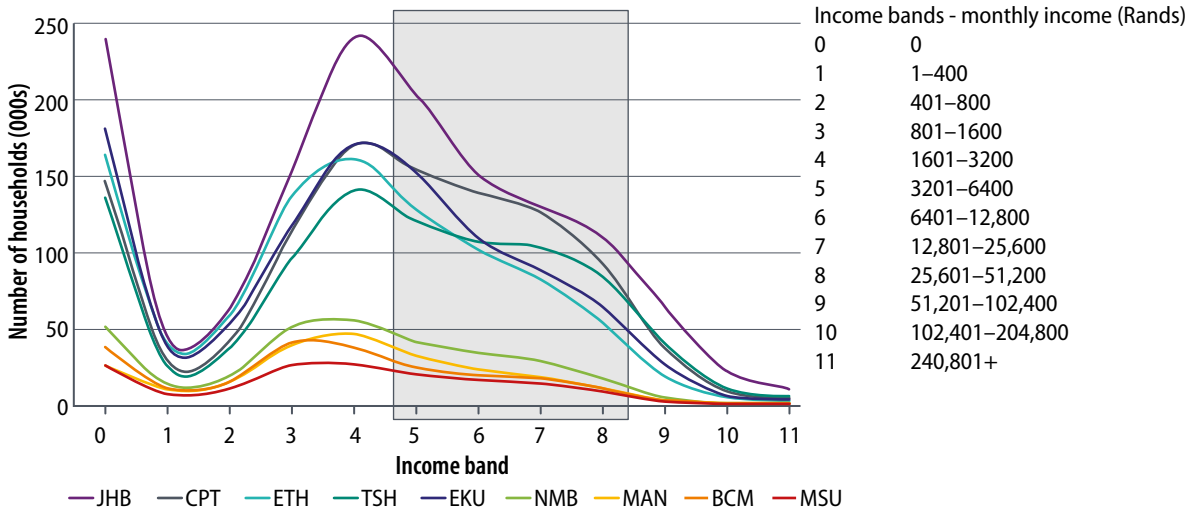
In addition, when calculating the municipal bill for each type of household, the following assumptions are applied:

- The rates and service charges are residential tariffs applicable to formal settlements.
- The rates and service charges are for "normal households" and do not take into consideration pensioners, child-headed households and indigent households.
- The water charges are for directly metered connections to the municipal water reticulation system, with no flow restrictions or water consumption management meters.
- The electricity charges are residential tariffs for customers with single-phase 230V or multi-phase 400/230V connections with a capacity of up to 80A per phase. Household types A and B are assumed to have pre-payment meters, while Types C and D are assumed to have credit meter arrangements.

Benchmark household incomes

The affordability of service charges needs to be measured in relation to household income. Therefore, the distribution of household incomes from the 2011 Census is used to create benchmark household income categories. The assumption is that households in these income categories consume the corresponding service packages. Figure 10 illustrates the different distributions of household incomes for the nine cities.

FIGURE 10: Household income profiles of the cities



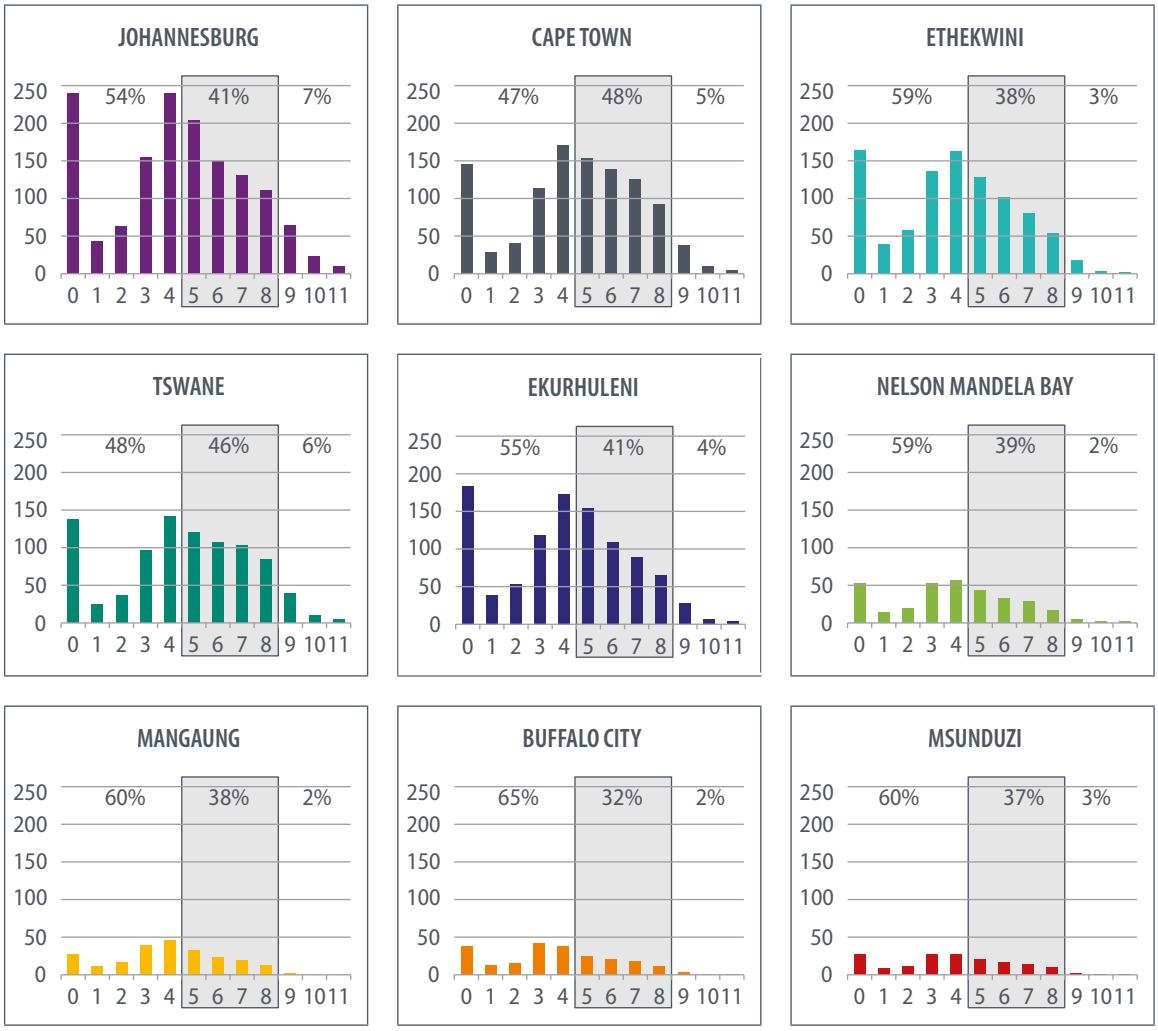
Source: Census 2011

As Figure 10 shows, household incomes can be divided into three broad groups:

- **Income bands 0–4** (households with incomes below R3200 per month in 2011 Rands) make up around 53% of all city households. Based on the indigent policies of the cities, most of these households would not be liable for any municipal taxes and service charges, provided they keep within specified consumption limits.[14]
- **Income bands 5–8** (households with incomes of R3200–R51,200 per month in 2011 Rands) make up 42% of all city households. These households are liable for rates and service charges.[15]
- **Income bands 9–11** (households with incomes of above R51,201 per month in 2011 Rands) make up just 5% of all city households and can certainly afford to pay their municipal bills.

Figure 11 shows the household income distributions for each city, highlighting bands 5–8. It illustrates how the distribution of household incomes differs widely across cities, and so each municipality needs to tailor its revenue-raising strategy to its circumstances. Buffalo City faces the greatest revenue-raising challenge, as 65% of its households fall within the income bands 0 to 4.

FIGURE 11: Household income profiles by city (Census 2011)



Source: Stats SA (2011)

A benchmark household income for each of the income bands 5–8 is then associated with the appropriate service package. Table 13 shows the 2012 benchmark incomes associated with each service package (SACN, 2013), which are adjusted for inflation using the average metropolitan inflation rate to obtain benchmark incomes for 2015 and 2017.

TABLE 13: Monthly income distribution and benchmark household incomes

INCOME BAND	INCOME RANGE (2011 Rands/month)	2012 BENCHMARK (R/ month)	2015 BENCHMARK (R/ month)	2017 BENCHMARK (R/ month)	ASSOCIATED SERVICE PACKAGE
5	3 201–6 400	6 000	7 050	7 896	Type A
6	6 401–12 800	12 000	14 100	15 792	Type B
7	12 801–25 600	24 000	28 201	31 583	Type C
8	25 601–51 200	48 000	56 402	63 166	Type D

Composition of municipal bills

The composition of households' municipal bills depends on how a city structures its rates and services charges, and the relative prices and quantities of the different services consumed by households. Table 14 shows the average composition of the municipal bill for each of the service package types, based on the bills charged in the nine cities.

TABLE 14: Average composition of municipal bill by package type (2017)

TAXES AND SERVICE CHARGES	AVERAGE COST IN NOMINAL RANDS				COST OF ITEM AS % OF TOTAL			
	TYPE A	TYPE B	TYPE C	TYPE D	TYPE A	TYPE B	TYPE C	TYPE D
Property taxes	20	132	339	753	2%	7%	12%	14%
Electricity charges	514	683	1 191	2 588	40%	38%	42%	48%
Electricity basic levy	78	78	78	78	6%	4%	3%	1%
Water charges	275	379	490	811	21%	21%	17%	15%
Water basic levy	10	10	10	10	1%	1%	0%	0%
Sanitation	144	192	238	302	11%	11%	8%	6%
Solid waste removal	76	97	114	139	6%	5%	4%	3%
Other	14	14	14	14	1%	1%	1%	0%
VAT on services	158	222	346	657	12%	12%	12%	12%
TOTAL	1 288	1 807	2 820	5 353	100%	100%	100%	100%

- Electricity charges (including the basic levy) account for the largest percentage of municipal bills in all cities and for all package types, ranging from 42% (38% + 4%) for Type B to 49% (48% + 1%) for Type D.
- Water charges (including the basic levy) are the second largest item, accounting for between 15% for Type D and 22% (21%+1%) for Type A and B.
- Property taxes are generally structured as a progressive tax, as their share of municipal bills increases across the package types, from 2% for Type A to 14% for Type D.
- The way in which cities structure sanitation and solid waste removal charges varies widely, although their share of the municipal bill tends to decline from Type A to Type D; some have progressive tariff structures, while others use flat-rate tariffs, fixed charges or declining block tariffs that are regressive in their impact.

In 2017, only Johannesburg, eThekwini and Buffalo City charged electricity basic levies, and only Nelson Mandela Bay, Mangaung and Msunduzi charged water basic levies. These basic levies are uniform connection charges that all households pay and are regressive, i.e. they represent a larger percentage of poorer households' bills compared to wealthier households' bills.

These average bills hide significant variations between cities, as a comparison of Johannesburg and Nelson Mandela Bay shows (Table 15). The "progressiveness of bill" is the total bill for a Type A, B or C package as a percentage of a Type D package.

TABLE 15: Composition of municipal bill by package type for Johannesburg and Nelson Mandela Bay (2017)

TAXES AND SERVICE CHARGES	JOHANNESBURG – 2017				NELSON MANDELA BAY – 2017			
	TYPE A	TYPE B	TYPE C	TYPE D	TYPE A	TYPE B	TYPE C	TYPE D
Property taxes	0%	1%	7%	11%	7%	13%	17%	19%
Electricity basic levy	31%	22%	16%	10%	0%	0%	0%	0%
Electricity charges	30%	27%	33%	40%	33%	33%	40%	47%
Water basic levy	0%	0%	0%	0%	4%	3%	2%	1%
Water charges	16%	16%	15%	16%	21%	19%	15%	12%
Sanitation	12%	16%	12%	7%	15%	13%	10%	7%
Solid waste removal	0%	6%	4%	4%	9%	7%	4%	2%
Other	0%	0%	0%	0%	0%	0%	0%	0%
VAT on services	12%	12%	12%	12%	12%	12%	12%	12%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%
TOTAL BILL (2017 RANDS)	1 481	2 076	2 798	4 635	1 211	1 669	2 664	4 864
Progressiveness of bill	32%	45%	60%	100%	25%	34%	55%	100%

- **Property taxes.** These taxes represent a significantly larger share of the municipal bill in Nelson Mandela Bay than in Johannesburg. Rates have a more progressive structure in Johannesburg, where in 2017 households received a rates rebate of R200,000, than in Nelson Mandela Bay, where households received only the R15,000 rebate required by statute.
- **Electricity.** Johannesburg charges all households an electricity basic levy of R452, which represents 31% of Type A bill and 9% of the Type D bill, showing the highly regressive nature of this charge. Nelson Mandela Bay does not charge an electricity basic levy. As a result, electricity charges represent 61% in Johannesburg but only 33% in Nelson Mandela Bay for the Type A package.
- **Water**. Johannesburg does not charge a basic levy for water, whereas Nelson Mandela Bay charges all households a levy of R44. However, although this charge is regressive in nature, its impact is relatively insignificant, as it represents just 4% of the Type A package in Nelson Mandela Bay (compared to 1% for Type D).
- **Sanitation.** Johannesburg charges a fixed fee for sanitation, of R172 for Type A households and R335 for Type B, C and D households. Nelson Mandela Bay charges all households a flat rate of R14.93 per kilolitre based on 60% of the household's water consumption. Both charging approaches are regressive in their impact, but Johannesburg's approach is more so.
- **Solid waste.** Johannesburg has a progressive solid waste removal tariff (R0 for Type A but R195 for Type D), whereas Nelson Mandela Bay charges a fixed tariff of R111 to all households, resulting in solid waste removal representing 9% of the Type A package but just 2% of the Type D package.

In sum, Nelson Mandela Bay has a more progressive billing structure than Johannesburg does, i.e. it is more pro-poor.

Table 16 shows the progressiveness of municipal bills in all nine cities (without the detail of Table 15 because of a lack of space), ranking the cities from most progressive to least progressive. A city is more progressive when its Type A package represents a lower percentage of a Type D package.

TABLE 16: Progressiveness of municipal bills

	TYPE A	TYPE B	TYPE C	TYPE D
Ekurhurleni	13%	18%	35%	100%
Cape Town	20%	33%	52%	100%
eThekwini	23%	32%	52%	100%
Nelson Mandela Bay	25%	34%	55%	100%
Mangaung	26%	35%	54%	100%
Msunduzi	27%	39%	57%	100%
Tshwane	28%	38%	57%	100%
Buffalo City	29%	39%	60%	100%
Johannesburg	32%	45%	60%	100%
AVERAGE	25%	35%	54%	100%

- Ekurhuleni has the most progressive billing structure, with Type A, B and C households paying between 13% and 35% of what Type D households pay. The biggest jump is from Type C to Type D households because electricity prices increase steeply between the highest block consumed by Type C and the block in which a large proportion of electricity is consumed by Type D households. Ekurhuleni is the only city where the municipal bill for Type C households is less than 50% that of Type D households.
- Johannesburg has the least progressive billing structure, with Type A households paying 32% of what Type D pay.
- The billing structure for eThekwini and Cape Town are equally progressive. Although eThekwini's tariffs for most services are slightly more progressive, this is offset by the basic electricity levy that it charges.
- The main cause of Tshwane's poor performance are flat solid waste and cleaning charges and sanitation charges that use a declining block tariff linked to the water bill.

Increasing Cost of Municipal Bills

In 2009 and 2010, electricity tariffs increased rapidly, affecting service charges. Since then, the growth in property taxes and service charges has stabilised but has consistently been above the inflation rate across all cities. In certain cities, the increase varies across service packages, suggesting a deliberate restructuring of the city's revenue collection strategy.

Comparative costs of service packages

Table 17 ranks the nine cities based on the real cost (in 2012 Rands) of the different service packages charged in 2015 and 2017. The percentage spread, i.e. the difference between the highest and lowest cost package, is shown ("Highest as % of lowest"), together with the comparative results from the 2014 and 2010 analysis that were included in the 2015 SOCF report.

TABLE 17: Monthly cost of packages A to D in 2015 and 2017, ranked by city (2012 R)

COST OF PACKAGES IN 2015, RANKED BY CITY (2012 RANDS)							
TYPE A		TYPE B		TYPE C		TYPE D	
EKU	695	EKU	937	MAN	1 841	MSU	3 225
CPT	791	MAN	1 217	MSU	1 862	MAN	3 361
MSU	878	ETH	1 231	EKU	1 905	JHB	3 494
ETH	901	NMB	1 239	NMB	1 957	NMB	3 799
NMB	907	MSU	1 298	ETH	2 040	ETH	3 950
MAN	913	AVE	1 323	AVE	2 077	AVE	3 969
AVE	942	CPT	1 361	JHB	2 105	TSH	4 032
JHB	1 089	TSH	1 495	CPT	2 225	BCM	4 164
TSH	1 112	JHB	1 543	TSH	2 287	CPT	4 184
BCM	1 195	BCM	1 589	BCM	2 474	EKU	5 513
Highest as % of lowest	172%		170%		134%		171%
2014	227%		193%		155%		130%
2010	238%		204%		133%		134%

COST OF PACKAGES IN 2017, RANKED BY CITY (2012 RANDS)							
TYPE A		TYPE B		TYPE C		TYPE D	
EKU	754	EKU	1 011	MAN	1 876	MSU	3 306
MAN	885	MAN	1 205	MSU	1 896	MAN	3 466
MSU	907	NMB	1 267	EKU	1 991	JHB	3 531
NMB	919	ETH	1 286	NMB	2 023	NMB	3 693
CPT	928	MSU	1 302	ETH	2 106	TSH	4 020
ETH	951	AVE	1 366	JHB	2 132	ETH	4 053
AVE	979	CPT	1 514	AVE	2 143	AVE	4 068
TSH	1 126	TSH	1 514	TSH	2 283	BCM	4 198
JHB	1 128	JHB	1 582	CPT	2 465	CPT	4 727
BCM	1 213	BCM	1 617	BCM	2 517	EKU	5 614
Highest as % of lowest	161%		160%		134%		170%

The cost of the service packages varies considerably across all package types and cities, but the extent of this variation decreased considerably between 2010 and 2017. The difference between the lowest and highest priced Type A package fell from 238% in 2010 to 161% in 2017. However, the difference in rand terms is considerable: in 2017, a Type A household in Ekurhuleni paid R754 compared to R1213 in Buffalo City, which is a large difference for this income level.

Table 18 ranks the cities based on the deviation from the average price for each service package in 2015 and 2017. The spread is again shown, together with a comparison for 2010 and 2014 from the 2015 report.

TABLE 18: Percentage variation from average cost of packages A to D in 2014, ranked by city

PACKAGES DEVIATION FROM THE AVERAGE IN 2015							
TYPE A		TYPE B		TYPE C		TYPE D	
EKU	–26%	EKU	–31%	MAN	–13%	MSU	–20%
CPT	–16%	MAN	–11%	MSU	–12%	MAN	–17%
MSU	–7%	ETH	–10%	EKU	–9%	JHB	–13%
ETH	–4%	NMB	–9%	NMB	–7%	NMB	–6%
NMB	–4%	MSU	–5%	ETH	–3%	ETH	–2%
MAN	–3%	AVE	–3%	AVE	–1%	AVE	–2%
AVE	0%	CPT	0%	JHB	0%	TSH	0%
JHB	16%	TSH	10%	CPT	6%	BCM	3%
TSH	18%	JHB	13%	TSH	9%	CPT	4%
BCM	27%	BCM	17%	BCM	18%	EKU	37%
Spread	53%		48%		30%		57%
2014	81%		61%		41%		27%
2010	91%		72%		27%		30%

PACKAGES DEVIATION FROM THE AVERAGE IN 2017							
TYPE A		TYPE B		TYPE C		TYPE D	
EKU	–23%	EKU	–33%	MAN	–12%	MSU	–19%
MAN	–10%	MAN	–20%	MSU	–12%	MAN	–15%
MSU	–7%	NMB	–16%	EKU	–7%	JHB	–13%
NMB	–6%	ETH	–15%	NMB	–6%	NMB	–9%
CPT	–5%	MSU	–14%	ETH	–2%	TSH	–1%
ETH	–3%	AVE	–10%	JHB	–1%	ETH	0%
AVE	0%	CPT	0%	AVE	0%	AVE	0%
TSH	15%	TSH	0%	TSH	7%	BCM	3%
JHB	15%	JHB	4%	CPT	15%	CPT	16%
BCM	24%	BCM	7%	BCM	17%	EKU	38%
Spread	47%		40%		30%		57%

Between 2010 and 2017, the variation in the cost of Type A and Type B packages declined, from 91% to 47% for Type A and from 72% to 40% for Type B. However, the variation in the cost of Type C and D packages increased, from 27% to 30% for Type C and from 30% to 57% for Type D. This points to significant variation in the structure of tariffs across the service packages within and across cities. As highlighted in the 2015 SOCF report, Ekurhuleni has a deliberately progressive billing policy that favours poorer households and taxes the wealthier households. Its Type A and Type B packages are 23% and 33% below the national average, and its Type D package is 38% above the national average.

Growth in the cost of service packages

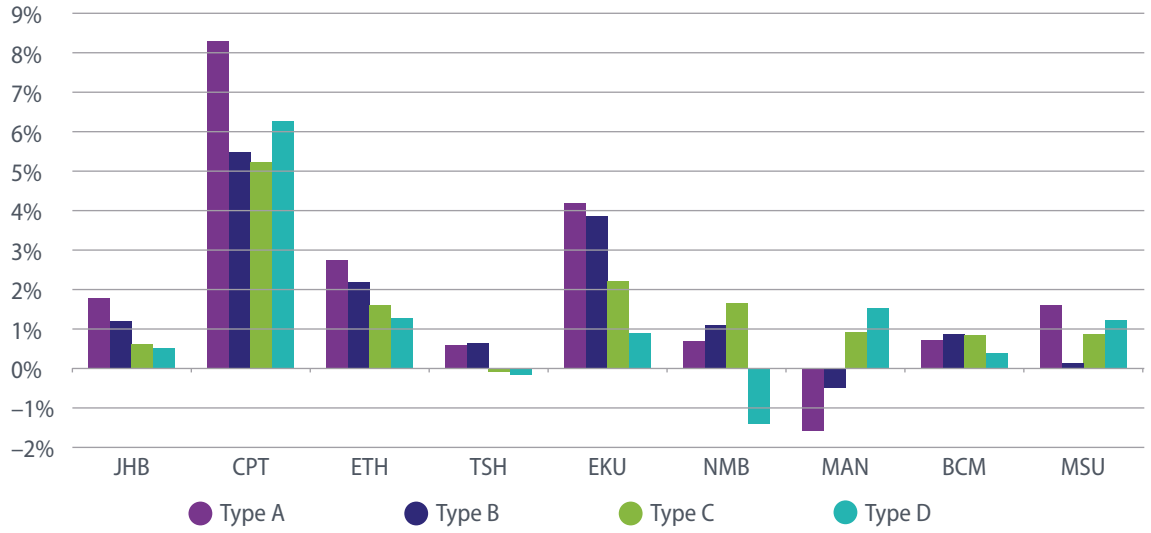
When looking at the affordability of municipal services, the real growth in cost needs to be considered. To obtain the real growth numbers, the CPI Urban Series (2012 = 100) was used to deflate the nominal cost of the service packages in each city. Up to the end of 2016, the CPI Urban Series gave a per-city inflation rate, which is a better measure of household inflation in the different cities than the national CPI. For 2017, the CPI per province up to the end of September was used, as it was the most recent CPI data available at the time of writing.

To understand the increases that households saw on their municipal bill, the average annual CPI rate is added to the relevant real growth rate per city (Table 19 and Figure 12). For example, in Cape Town the cost of the Type A package grew at an annual average real rate of 5.46%. However, between 2015 and 2017, households would have seen a 13.6% nominal increase (8.3% + 5.3%) in their municipal bills each year. The highlighted cells in Table 19 show the service packages with a greater growth than the average annual growth.

TABLE 19: Average annual real growth in the cost of service packages by city between 2015 and 2017

CITY	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE ANNUAL CPI (2010 TO 2014)
JHB	1,79%	1,23%	0,64%	0,53%	5,1%
CPT	8,30%	5,47%	5,25%	6,29%	5,3%
ETH	2,77%	2,21%	1,61%	1,29%	5,2%
TSH	0,61%	0,64%	–0,09%	–0,15%	4,8%
EKU	4,19%	3,87%	2,22%	0,92%	5,2%
NMB	0,70%	1,13%	1,66%	–1,39%	5,3%
MAN	–1,57%	–0,49%	0,95%	1,54%	5,1%
BCM	0,75%	0,88%	0,85%	0,41%	5,1%
MSU	1,62%	0,17%	0,91%	1,24%	5,1%
AVERAGE	2,13%	1,68%	1,55%	1,19%	5,1%

FIGURE 12: Average annual real growth in the cost of service packages by city between 2015 and 2017



As Table 19 and Figure 12 show, between 2015 and 2017, the cost of all service packages increased in all cities, with the exception of Nelson Mandela Bay (Type D) and Mangaung (Types A and B). Cape Town increased the cost of all its service packages at well above the average growth for the nine cities, although the city still has one of the more progressive tariff structures (Table 16). This increase was driven by higher charges for water combined with the abolition of the free 6kl for non-indigent households, which had a greater impact on Type A packages, as these households consume proportionally more water. Figure 13 shows graphically the trends and the relative cost of the services packages across the cities.

FIGURE 13: Real growth in the cost of service packages by city in 2012 Rands (2015–2017)

Sources of growth in the cost of service packages

Higher electricity charges continue to contribute the most to the increase in costs of the service packages. To understand what is driving these increases, the changes in the cost of each item are analysed, taking into account the relative importance of that item in households' municipal bills. As Table 20 shows, between 2015 and 2017, higher utility charges (electricity and water) contributed the most to the increased costs of the service packages in all cities.

TABLE 20: Sources of growth in the cost of service packages between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
Property taxes	0%	6%	10%	16%	8%
Electricity basic levy	3%	2%	2%	1%	2%
Electricity charges	26%	25%	29%	30%	27%
Water basic levy	1%	1%	0%	0%	1%
Water charges	36%	32%	28%	29%	31%
Sanitation	13%	14%	12%	9%	12%
Solid waste removal	7%	6%	5%	3%	5%

Tables 21 to 25 show the contribution of water, electricity, sanitation, solid waste removal and property rates to the growth in the cost of service packages per city.

TABLE 21: Water charges' contribution to cost growth between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
JHB	34%	24%	17%	23%	24%
CPT	43%	42%	42%	53%	45%
ETH	37%	35%	28%	28%	32%
TSH	31%	32%	31%	26%	30%
EKU	35%	37%	29%	19%	30%
NMB	28%	24%	21%	26%	25%
MAN	47%	38%	24%	18%	32%
BCM	25%	26%	21%	21%	23%
MSU	47%	35%	39%	43%	41%
AVERAGE	**36%**	**32%**	**28%**	**29%**	**31%**

Cape Town and Msunduzi stand out for the increases in the cost of water. As mentioned already, in Cape Town this is driven by water restrictions and the abolishment of the free 6kl per month for all households except indigent households. In Msunduzi, the overall growth of all service packages has been slow, with water charges growing more than other charges.

TABLE 22: Electricity charges' contribution to cost growth between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
JHB	35%	31%	38%	39%	36%
CPT	5%	16%	20%	19%	15%
ETH	39%	36%	35%	33%	36%
TSH	30%	28%	35%	42%	34%
EKU	25%	24%	36%	55%	35%
NMB	20%	20%	26%	–2%	16%
MAN	56%	42%	36%	36%	43%
BCM	31%	29%	30%	36%	31%
MSU	16%	17%	17%	17%	17%
AVERAGE	29%	27%	30%	31%	29%

Electricity (not water) is the biggest contributor to growth in service packages of all cities except for Cape Town and Msunduzi. The monthly electricity service charges include the basic electricity levy that Johannesburg, eThekwini and Buffalo City charge households. The Type D package in Nelson Mandela decreased because in 2017/18 the highest block tariff became the same as the block below.

TABLE 23: Sanitation charges' contribution to cost growth between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
JHB	18%	27%	22%	13%	20%
CPT	40%	28%	25%	15%	27%
ETH	12%	11%	9%	8%	10%
TSH	16%	23%	13%	8%	15%
EKU	16%	14%	10%	5%	11%
NMB	20%	17%	12%	14%	16%
MAN	–25%	–15%	2%	8%	–8%
BCM	6%	7%	11%	4%	7%
MSU	17%	14%	9%	5%	11%
AVERAGE	13%	14%	12%	9%	12%

In most cities, sanitation charges are linked to water consumption, i.e. as consumption increases, the cost per kilolitre decreases. Therefore, sanitation contributes more to the growth in cost of the Type A package than the higher packages. In Mangaung, sanitation charges are linked to the value of the property, and so the decline is a result of the city increasing the rateable value of properties excluded, from R70,000 to R80,000 per property.

TABLE 24: Solid waste removal charges' contribution to cost growth between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
JHB	0%	5%	4%	2%	3%
CPT	0%	2%	2%	1%	1%
ETH	0%	0%	5%	5%	3%
TSH	11%	8%	6%	4%	7%
EKU	12%	9%	8%	4%	8%
NMB	12%	8%	5%	4%	7%
MAN	7%	5%	3%	2%	4%
BCM	16%	12%	8%	5%	10%
MSU	6%	5%	3%	2%	4%
AVERAGE	7%	6%	5%	3%	5%

As solid waste removal charges are not directly linked to levels of consumption, they contribute more to the growth in cost of Types A and B service packages. Johannesburg and Cape Town do not charge Type A households for solid waste removal, while eThekwini does not charge Types A and B households.

TABLE 25: Property rates' contribution to cost growth between 2015 and 2017

	TYPE A	TYPE B	TYPE C	TYPE D	AVERAGE
JHB	0%	1%	6%	10%	4%
CPT	0%	0%	–1%	–1%	0%
ETH	0%	5%	10%	13%	7%
TSH	–12%	–12%	–4%	4%	–6%
EKU	0%	2%	5%	5%	3%
NMB	3%	15%	22%	43%	21%
MAN	–2%	14%	21%	23%	14%
BCM	7%	13%	17%	21%	14%
MSU	0%	15%	18%	20%	13%
AVERAGE	0%	6%	10%	16%	8%

Between 2016/17 and 2017/18, Tshwane increased the value of properties not included in the ratings calculation from R75,000 to R120,000. As a result, the contribution of property rates fell for Type A, B and C packages. In Cape Town, the cents in the Rand rate was reduced for Type C and D packages, resulting in a decrease in contribution. In Mangaung, as explained, the value of properties excluded from the rating calculations increased, which affects the contribution to Type A bills.

Affordability of Municipal Bills

The affordability of municipal bills depends on both the rates and charges (as discussed above) and household incomes. As Figure 10 highlighted earlier, cities have different household income profiles and different compositions of ratepayers and customers (including households). This means that each city faces unique challenges in structuring its tariffs to ensure the municipality is funded, while keeping municipal bills affordable for the full spectrum of ratepayers and customers.

Setting tariffs within a municipal context is a complex and complicated exercise, while managing tariff structures so that municipal bills remain affordable is a dynamic process. Households have different economic circumstances, and cities have different economic growth rates that affect household incomes. Over a given period, incomes will grow in some cities but decline in other cities. When annually reviewing their tariff structures, cities need to consider changes to these incomes and the impact of increases of other charges on the disposable income of households.

Furthermore, the affordability of municipal bills cannot be viewed in isolation. Local government cannot be held solely responsible for municipal bills being unaffordable, if the revenue-raising activities of national and provincial government do not leave enough room for municipalities to raise their fair share of revenue. This is particularly pertinent given rising bulk tariffs for electricity and national government's increases to personal income tax rates and VAT.

Cost of service packages relative to household incomes

To assess changes in the affordability of municipal bills, the cost of Types A to D service packages in each city are compared with the benchmark household real incomes (2012 Rands) for each type. Table 26 lists the service packages for the nine cities. For each type of service package, the cities are listed in ascending order of the percent value in 2017: Ekurhuleni has the lowest value for Type A and Type B, Mangaung for Type C and Msunduzi for Type D. The "change" column shows the increase or decrease between 2010 and 2017. A negative value shows that the value increased or worsened.

TABLE 26: Cost of packages A to D in 2010 and 2017 as a percentage of benchmark incomes, ranked by city

TYPE A			
	2010	2017	CHANGE
EKU	10,2%	9,5%	0,6%
MAN	11,4%	11,2%	0,2%
MSU	22,8%	11,5%	11,3%
NMB	14,1%	11,6%	2,5%
CPT	9,6%	11,8%	–2,2%
ETH	10,9%	12,0%	–1,1%
AVE	14,5%	12,4%	2,1%
TSH	17,5%	14,3%	3,2%
JHB	18,1%	14,3%	3,8%
BCM	16,4%	15,3%	1,0%
MAX/ MIN	42,0%	62,2%	0,0%

TYPE B			
	2010	2017	CHANGE
EKU	7,1%	6,4%	0,7%
MAN	11,4%	11,2%	0,2%
NMB	14,1%	11,6%	2,5%
ETH	10,9%	12,0%	–1,1%
MSU	22,8%	11,5%	11,3%
AVE	14,5%	12,4%	2,1%
CPT	9,6%	11,8%	–2,2%
TSH	17,5%	14,3%	3,2%
JHB	18,1%	14,3%	3,8%
BCM	16,4%	15,3%	1,0%
0,0%	31,1%	41,7%	0,0%

TYPE C			
	2010	2017	CHANGE
MAN	8,3%	5,9%	2,4%
MSU	8,3%	6,0%	2,3%
EKU	6,4%	6,3%	0,1%
NMB	7,1%	6,4%	0,7%
ETH	6,8%	6,7%	0,2%
JHB	8,5%	6,8%	1,8%
AVE	7,8%	6,8%	1,0%
TSH	8,5%	7,2%	1,3%
CPT	7,8%	7,8%	0,0%
BCM	8,2%	8,0%	0,3%
0,0%	75,4%	74,7%	0,0%

TYPE D			
	2010	2017	CHANGE
MSU	6,3%	5,2%	1,1%
MAN	8,0%	5,5%	2,5%
JHB	6,6%	5,6%	1,0%
NMB	6,1%	5,8%	0,2%
TSH	7,2%	6,4%	0,8%
ETH	7,0%	6,4%	0,6%
AVE	6,8%	6,4%	0,3%
BCM	6,7%	6,6%	0,0%
CPT	7,0%	7,5%	–0,5%
EKU	6,0%	8,9%	–2,9%
0,0%	74,6%	58,8%	0,0%

- Ekurhuleni has the most affordable Types A, B and C packages and the least affordable Type D package, reflecting the city's progressive tariff structure and very large increases in solid waste removal and electricity tariffs at higher levels of consumption. Solid waste removal and electricity tariffs for Type D households have increased faster than other household types since 2010, which is why the affordability of Type D packages has decreased.
- Mangaung provides the second most affordable package across all types. The affordability of Types A and B packages has remained at a similar level, but Types C and D have become more affordable, suggesting that the city's tariff structure has become more regressive.
- Between 2010 and 2017, Msunduzi's tariff structure became much more progressive, with the affordability of Type A and Type B packages being better than average and the cost of both service packages reducing significantly, from 22.8% to 11.3% of the household income.
- All packages in Nelson Mandela Bay saw small increases in affordability, which suggests no meaningful changes to the progressiveness of the tariff structures.
- Cape Town and eThekwini are the only metros where the cost of Types A and B service packages as a percent of income has increased (worsened). In Cape Town, this is mainly due to changes to the water tariffs, which have also affected the sanitation tariffs.
- In Tshwane, although all service packages except for Type D are less affordable than the average, the affordability of all packages has increased since 2010, especially for Types A and B.
- The City of Johannesburg has also seen improved affordability of Types A and B service packages, although they are still the second most unaffordable of all the cities. The affordability of Types C and D packages has increased slightly. The relative changes in affordability can be attributed to changes in the water tariffs.
- Buffalo City has the least affordable Type A, B and C service packages of all the cities, although the affordability of Type A and B has improved marginally.
- The average value decreased, or improved, for all types of service packages between 2010 and 2017. However, the averages for Type A and Type B in 2017 are 12% for each service type compared to 7% and 6% for Type C and Type D, which suggests that overall metros have a regressive tariff structure as in aggregate their tariff structures favour wealthy households.

Progressive/regressive nature of cities' municipal bills

As explained earlier, *progressive* tariff structures are those where higher-income households pay proportionately higher municipal bills than lower-income households, whereas *regressive* tariff structures result in poorer households paying a greater percentage of their incomes than wealthier households.

Figure 14 and Table 27 illustrate the progressive/regressive nature of each of the cities' municipal bills, as well as the trends in affordability for the four packages.

FIGURE 14: Cost of packages Type A to D as a percentage of benchmark household incomes (2015–2017)

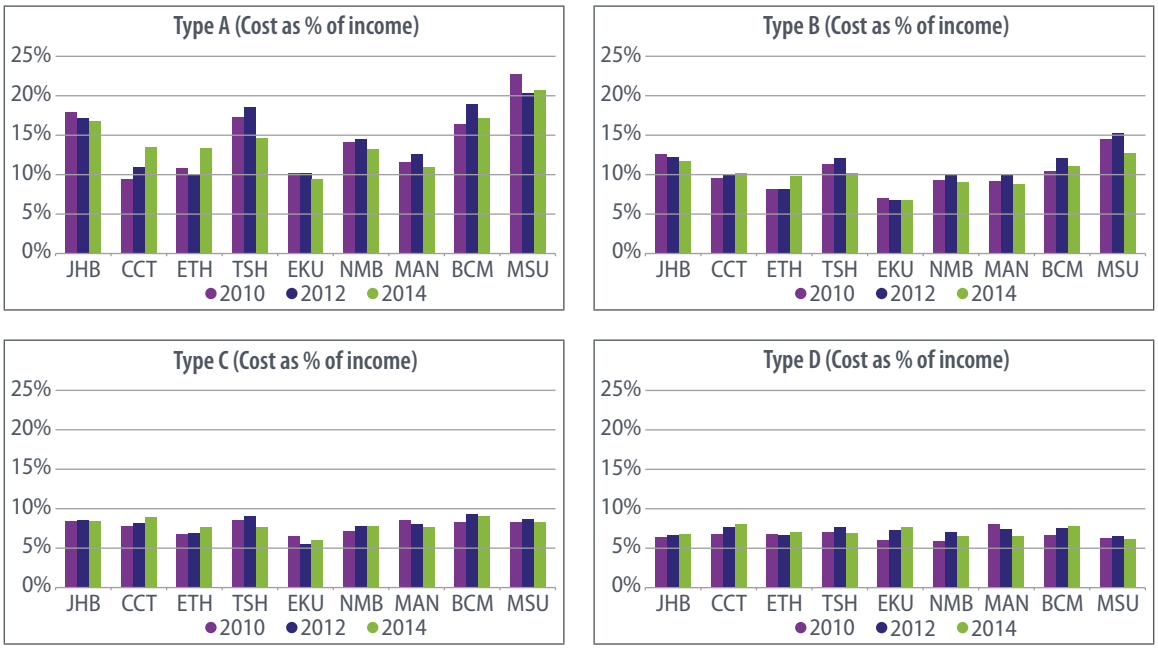


Table 27 gives the "payment-income ratio", which is the difference between what households with Types A, B and C service packages spend and what households with Type D packages spend on their municipal bills, based on their income. This ratio provides an indication of how progressive or regressive the relevant city's tariff structures are. The "change in ratio" shows how the payment-income ratio has changed between 2010 and 2017. A negative value means that the ratio decreased between 2010 and 2017 – in other words, the proportion of household income spent on municipal bills is closer to that of Type D households. Therefore, a decrease in the ratio indicates increased progressiveness.

TABLE 27: Payment-income ratios in 2017

	PAYMENT-INCOME RATIO 2017			CHANGE IN RATIO 2010–2017		
	TYPE A	TYPE B	TYPE C	TYPE A	TYPE B	TYPE C
JHB	2,56	1,79	1,21	–7%	–8%	–6%
CPT	1,57	1,28	1,04	15%	–7%	–7%
ETH	1,88	1,27	1,04	20%	6%	6%
TSH	2,24	1,51	1,14	–7%	–6%	–4%
EKU	1,08	0,72	0,71	–37%	–39%	–34%
NMB	1,99	1,37	1,10	–15%	–10%	–7%
MAN	2,04	1,39	1,08	43%	23%	4%
BCM	2,31	1,54	1,20	–6%	–3%	–3%
MSU	2,19	1,58	1,15	–39%	–31%	–12%

In general, cities have regressive tariff structures.

- Ekurhuleni remains the most progressive metro and has become more progressive since 2010.
- Despite becoming more regressive, as shown by the 15% change in ratio for Type A, Cape Town still has the second most progressive tariff structure of the nine cities. Like Cape Town, eThekwini has one of the most progressive tariff structures but appears to be continuing with its strategy of reducing the progressiveness of its tariffs.
- The metro where the progressiveness of tariff structures reduced the most was Mangaung, where changes to threshold values at which charges change disproportionally favoured the more expensive package types.
- Despite relatively large improvements in progressiveness, Msunduzi continues to have the second most regressive tariff structure in the country. In 2015 Msunduzi had the most regressive tariff structures but has since been eclipsed by Johannesburg.

Identifying municipal bills that are unaffordable

The affordability of a standard household municipal bill depends on many variables, including the household's financial circumstances and the willingness to prioritise payment of municipal bills over other expenditures. In other words, affordability is linked to households' willingness to pay and the municipal leadership's willingness to enforce payments. As yet, government has not proposed an objective *affordability threshold* for a standard household municipal bill.[16]

The lack of such a threshold works against the interests of poorer households, as there is no objective standard against which to measure the equity of municipal tax and tariff structures and the resultant municipal bills. Municipalities can, therefore, impose unreasonable bills and enforce the tariff structures by implementing service cut-offs.

Table 28 analyses the data in Table 26 from a different perspective, using an affordability threshold of 10% of household income. The 2015 SOCF first proposed that 10% of household income is a reasonable affordability threshold for a *typical, standard household municipal bill* as defined by the four services packages in relation to the specified benchmark incomes. Since then, the Stats SA Living Conditions Survey 2014/15 suggests that 10% is a reasonable benchmark. The Survey has a category, "housing, water, electricity, gas and other fuels", which includes "household consumption expenditure on housing and basic services, such as water, electricity, gas and other fuels"[17] that amounts to 6.5% of household consumption. Although the Survey does not refer specifically to property rates, the item "other services relating to the dwelling" (which equals 1.2% of consumption) is assumed to include property rates and other municipal services. Together these two items amount to 7.7% of household consumption. According to the Survey, the average household consumption is R103,293 and average income is R138,168: R138,168 × 7.7% = R10 638, which is 10.3% of R103,293. Therefore, 10% benchmark is a reasonable figure to use.

Table 28 shows the change in affordability of municipal bills between 2015 and 2017 and ranks the service packages across cities from least affordable to the most affordable in 2017. The change in affordability is the difference between 2017 and 2015. This change is highlighted in green for service packages that are more affordable and in red for those that have become less affordable.

TABLE 28: Affordability of municipal bills

CITY	PACKAGE TYPE	2017 BENCHMARK MUNICIPAL BILL (2017 Rands)	MUNICIPAL BILL AS % OF BENCHMARK INCOME		CHANGE IN AFFORDABILITY SINCE 2015
			2015	2017	
BCM	Type A	1 212,75	16,9%	15,3%	–1,6%
JHB	Type A	1 128,28	15,5%	14,3%	–1,2%
TSH	Type A	1 125,58	15,8%	14,3%	–1,5%
ETH	Type A	951,35	12,8%	12,0%	–0,7%
CPT	Type A	928,12	11,2%	11,8%	0,5%
NMB	Type A	919,44	12,9%	11,6%	–1,2%
MSU	Type A	906,53	12,4%	11,5%	–1,0%
MAN	Type A	884,99	13,0%	11,2%	–1,8%
BCM	Type B	1 616,71	11,2%	10,2%	–1,0%
JHB	Type B	1 581,54	11,0%	10,0%	–0,9%

Affordability threshold = municipal bill for Type A, B, C or D packages greater than 10% of benchmark household income

TSH	Type B	1 514,19	10,6%	9,6%	–1,0%
CPT	Type B	1 514,14	9,7%	9,6%	–0,1%
EKU	Type A	754,46	9,8%	9,5%	–0,3%
EKU	Type D	5 614,24	9,8%	8,9%	–0,9%
MSU	Type B	1 302,06	9,2%	8,2%	–1,0%
ETH	Type B	1 285,95	8,7%	8,1%	–0,6%
NMB	Type B	1 266,99	8,8%	8,0%	–0,8%
BCM	Type C	2 516,60	8,8%	8,0%	–0,8%
CPT	Type C	2 464,67	7,9%	7,8%	–0,1%
MAN	Type B	1 205,47	8,6%	7,6%	–1,0%
CPT	Type D	4 726,64	7,4%	7,5%	0,1%
TSH	Type C	2 282,85	8,1%	7,2%	–0,9%
JHB	Type C	2 132,00	7,5%	6,8%	–0,7%
ETH	Type C	2 106,12	7,2%	6,7%	–0,6%
BCM	Type D	4 198,35	7,4%	6,6%	–0,7%
ETH	Type D	4 052,74	7,0%	6,4%	–0,6%
NMB	Type C	2 022,79	6,9%	6,4%	–0,5%
EKU	Type B	1 010,75	6,6%	6,4%	–0,2%
TSH	Type D	4 019,77	7,2%	6,4%	–0,8%
EKU	Type C	1 991,16	6,8%	6,3%	–0,5%
MSU	Type C	1 895,64	6,6%	6,0%	–0,6%
MAN	Type C	1 875,62	6,5%	5,9%	–0,6%
NMB	Type D	3 693,33	6,7%	5,8%	–0,9%
JHB	Type D	3 531,23	6,2%	5,6%	–0,6%
MAN	Type D	3 466,00	6,0%	5,5%	–0,5%
MSU	Type D	3 305,90	5,7%	5,2%	–0,5%

- Like in 2015, the Type A packages (what the poorest households pay) are above the 10% affordability threshold in all cities except Ekurhuleni, illustrating the regressive nature of city tariff structures.
- Two Type B packages are above the affordability threshold: Buffalo City (10.2%) and Johannesburg (10%). For the other cities, the Type B packages range from 9.6% (Tshwane and Cape Town) to 6.4% (Ekurhuleni) of household income.
- All Type C packages are below the affordability threshold and within a range of less than 2%, from 6.3% in Ekurhuleni to 8% in Buffalo City.
- All the Type D packages are below the affordability threshold, with the least affordable being in Ekurhuleni (8.9%), which has the most progressive tariff structure of all cities. The relative unaffordability of the Type D package in Ekurhuleni is a result of the massive increase in electricity tariffs at higher levels of consumption. Msunduzi still has the most affordable Type D package, which in 2015 was 5.7% and in 2017 was 5.2% of the benchmark income.
- The City of Cape Town is the only city where Types A and D service packages have become less affordable since 2015. The smallest increases in affordability for all service packages are also in Cape Town for the Type C and B packages.

Conclusion

The nine cities have adopted different tax and tariff strategies in response to different mixes of business and domestic customers, and of low-, middle- and high-income households. Despite this diversity, a number of general conclusions can be drawn from the analysis:

Most growth in municipal bills is from increased electricity and water costs

Between 2015 and 2017, increased electricity and water costs accounted for 73% of the growth in municipal bills, followed by sanitation costs, except for Type C packages, where property rates contributed more than sanitation to the increases. As the 2015 report pointed out, the growing cost of services is squeezing out municipal property rates in the service packages.

Slower real growth and increased affordability

Between 2015 and 2017, the average cost of municipal bills grew annually by 2.13% (Type A), 1.68% (Type B), 1.55% (Type C) and 1.19% (Type D), compared to 5.6%, 5.1%, 6.1% and 7% respectively for between 2010 and 2014. Based on the 10% of household income affordability threshold, in general municipal bills are becoming more affordable, although eight out of the nine Type A service packages remain unaffordable. In 2010, Type A service packages represented between 9.6% and 22.8% of household income, compared to between 9.5% and 15.3% in 2017, suggesting increasing affordability of municipal bills for lower income households. This has been the general trend for all service packages, with the exception of the City of Cape Town, where higher water prices have driven an increase. However, despite Nelson Mandela Bay facing similar pressures, the affordability of their service packages improved. The average increase in affordability ranged from between 0.3% for Type D packages and 2.1% for Type A packages. Between 2015 and 2017, only four of the service packages become less affordable, compared to 16 between 2010 and 2014.

Ekurhuleni has the most progressive tariff structures

In 2017, Ekurhuleni had the most progressive tariff structures of the nine cities, largely driven by the increased cost of the Type D service package, as a result of the city's electricity tariffs, which have a stepped structure.

Most cities have regressive tariff structures

In general, the structure of tariffs in cities is regressive when compared to household incomes, meaning that poorer households are paying relatively more for municipal services than wealthier households. The charging of a flat-rate connection and/or service fees are the main factors for bills being regressive. The three cities with the most regressive tariff structures are Johannesburg, Buffalo City and Tshwane, which charge uniform fixed charges for electricity (Johannesburg), flat rates for solid waste removal (Buffalo City) or declining stepped tariffs for sanitation (Tshwane). It is surprising that these types of charges still exist. Between 2010 and 2017, tariffs become more regressive in eThekwini and Mangaung across all service packages. In the City of Cape Town, the tariffs for Type A households become more regressive, but the tariffs for all other package types across all cities became more progressive.

To improve the progressiveness of bills, cities can eliminate basic levies or monthly connection fees, especially to lower income households; make use of inclining block tariffs that increase progressively especially for very high levels of consumption, and offer special service packages to indigents (that cap consumption). However, these seemingly simple changes do require greater administrative capacity to implement them.

In addition, as highlighted in the 2015 report, a national debate is needed on whether or not national and provincial governments are leaving sufficient tax room to enable local government to raise revenue through alternative means. This revenue is needed to fund those services that do not appear on the municipal bill, such as roads, public transport, environmental health and safety, storm water management and public parks, as well as the building and maintenance of infrastructure. National government controls any increases in bulk tariffs for electricity and water, which are driving most of the increases in municipal bills. There is thus a direct link between national government pushing up these bulk tariffs and the unaffordability of municipal bills.

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Data sources

a. Taxes and service charges: Tariff tables of the various financial years accessed through individual city websites (the characteristics of the standard packages of services are summarised in Table 12). Tariffs and charges were collected on the following standard assumptions and basis:
   i. These are residential tariffs to formal settlements.
   ii. They are the charges for taxes and for services consumed and therefore do not take household type into consideration, such as pensioners, child-headed and indigent households, except where this is built into the service charges themselves. They also do not take account of any additional rebates based on income levels of pensioners.
   iii. Water consumption: for direct metered connections to the Council's water reticulation system, with no flow restriction or water consumption management meter.
   iv. Waste: for a 240 litre bin removed once a week.
   v. Electricity: for residential customers with single-phase 230 V or multi-phase 400/230 V connections with a capacity of up to 80 A per phase. Types A and B are assumed to have pre-payment meters, while Types C and D are assumed to have conventional credit arrangements.

b. Data on income distribution per city: calculated from Census 2011 data

Annexure: Cost of service packages A–D 2010–2017

A Total cost of packages of services by city, 2010, 2015 and 2017 (2012 R values)

	JOHANNESBURG				CAPE TOWN				ETHEKWINI			
	A	B	C	D	A	B	C	D	A	B	C	D
2010	978	1 383	1 841	2 856	516	1 041	1 693	3 025	591	903	1 473	3 016
2015	1 089	1 543	2 105	3 494	791	1 361	2 225	4 184	901	1 231	2 040	3 950
2017	1 128	1 582	2 132	3 531	928	1 514	2 465	4 727	951	1 286	2 106	4 053
% ANNUAL INCREASE	7,4%	6,9%	7,6%	11,2%	34,1%	20,6%	20,7%	25,0%	26,9%	19,3%	19,6%	15,9%

	TSHWANE				EKURHULENI				NELSON MANDELA BAY			
	A	B	C	D	A	B	C	D	A	B	C	D
2010	943	1 247	1 841	3 119	550	766	1 388	2 591	762	999	1 538	2 616
2015	1 112	1 495	2 287	4 032	695	937	1 905	5 513	907	1 239	1 957	3 799
2017	1 126	1 514	2 283	4 020	754	1 011	1 991	5 614	919	1 267	2 023	3 693
% ANNUAL INCREASE	9,2%	10,2%	11,4%	13,5%	17,1%	14,8%	19,8%	47,2%	9,9%	12,6%	14,7%	18,8%

	MANGAUNG				BUFFALO CITY				MSUNDUZI			
	A	B	C	D	A	B	C	D	A	B	C	D
2010	618	982	1 803	3 472	885	1 142	1 778	2 888	1 230	1 564	1 796	2 742
2015	913	1 217	1 841	3 361	1 195	1 589	2 474	4 164	878	1 298	1 862	3 225
2017	885	1 205	1 876	3 466	1 213	1 617	2 517	4 198	907	1 302	1 896	3 306
% ANNUAL INCREASE	19,7%	10,8%	2,0%	–0,1%	17,0%	19,0%	19,0%	20,6%	–14,2%	–8,8%	2,7%	9,8%

	AVERAGE FOR THE CITIES			
	A	B	C	D
2010	786	1 114	1 684	2 925
2015	942	1 323	2 077	3 969
2017	979	1 366	2 143	4 068
% ANNUAL INCREASE	11,6%	10,7%	12,8%	17,9%

B Detailed composition of service charges by city and service package type in 2017 Rand values

2017 TYPE A	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	–	–	–	–	–	79	13	89	–	20
Electricity	895	460	851	599	423	396	552	722	426	591
Water	232	326	182	288	225	297	320	316	353	282
Sanitation	172	286	67	156	120	179	92	72	156	144
Solid waste removal	–	–	–	127	104	111	43	203	93	76
Other	–	–	–	127	–	–	–	–	–	14
VAT on services	182	150	154	181	122	149	143	196	147	158
TOTAL	1 481	1 222	1 254	1 478	994	1 211	1 163	1 598	1 195	1 288

2017 TYPE B	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	31	28	138	119	76	218	114	222	247	132
Electricity	1 005	846	1 011	768	528	550	712	893	533	761
Water	332	518	248	394	316	361	415	436	457	386
Sanitation	335	368	119	76	218	114	222	247	156	206
Solid waste removal	118	60	–	127	104	111	57	203	93	97
Other	–	–	–	127	–	–	–	–	–	14
VAT on services	255	255	208	244	163	205	195	262	211	222
TOTAL	2 076	2 073	1 695	1 988	1 331	1 669	1 585	2 131	1 716	1 807

2017 TYPE C	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	184	168	402	346	267	450	282	444	509	339
Electricity	1 386	1 426	1 492	1 295	1 316	1 052	1 193	1 407	853	1 269
Water	432	709	337	512	408	455	509	556	560	498
Sanitation	335	453	346	267	450	282	444	509	156	360
Solid waste removal	118	90	81	127	144	111	57	203	93	114
Other	–	–	–	127	–	–	–	–	–	14
VAT on services	344	398	341	368	322	327	303	407	307	346
TOTAL	2 798	3 244	2 775	2 997	2 623	2 664	2 466	3 317	2 498	2 820

2017 TYPE D	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	490	448	931	802	649	914	619	888	1 034	753
Electricity	2 322	2 866	2 613	2 572	4 833	2 270	2 313	2 607	1 599	2 666
Water	724	1 401	730	768	636	614	721	856	920	819
Sanitation	335	624	802	649	914	619	888	1 034	156	669
Solid waste removal	195	119	144	127	161	111	100	203	93	139
Other	–	–	–	127	–	–	–	–	–	14
VAT on services	569	764	656	648	908	597	560	679	535	657
TOTAL	4 635	6 222	5 341	5 277	7 394	4 864	4 556	5 533	4 357	5 353

C. Percentage composition of service charges by city and service package type, 2017

2017 TYPE A	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	0%	0%	0%	0%	0%	7%	1%	6%	0%	2%
Electricity	60%	38%	68%	41%	43%	33%	47%	45%	36%	46%
Water	16%	27%	15%	19%	23%	25%	28%	20%	30%	22%
Sanitation	12%	23%	5%	11%	12%	15%	8%	5%	13%	11%
Solid waste removal	0%	0%	0%	9%	10%	9%	4%	13%	8%	6%
Other	0%	0%	0%	9%	0%	0%	0%	0%	0%	1%
VAT on services	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

2017 TYPE B	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	2%	2%	11%	8%	8%	18%	10%	14%	21%	10%
Electricity	68%	69%	81%	52%	53%	45%	61%	56%	45%	59%
Water	22%	42%	20%	27%	32%	30%	36%	27%	38%	30%
Sanitation	23%	30%	9%	5%	22%	9%	19%	15%	13%	16%
Solid waste removal	8%	5%	0%	9%	10%	9%	5%	13%	8%	8%
Other	0%	0%	0%	9%	0%	0%	0%	0%	0%	1%
VAT on services	17%	21%	17%	17%	16%	17%	17%	16%	18%	17%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

2017 TYPE C	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	12%	14%	32%	23%	27%	37%	24%	28%	43%	26%
Electricity	94%	117%	119%	88%	132%	87%	103%	88%	71%	98%
Water	29%	58%	27%	35%	41%	38%	44%	35%	47%	39%
Sanitation	23%	37%	28%	18%	45%	23%	38%	32%	13%	28%
Solid waste removal	8%	7%	6%	9%	15%	9%	5%	13%	8%	9%
Other	0%	0%	0%	9%	0%	0%	0%	0%	0%	1%
VAT on services	23%	33%	27%	25%	32%	27%	26%	25%	26%	27%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

2017 TYPE D	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	MSU	AVERAGE
Property Taxes	33%	37%	74%	54%	65%	75%	53%	56%	87%	58%
Electricity	157%	235%	208%	174%	486%	187%	199%	163%	134%	207%
Water	49%	115%	58%	52%	64%	51%	62%	54%	77%	64%
Sanitation	23%	51%	64%	44%	92%	51%	76%	65%	13%	52%
Solid waste removal	13%	10%	11%	9%	16%	9%	9%	13%	8%	11%
Other	0%	0%	0%	9%	0%	0%	0%	0%	0%	1%
VAT on services	38%	63%	52%	44%	91%	49%	48%	43%	45%	51%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

INNOVATION WITH BLOCKCHAIN [G]

What is Blockchain?

Blockchain is the technology that underpins Bitcoin and other cryptocurrencies. It is a database whose data is stored on multiple computers belonging to a network. This is fundamentally different to the current databases used by South Africa metros that are centralised and stored on a digital mainframe. For instance, all metros have a database of properties on their valuation roll, which includes information about the owner, the address of the property and its value. The live database is a central database stored in one place, although metros make back-up copies of it.

A blockchain is a data file with a collection of digital fingerprints representing digital files, which are duplicated thousands of times across a network of computers and regularly updated. Information held on a blockchain is shared in a database that is reconciled regularly. Figure 15 shows the process for making a transaction on a blockchain – a transaction could be something as simple as paying for electricity. The request is broadcast to the network of nodes who validate the payment, and a record of the transaction is stored in a block with other transactions.

Blockchains are described as distributed ledgers because the databases are stored in multiple locations (or nodes). Each node has the same copy of the database, and transactions cannot be changed without getting the permission of all nodes where the data is stored. This makes the database unalterable in practice, as hackers would need to hack thousands (or even millions) of computers on which the data is stored. In contrast, hackers seeking to change the data in the metro property database would only have to target one database.

Blockchain security uses encryption technology and "keys", which are long, randomly generated strings of numbers. Using sophisticated algorithms, blockchains create these keys and signatures to control who can do what inside the shared ledger. This means that no single party has the power to tamper with the records, which ensures data integrity. Smart contracts, which allow data to be shared or replicated under specific conditions, makes the promise of blockchain technology a possibility. A smart contract contains logic that operates on the data in all parts of the shared ledger. For instance, in Figure 16, User 1 opts in for sharing information, whereas User 2 opts out. This means that the institution, which could be a city department, will be able to see information about User 1 but not about User 2. Smart contracts can perform a range of functions and allow people to have security regarding their data.

FIGURE 15: Transaction process on a blockchain

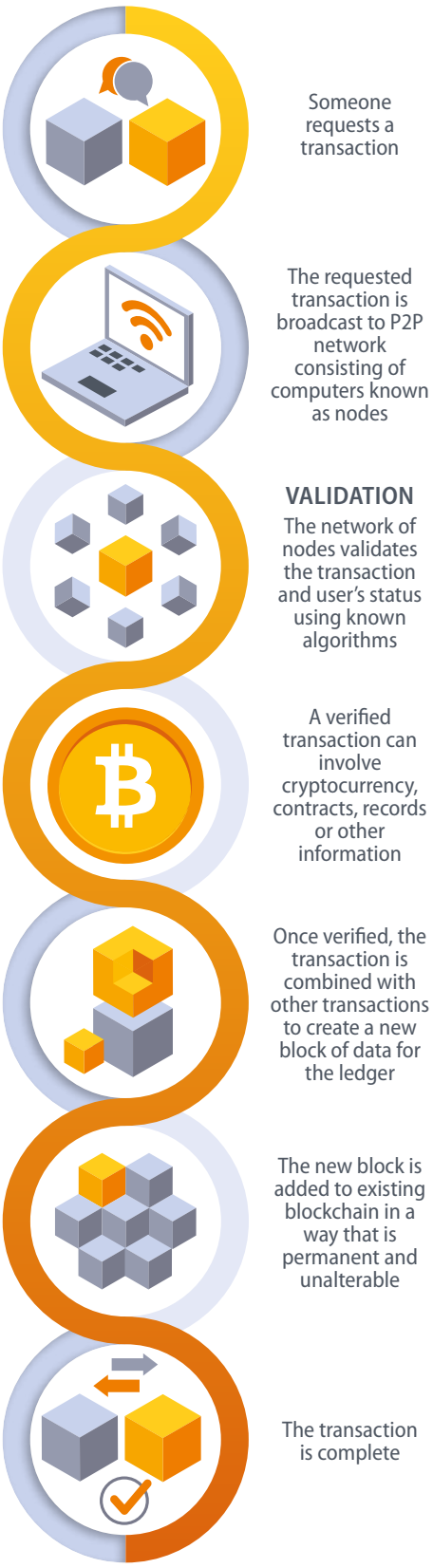
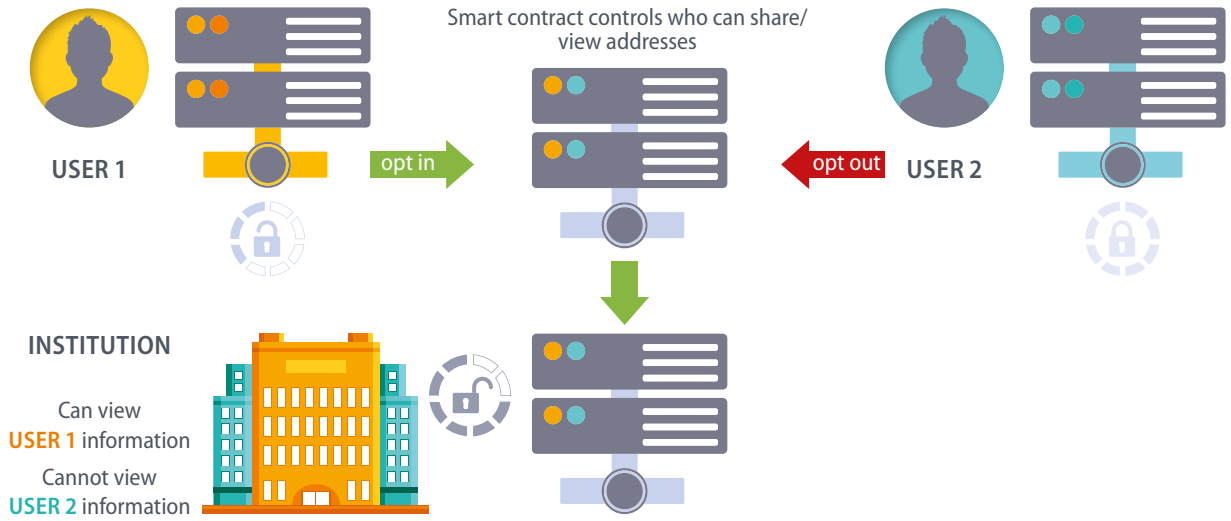


FIGURE 16: Transaction process on a blockchain



Possible Applications for South African Cities

Blockchain technology has the potential to transform South African cities and, in the process, make them more transparent and efficient. Some of the possible applications and consequences are described below.

Back-office financial functions

Blockchain technology can be used to automate back-office financial functions, such as receiving and settling property rates and utility bills. A system of smart contracts could also replace all the ledgers in a city, which would ensure automated, up-to-date financial reporting and complete compliance with Municipal Standard Chart of Accounts (mSCOA) reporting standards – the mSCOA provides a framework for standardising municipal accounting practices and reporting across municipalities. As a result, reports would be more accurate and standardised across metros.

Procurement

Cities could move a number of procurement processes onto the blockchain and create rules that ensure contractors meet specific conditions and that the correct process is followed. For instance, rules that would not allow some transactions to be made before other transactions have been made, so that administrators could approve specific steps in the process. Particular rules can be enforced from a central or head office but allow for decentralised procurement and contract management. The result would be massive efficiencies and faster decision-making at ground level, as well as exposure of corrupt dealings because everything is recorded in the blockchain database.

Land registration

Many steps in city housing processes could be performed on the blockchain. Since events, such as when a person registered on the waiting list, are time-stamped, corrupt officials would not be able to move people up the waiting list. Currently, plans are in place to use blockchain in land transfer processes in Ghana, Sweden and Georgia. The advantage for a city is that information and agreements are paperless and can be retrieved more efficiently, and residents will not be able to dispute agreements that they entered into previously.

Residents IDs

Like a person's ID number, residents can be allocated a "user key" that is a unique identifier for all their interactions with a city. From the time a person starts using blockchain technology, their history will be stored on the blockchain. Therefore, to evaluate an

application for a specific service, the city could require a person to allow access to specific aspects of their history. In this paperless environment, a resident will be able to select which information is shared with the city and be confident that any information not selected will remain private.

Voting

Estonia's e-residency programme uses blockchain technology to create digital identifications for all its residents. In the most recent general elections, 30% of voters cast their votes online using blockchain technology. This removes the need for voting stations and other costly resources required for elections. Cities could use blockchain technology to hold city or ward referendums efficiently and at low cost, on issues, such as approving sections of (or the entire) integrated development plan.

Issues to Consider

Public or private blockchains?

A technical issue is whether cities use a public or private blockchain. Anyone can join and participate in a public blockchain, whereas participants are invited to join a private blockchain.

Public blockchains ensure decentralisation, independent security and inter-operability (ability to exchange information between different systems) and are more likely to be trusted than private blockchains. However, transactions on the public blockchain take longer to settle. Private blockchains are controlled by the network starter and/or rules governing the blockchain, which makes them less trustworthy, but they are more efficient, as transactions are faster.

The right partners

Cities will need to identify the right and trusted partners who will work in the interests of the city and develop functional applications that create solutions for cities. The right skills and expertise are needed, as building a platform for recording transactions is very different from ensuring transactions comply with both mSCOA reporting and procurement processes.

Education

Cities will need to raise awareness and educate residents, city officials and elected representatives about blockchain technology. For cities to experience the benefits of using blockchain technology, a critical mass of users is needed, which in theory is possible because the public can use blockchain applications on all smart phones. In the interim, cities will have to put in place a strategy to manage the transition from paper to blockchain. For instance, how to evaluate a bidding process when only half the bidders are using blockchain? Nevertheless, the cost savings through efficiencies and increased public trust due to the use of blockchain technology will be worth the effort of overcoming implementation challenges.

PART

B

THE CASE FOR FISCAL TRANSFORMATION

CHAPTER 3

FINANCING SPATIAL TRANSFORMATION

Key Messages

South Africa's national urban agenda prioritises urban densification, but the municipal revenue model, which is dependent on property rates, incentivises urban sprawl.

The gap between city finance (core revenue model) and spatial transformation needs to be bridged, to ensure that the desired spatial objectives are incentivised and built into the day-to-day running of cities.

While property rates are a good local tax and should remain, an alternative revenue model is needed that rewards cities financially for developing brownfield sites and restricting peripheral greenfield development.

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DBSA Development Bank of Southern Africa

AFD

South Africa's urban agenda, expressed through the Integrated Urban Development Framework (IUDF), is spatial transformation. This "New Deal" for South African cities seeks a "sustainable growth model of *compact, connected* and *coordinated* cities and towns" (DCOG, 2016: 7). Compact growth is a clear policy choice of South Africa (ibid; FFC, 2011; SACN, 2016), as urban sprawl has consequences for the:

- *environment*: the loss of valuable open space and bio-diversity when land is developed (Yusuf & Allopi, 2010);
- *city finances*: servicing ever-expanding urban areas comes at a high cost to municipalities (WCPG, 2013; FFC, 2011); and
- *consumers*: households located far from opportunities have to pay high transport costs, and the increased travel-related carbon emissions further compound the environmental issue (ibid).

Although the policy environment opposes sprawl and promotes compaction, the dominant development is one of sprawl. There is a clear link between the development of land and city revenue, as articulated in the IUDF's Policy lever 5, "Efficient land governance and management", which envisages "cities and towns that grow through investments in land and property, providing income for municipalities, which allows further investments in infrastructure and services, resulting in inclusive, multi-functional urban spaces" (ibid: 75). Achieving this objective is difficult given the current "revenue-raising model for cities, which is heavily reliant on property rates" (SACN, 2018: 10). As much of their revenue comes from ratepayers, municipalities "have no incentive to use valuable land for poor people" who cannot afford to pay high rates (ibid: 3). Therefore, cities, face the contradiction of having to strengthen land values and being expected to provide well-located land for the poor in order to achieve spatial transformation. Further investigation is needed into land development models and their revenue generation.

The main own-revenue sources for cities are property rates and electricity charges (see Chapter 1). Property rates provide cities with revenue autonomy, allowing them to go about their daily business and to raise finances off their balance sheet.[18] As cities come under pressure to find additional revenues and maximise own revenues, property rates represent a leverageable revenue tool. One way in which municipalities can increase their revenue from land is by changing the zoning, which results in changing the cent-in-the-rand property rates on the land. Property rates are, therefore, inextricably linked to spatial development (Slack, 2002), which may explain why cities are not achieving compact growth.

This chapter argues that a municipal revenue model dependent on property rates incentivises urban sprawl. The chapter looks at the impact on short-term municipal revenue of greenfield rezoning and development compared to brownfield development. Although the focus is mainly on formal (i.e. involving the private sector) development processes, the development of informal settlements and RDP settlements also contributes to urban sprawl and affects city finances. However, such developments seldom provide rates revenue for the municipalities, as they are typically occupied by poorer households that benefit from indigent policies. After explaining why local governments favour property rates, the chapter gives an overview of property rates in South African cities and the relationship between property rates and sprawl. Scenarios are used to explore the implications of rezoning agricultural land to urban land uses, both theoretically and through the case study of Ekurhuleni. The chapter presents three interlocking issues that need to be considered in developing an alternative revenue logic and concludes with recommendations and suggestions for further research.

In this chapter, "sprawl" refers to the conversion of peripheral[19] undeveloped (mainly agriculturally zoned, but also other natural or recreational uses) land to either residential or commercial uses. What constitutes peripheral land is not always clear in South Africa, but here it means land that is on the urban fringe.[20]

This chapter is relevant because the national urban agenda and cities have a clear compact development intent. Should there be an indication that property rates do in fact contribute towards sprawl, then cities, National Treasury, the Department of Human Settlements and others need to be cognisant of such implications, so that appropriate steps can be put in place to address this contradiction between policy intent and the incentives created by making property rates the core source of local government revenue.

Why Local Governments Favour Property Rates

Property taxes are widely identified as being ideal taxes for local government and are seen, by some, as the "perfect local tax" (Daud et al., 2013: 6). They are "a mainstay at the sub-national level, especially for local governments" (Bahl & Martinez-Velazquez, 2007: 1). In low- and middle-income countries, property taxes are regarded as an excellent local government tax for four main reasons.

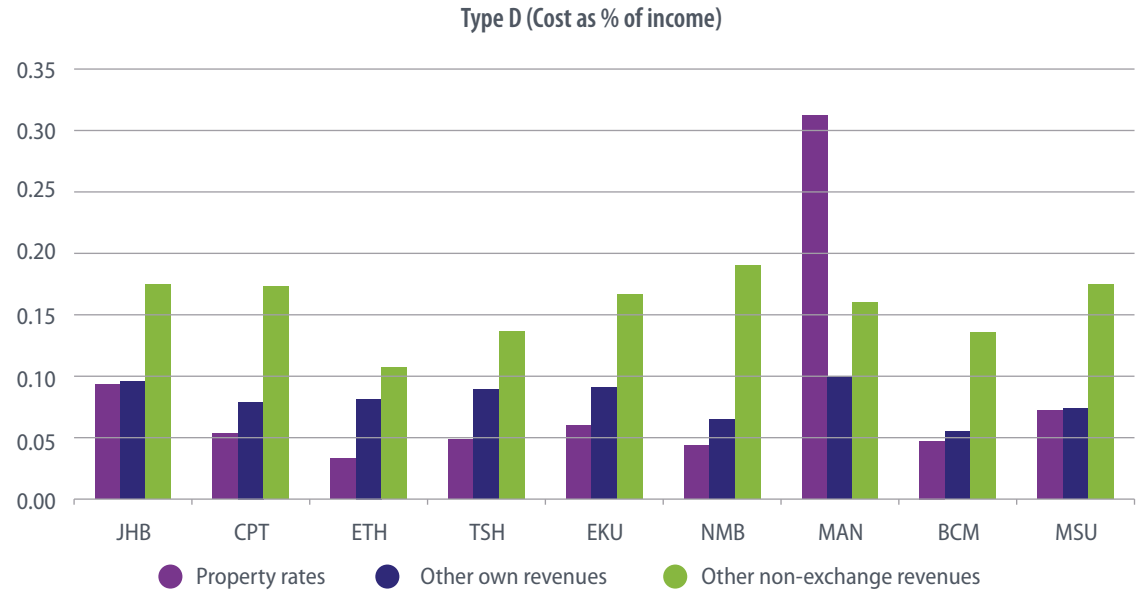
1. **Their enormous untapped revenue-generating potential**
   Revenue from property taxes represents on average just 0.6% of GDP in developing countries compared to 2.2% in OECD countries (Bahl, 2009). In sub-Saharan Africa, South Africa is the only country where property taxes amount to more than 1% of GDP (McCluskey et al., 2017).

2. **Their stability**
   Property rates represent a stable revenue source for cities because they are levied on immobile assets, which are less sensitive to the business cycle than most other taxes (Daud et al., 2013; Bird & Slack, 2002; Bahl & Martinez-Velazquez, 2007). They are also difficult to avoid, as the asset is visible. Furthermore, property values are assessed relatively infrequently and remain constant during the periods between evaluations. Figure 17 illustrates this stability, with property rates having the lowest standard deviation of all city revenue sources.

3. **Their relatively non-distortionary nature**
   Compared to other taxes, property taxes have a negligible distortionary effect on business and consumer decisions (McCluskey et al., 2017; Bahl, 2009), and taxes on immovable, particularly residential, property are the "least distortive tax instrument in terms of reducing long-run GDP per capita" (Norregaard, 2013: 14).

4. **Their inherent fairness**
   Property taxes represent, to some extent, a benefit charge for access to local government services, and so property values will generally be higher in areas with better services (Bahl & Martinez-Velazquez, 2007) – they are a form of land value capture.[21] Taxpayers are generally receptive to property rates, which they consider to be fair insofar as they assess the value of their own properties as proportional to the benefits that accrue from this expenditure.

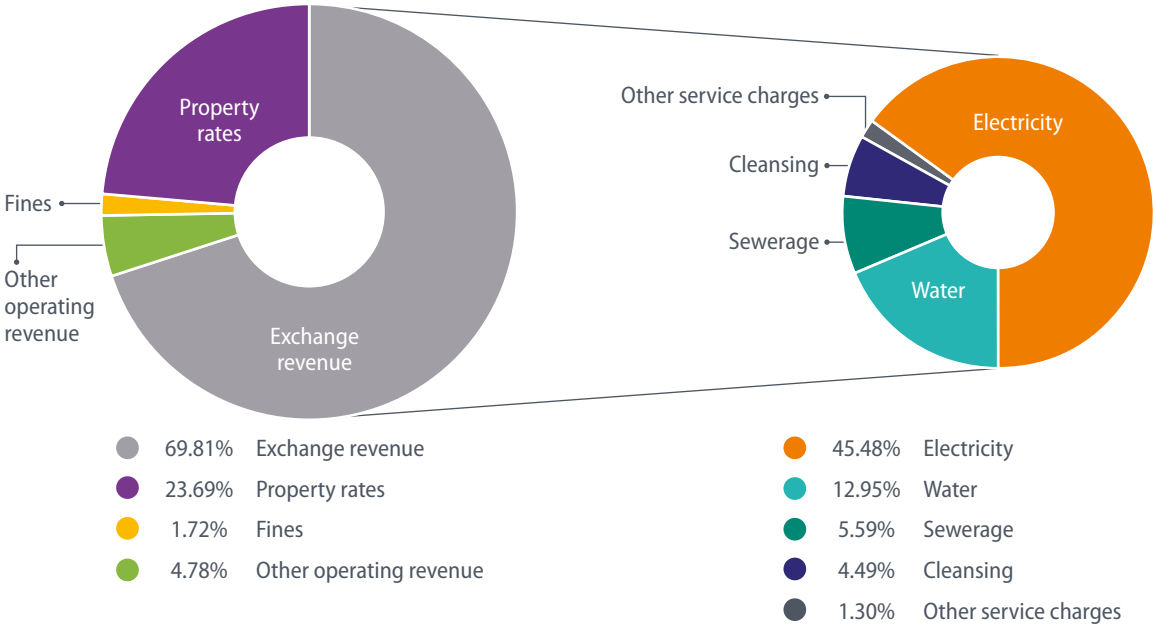
FIGURE 17: Standard deviation in city revenue sources (2007/08–2015/16)



Note: Mangaung is an outlier because in 2013/14 a new municipal valuation roll was implemented, resulting in revenue from property rates doubling in a single year. If this is excluded from the assessment, property rates in Mangaung would have the lowest standard deviation.

Property rates can also be designed to be strongly progressive, especially in countries with high levels of inequality, such as South Africa. This is because the transparency of property taxes makes it easier to remove the tax burden on the poor at local level, as relatively low-valued properties can be exempt from the tax. Property rates can also generate revenue for a city's redistributive agenda. As Figure 18 shows, most city own revenues come from exchange transactions (electricity, water, sanitation and cleaning services), which generally have to be used for providing these services in the spatial areas from which they were received, leaving little room for redistribution. In contrast, property taxes are more discretionary and allow cities more freedom in allocating expenditure – cities can use these taxes in other areas, as part of their redistributive agendas.

FIGURE 18: Average breakdown of cities' own revenues (2015/16)

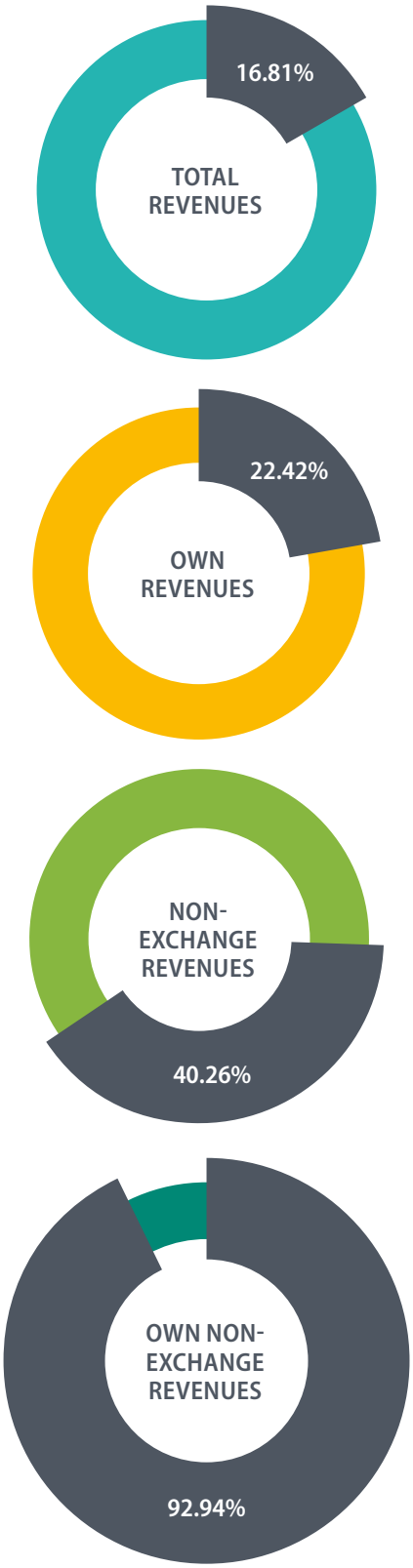


Property Rates in South African Cities

Section 229(2) of the South African Constitution enshrines the power for municipalities to impose rates on properties within their boundaries. This section also dictates that this power "may be regulated by national legislation". Under this proviso, national government enacted the Municipal Property Rates Act (MPRA), No. 6 of 2004, amended in 2014, to govern the administration and implementation of property rates across municipalities. The MPRA states that property rates play a critical role in "promoting the economic and financial viability of municipalities" and "providing local government with access to a sufficient and buoyant source of revenue". It acknowledges that "income derived from property rates is a critical source of revenue for municipalities to achieve their constitutional objectives". The Act provides a framework for municipalities to impose rates on property, which is a proportional rate based on the rand value of a property, and to develop policies on the levying of such rates. This framework allows certain property types to be excluded from rating in the national interest and provides for a system of exemptions, reductions and rebates in the interests of redistribution, as well as the ability to levy different cent-in-the-rand rates for different categories of property.

In the case of metropolitan municipalities (metros), property rates contribute, on average, 16.8% of their total revenues and 22.4% of their own revenues, the autonomously mobilised revenue base that is crucial for the effective operation of a local government. Property rates are *the* most important discretionary revenue source for cities (SACN, 2015), contributing on average 40.3% of metros' non-exchange revenues,[22] which include various transfers from national government that are often conditional in nature (Figure 19). True fiscal decentralisation relies upon both discretion and autonomy in the raising and spending of revenues. Non-exchange own revenues are truly autonomous and discretionary, as they are generated by cities themselves and are not ringfenced in any form. Property rates contribute 92.9% of metros' non-exchange own revenues, making them arguably the most important revenue source for cities in terms of local governance.

FIGURE 19: Proportional contribution of property rates (grey) to revenues (2015/16)



Property rates are considered particularly crucial to cities because they are the revenue with the greatest upward potential in the current revenue model (SACN, 2015). However, a key disadvantage of property rates is they are not growth elastic,[23] and property valuation is laborious, time-consuming and infrequent. This means that growth in revenues from property rates is generally slower than growth in revenues from other tax bases (Alm et al., 2012). The MPRA requires municipalities to reassess property values every five years, although it does include a provision to assess annually.

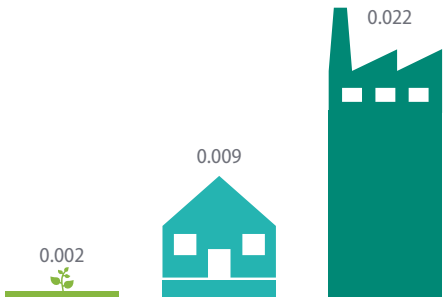
Re-evaluations happen so infrequently because administering property taxes is difficult and costly, which is also why central governments are generally happy to devolve this function to local governments. As a result, while the property values may grow, tax revenues remain largely static in the years between re-evaluations. However, in an environment of fiscal uncertainty and fluctuating demand for services, revenue growth is a short-term concern for South African cities. Therefore, cities are often forced to actively seek year-to-year growth in revenues through their most reliable revenue source – property rates. Municipalities can increase the revenues received from property rates through several mechanisms:

- undergo a complete rates base determination process,
- increase the cent in the rand[24] charged per property type,
- re-evaluate the property register,
- limit the use and impact of valuation thresholds,
- improve collection rates to capture unpaid bills, and
- change the composition of the property rates base through rezoning decisions.

To assess their attractiveness and pitfalls in the South African city context, these mechanisms are tested against the following criteria:[25] revenue-generating potential, cost implications, complexity and political/public acceptability (Table 29).

As Table 29 shows, the easiest way for municipalities to increase their revenue from property rates is to rezone properties[26] and land parcels to a category with a higher cent-in-the-rand rate.[27] The MPRA lists the property categories for which municipalities must determine a cent-in-the-rand rate, from which property rates are determined and levied. Categories include residential, commercial and agricultural properties. Figure 20 shows the cent-in-the-rand rate averaged across all metropolitan municipalities for these three categories. The rates range from 0.002 for agricultural, to 0.009 for residential and 0.022 for commercial properties. The cent-in-the-rand rate for agricultural property is equal to 24% of the rate on residential properties, and directives from the Ministry of Cooperative Governance and Traditional Affairs (COGTA) prohibit this ratio from exceeding 25%. The rate for commercial properties is 247% of the rate for residential properties and over 1000% of the rate for agricultural properties.

FIGURE 20: Comparison of cent-in-the-rand rates for agricultural, residential and commercial properties (2016/17)



Brief history of property taxes

Property taxes exist in one form or another in all but 11 of the world's countries. These 11 countries[28] are either wealthy micro states, gulf states or island states, and mostly generate revenues through taxing property sales. Therefore, property taxes are considered an inherent part of property ownership, although their function and application has changed over time and is applied differently across the world. The earliest known records of property taxes were in Ancient Mesopotamia, where under the *bala* taxation system, all land owners paid a tax based on the agricultural productivity of their land. These taxes were used to fund expenditure on infrastructure, such as roads, irrigation, and defence for the city-states (Carlson, 2005) – infrastructure that citizens would benefit from. Similar productivity-based property taxes were common in the Ancient Egyptian, Greek and Roman empires (ibid). This trend of taxes based on agricultural productivity continued into Medieval Europe, when the contemporary system of property taxation started to evolve. In 11th century England, the Domesday Book recorded property ownership and values, which were used to calculate taxes and assessed periodically. In 1689, the English Bill of Rights made specific provision for: land taxes (in lieu of personal property taxes that were difficult to administer), parliamentary approval for the implementation of taxation, and the administration and collection of tax revenues at a local level. This legal framework for the structure, implementation and administration of property taxes was subsequently exported around the world, including to South Africa, with the advent of colonialism.

Today, property taxes are increasingly a means for generating revenue at local government level. Over the past two decades, this has been driven by the move, particularly among developing countries, towards decentralised government systems. Shifting governments closer to their electorate can improve the effectiveness of institutions, the efficiency of the public sector and socio-economic welfare (Daud et al., 2013). In other words, decentralisation results in governments that are more accountable and responsive to the needs of citizens. However, the ability to respond to these needs is largely determined by local governments' control over revenues, as greater accountability that comes from decentralisation "can only be assured when sub-national governments have an adequate level of autonomy and discretion in raising their own revenue" (Bahl & Martinez-Vazquez, 2007: 1). This autonomy in own-revenue raising is important for efficient decentralised governance, but the majority of broad-based taxes, such as income tax and VAT, are far more efficiently administered at central government level (Daud et al., 2013).

In most countries (including South Africa) a portion of these taxes are transferred from central to local government, although many of these transfers are conditional and do not fit the own revenue-generating autonomy requirement. In an effort to ensure greater fiscal autonomy, many cities are allocated local revenue-raising mechanisms beyond only property taxes.

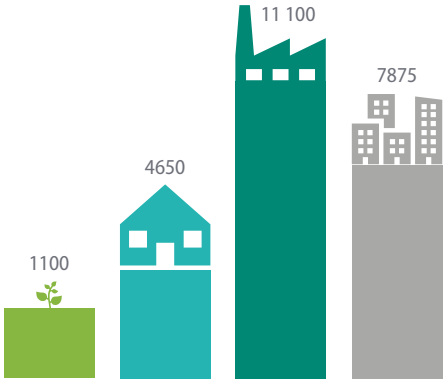
TABLE 29: Assessment of mechanisms for increasing property rates in South African cities

	MECHANISM FOR INCREASE	REVENUE GENERATION	COST IMPLICATIONS	COMPLEXITY	POLITICAL/ PUBLIC ACCEPTABILITY
Undergo a rates base determination	All properties in the city will be covered, so full value is captured through rates	Limited to those properties not captured in current rates base	Assessing all properties will be very costly	Assessing all properties will be laborious and lengthy	Unlikely to face undue resistance
Increase the cent in the rand charged	Rates charged per property will increase	Unlimited	Negligible costs associated with legislative processes	Lengthy legislative process and bureaucracy	Guaranteed widespread public resistance
Re-evaluate all properties in the city	More frequent re-evaluations will reduce the lag-time between value growth and growth in rates received	Limited by number of properties and growth in property values	Regular evaluation of all properties will be very costly	Regular evaluation of all properties will be very time-consuming.	Likely to be moderate resistance from the public to regular rates increases
Reduce/ remove thresholds	Reduction in or removal of rebates will broaden base of taxable properties	Limited to number of properties receiving rebates	Negligible costs associated with legislative processes	Requires overhaul of MPRA, so lengthy legislative processes	Likely resistance from poor/ indigent households. Contrary to policy/ progressive taxation regime
Improve collection rates	Higher rates of collection will increase value captured	Limited to current properties for which rates are not collected	Negligible costs associated with increased labour	Increased personnel and responsibilities	Unlikely to face undue resistance
Rezone	Property mix will include a greater proportion of properties with higher cent-in-the-rand rates	Limited only by how much non-urban land exists within municipal boundaries	Costs of rezoning predominantly for applicants or developers	Administrative burden borne largely by applicants or developers	Demand-driven process but open to public comment[#]

favourable neutral unfavourable

[#]Rezoning applications are open to public comment and grounds for resistance. In greenfield developments, public comment and resistance are far less likely because these relatively large agricultural properties usually have few neighbouring properties and are sometimes surrounded by vacant land.

FIGURE 21: Comparison of rates revenue according to different zonings



Across all municipalities, agricultural properties are taxed at a far lower rate than typical urban properties (residential and commercial). Therefore, the rezoning of land and properties from agricultural to urban land use will naturally result in increased rates revenue for municipalities. Figure 21 shows the impact of different zonings on a property whose value does not change. If a parcel of land is zoned for agriculture, the average property rates would be R1100. Rezoning this parcel of land to typical urban uses would lead to property rates increasing to R4650 (if residential use), R7875 (if mixed residential/commercial use) and R11,100 (if commercial use).

The Relationship between Property Rates and Sprawl in South Africa

The previous section shows clearly the revenue potential of rezoning low-rated (typically agricultural) land to residential, commercial or mixed use. As low-rated land is usually found on the urban fringe, this suggests that an underlying financial logic is driving outward urban expansion. If cities want to grow their rates base, more rateable and higher value properties must come onto the valuation roll (SACN and Urban Landmark, 2009). The way in which property taxes work means that municipalities can increase their revenues by approving the development of undeveloped land. This relationship between spatial outcomes and property tax is not unique to South Africa, and what is becoming increasingly clear is that property tax (which is considered a good local tax) is influencing the outward expansion of cities (Slack, 2002; Brueckner & Kim, 2003; Song & Zenou, 2006; Ermini & Santolini, 2017), especially when property rates feature prominently in a municipal revenue profile (Slack, 2002).

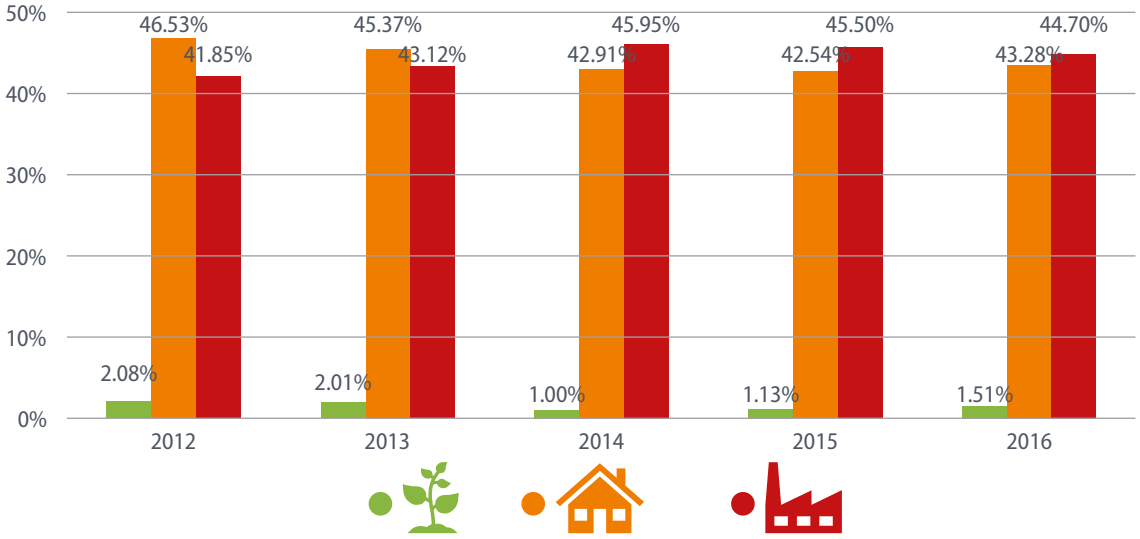
This section explores the correlation between property rates and urban sprawl, arguing that the need for short-term revenue drives municipalities to promote sprawling development.[29] This development will often take the form of greenfield development, which is the development of a site that has not been built on before (often rural areas, including the rural-urban fringe), rather than brownfield development, which is the redevelopment of a site that has been built on before (normally associated with inner city areas). Greenfield development is a core symptom of sprawl, while brownfield development is indicative of densification in the urban core.

The logic underpinning this hypothesis is that municipalities seeking revenue injections will be inclined to allow, or even actively promote, development that increases revenue from property rates.

The contribution of core property types to total property rates revenue

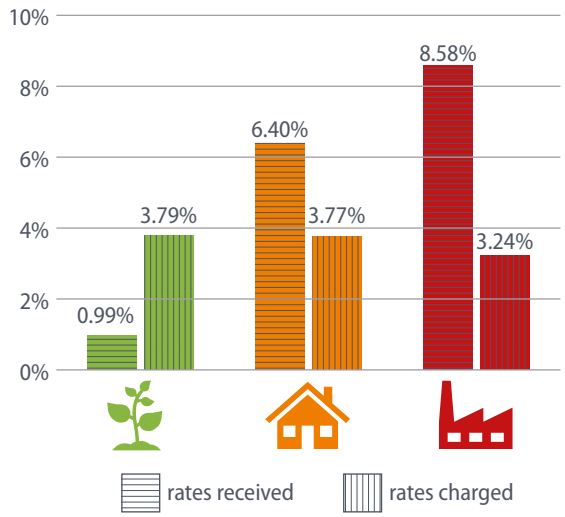
Over the past five years, the proportional contributions of agricultural, commercial and residential properties to total rates revenue appear to have remained relatively flat (Figure 22). However, the magnitude of the changes suggests a general decrease in agricultural property. In 2016, agricultural property contributed 27.4% less to total rates revenue than in 2011. Residential property contributed 4.4% less, while commercial property contributed 4% more to total rates revenue. This sharp drop in the contribution of agricultural property may be evidence of a shift in the property patterns across the metros.

FIGURE 22: Average contribution of revenues from property types to total rates revenue for all metros (2011/12–2015/16)



However, this data does not show the growth in rates received per property type. As Figure 23 illustrates, across the metros, rates received for residential and especially commercial properties have grown much faster than rates for agricultural properties. Importantly, the average growth in rates received from residential and commercial properties has outstripped growth in rates charged on such properties. In contrast, the growth in rates received on agricultural properties has been slower than the growth in rates charged – and has been negative in three of the cities.

FIGURE 23: Average compound annual growth in rates received and rates charged on agricultural, residential and industrial properties (2010/11–2015/16)



Given that property re-evaluations occur relatively infrequently, the expectation is that, all other things being equal, the growth rates would be about the same for rates received and for rates charged. This discrepancy in growth suggests that the tax base is evolving, with commercial and residential properties making up an increasing proportion of the property tax base, while agricultural properties are diminishing. It is further circumstantial evidence of a general shift in the distribution of properties, away from agricultural spaces and towards more urban spaces through urban sprawl.

The maps in Figure 24 provide empirical evidence of this sprawl, highlighting the growth in urban land cover that occurred in South Africa's six largest metros between 1990 and 2014. This growth is particularly noticeable in the three Gauteng metros – Johannesburg, Ekurhuleni and Tshwane, where urban land cover grew by 11.22%, 12.84% and 20.87% respectively. Most growth seems to be on the periphery of existing urban areas, which is typically indicative of urban sprawl.

FIGURE 24: Urban land coverage in six largest metros in 1990 (grey) and 2014 (grey and red)

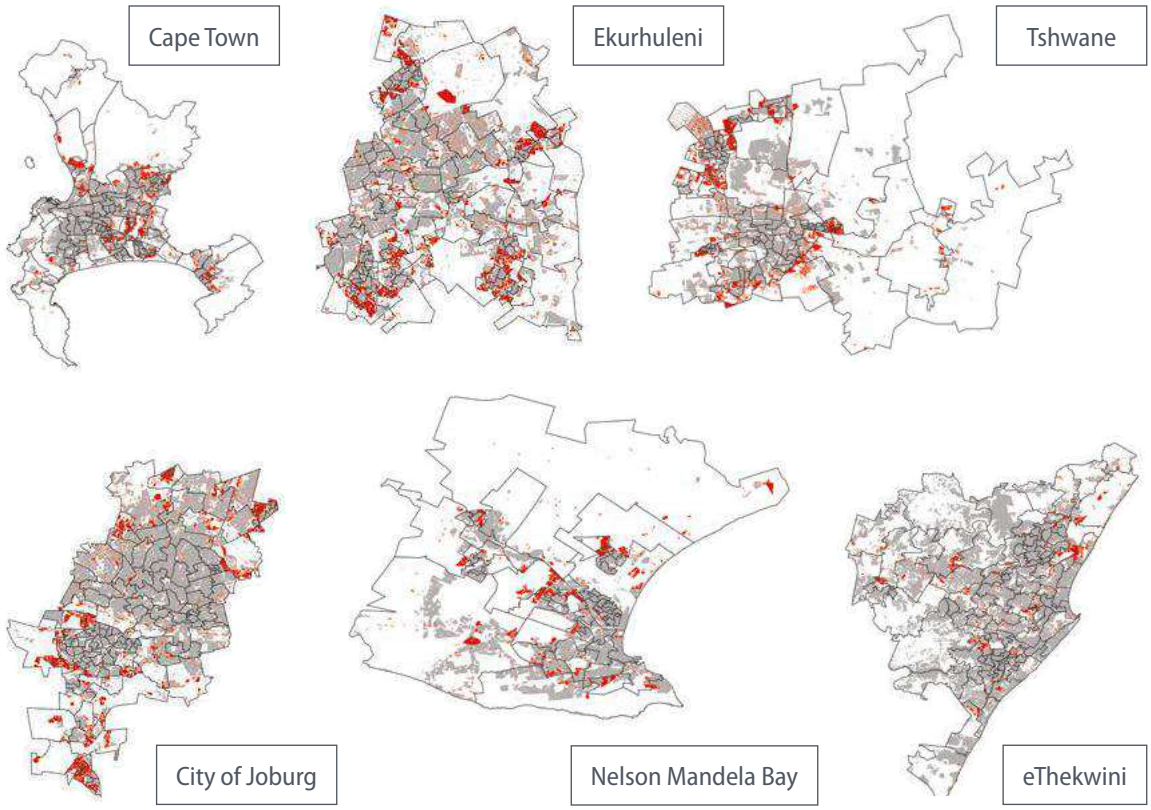
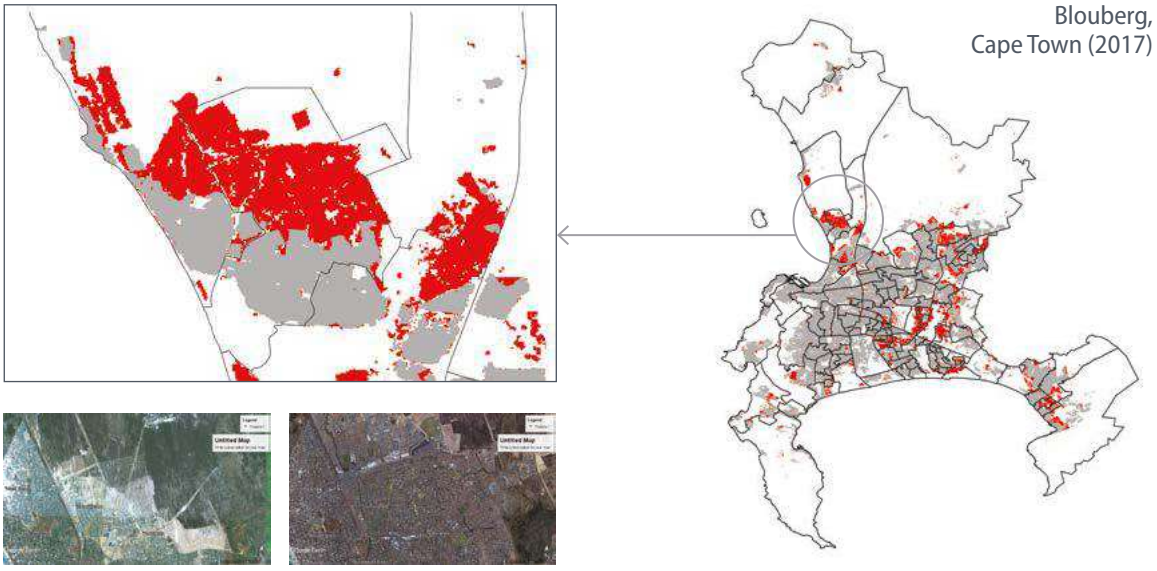
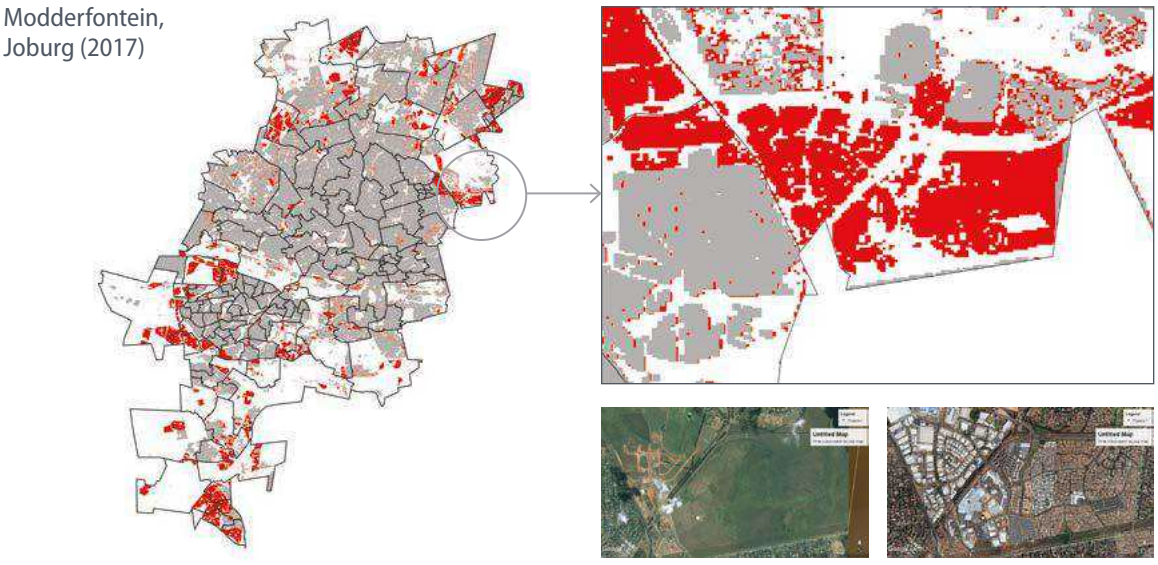


Figure 25 provides specific evidence of greenfield developments in two areas: Blouberg in the City of Cape Town and Modderfontein in the City of Johannesburg. These satellite images, and their accompanying maps, further illustrate the sprawl dynamic alluded to in Figure 24.

FIGURE 25: Satellite images and maps of greenfield developments in Blouberg, Cape Town (top) and Modderfontein, Joburg (bottom)



Source: Google Earth

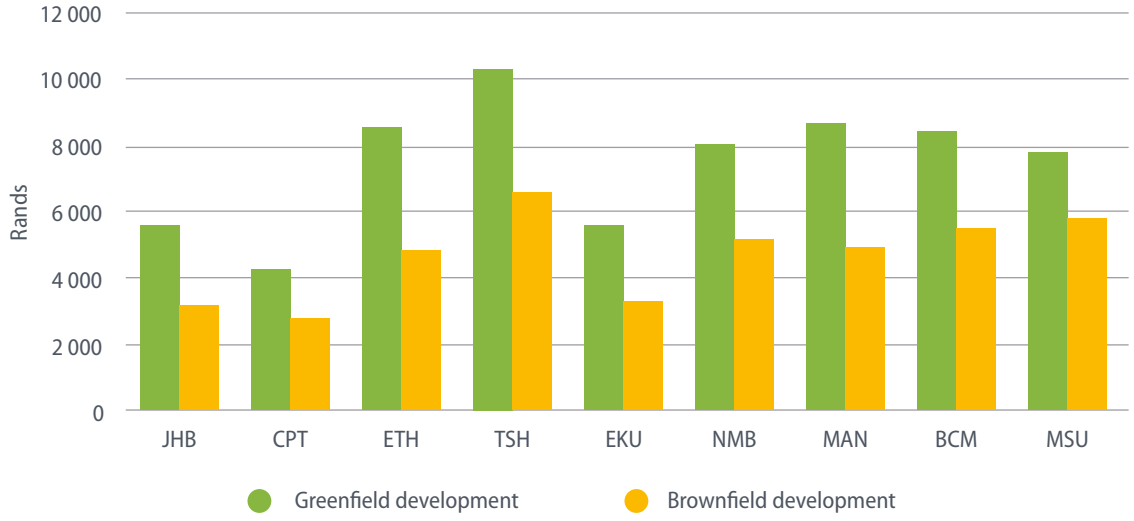


Source: Google Earth

Implications of greenfield vs. brownfield development on per-property revenue

As mentioned earlier, greenfield developments are associated with dispersed cities and urban sprawl, while brownfield developments are associated with compact cities and densification of the urban core (SACN, 2016). Having established their spatial impact, a simulation was run to understand the implications of these distinct forms of development on a city's revenues. A random sample was taken of 1000 properties in each municipality that broadly represent the property value distribution in South Africa. Then, using each municipality's property rates policies, the average revenues received from these properties were estimated for the different spatial development scenarios. These scenarios were, in turn, used to determine the per-property revenue implications of brownfield and greenfield developments on city revenues (Figure 26).

FIGURE 26: Impact of brownfield and greenfield developments on per-property municipal revenue



As Figure 26 shows, both brownfield and greenfield developments have a positive impact on revenues in all nine municipalities, but greenfield development has a significantly higher impact. This indicates clearly a fiscal incentive for municipalities to promote greenfield developments.

Ekurhuleni as a Case Study

The next simulations looked at the implications of rezoning activities on city revenue in Ekurhuleni. Ekurhuleni was chosen as it has the most disaggregated property rates data of all the cities coupled with the availability of relevant land use data. Although Ekurhuleni is a metropolitan municipality and (as expected) largely urban in nature, about 10% of its land is zoned for agriculture.

Revenue implications of rezoning agricultural land

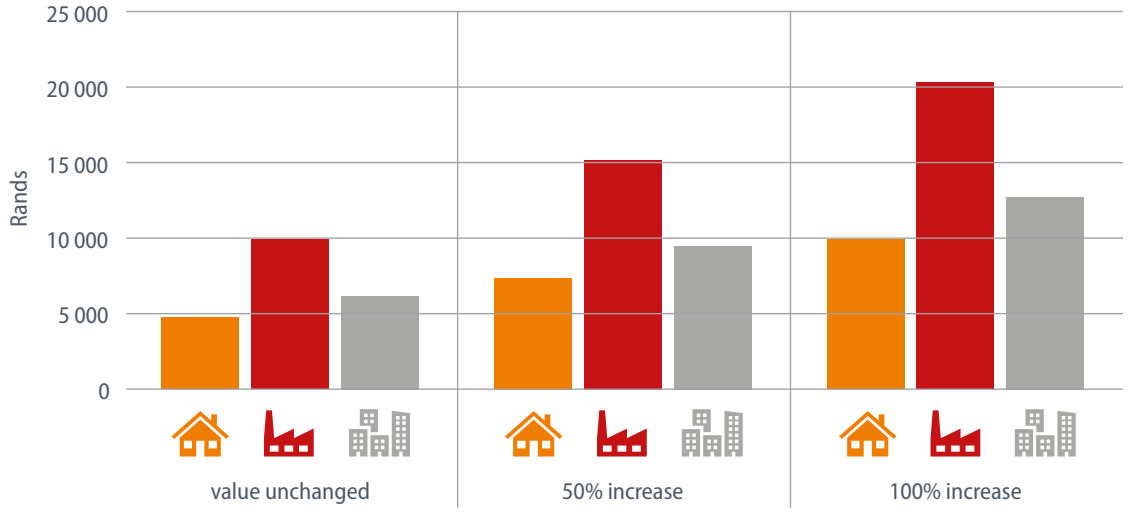
The first simulation established that the rezoning of agricultural land (located mostly on the periphery) not only facilitates the development of greenfield sites, but also increases revenue for a municipality. The simulation projected the revenue impact of rezoning 10% of existing agricultural land under various scenarios:

- rezoning entirely to residential land.
- rezoning entirely to commercial land.
- rezoning to a mix of commercial and residential land, based on the city's current mix.

These scenarios were run assuming (i) the value of the land remains constant, (ii) the value of the land increases by 50%, and (iii) the value of the land increases by 100%.

Figure 27 summarises the results and shows that the revenues received from property rates are directly proportional to the amount of agricultural land rezoned to urban, the rate in the rand on the property type to which the land was rezoned, and the value of the property subsequent to the rezoning.

FIGURE 27: Annual property rates revenue increases of rezoning of 10% agricultural land in Ekurhuleni



As Figure 27 shows, if 10% of Ekurhuleni's agricultural land were rezoned, the growth in annual rates revenue ranges from R4.72-million (land is rezoned to residential use, and its value remains the same) to R20.31-million (land is rezoned to commercial use, and its value doubles).

Although rezoning agricultural land increases the city's rates revenue, the increase is proportionally small. Even under the most lucrative of projections – in which 10% of agricultural land is rezoned to commercial use and its value doubles – the annual increase in rates (R20.31-million) represents less than half a percent (0.45%) increase in Ekurhuleni's total annual rates revenue. This is because, although 10% of land in Ekurhuleni is zoned for agriculture, this land represents just 1.57% of Ekurhuleni's total property value. This suggests that the latent value of agriculturally zoned land lies not only in the higher rates that can be charged following rezoning, but also in the higher value of urban properties by land area occupied relative to agricultural properties.

The analysis includes for a 50% and a 100% increase in value because municipal revenue increases in stages: after rezoning, the cent-in-the-rand rate increases; then, once the land has been developed, the value of the property is likely to increase significantly, as services and infrastructure are provided. The higher rateable value increases the overall revenue received, and the sentiment that the land (and adjacent land) is developable heightens. In terms of the MPRA, rates are levied on property values alone, rather than the value of the land they occupy. Therefore, municipalities can gain significant revenue from developing land, so that the property value per parcel, or area, of land is increased. Agricultural land has a much lower value density than urban land, particularly commercial land, which provides an additional perverse incentive for municipalities to allow for the rezoning *and* development of extant, agricultural land. Research suggests that the value increase is significantly higher than 100%, as illustrated in the next section.

Revenue impact of greenfield vs. brownfield development

To understand the potential real-world revenue implications of the hypothetical rezoning activities in Ekurhuleni modelled above, it is necessary to factor in the value density and then calculate the revenue increases that would result from redeveloping agricultural land for fully developed urban use. The value density means the average property value per land area for each property type, and the values used were based on the city's current land use and property value compositions.

The revenue impact of developing 10% of existing agricultural land in Ekurhuleni was calculated under three scenarios of redeveloping agricultural land, as (i) residential land, (ii) commercial land, and (iii) a mix of commercial and residential land proportional to the current composition of the city's urban spaces. The results are summarised in Figure 28, which shows, again, that such redevelopment has a positive impact on the city's annual property rates revenue.

The increase in rates received if 10% of agricultural land is redeveloped as commercial land is R1.1-billion, or 24.53% increase in Ekurhuleni's property rates revenue. If the agricultural land is redeveloped to a mixed urban land use, which is representative of the current land-use mix and the most rational redevelopment scenario, the city's property rates revenues would grow by 8.62%.

For the purpose of comparison, the same set of projections were run for brownfield development, based on redeveloping 10% of existing urban land in Ekurhuleni. Again, the assumed land value per area distribution was based on the city's current land use and property value compositions. The three scenarios of redeveloping urban land were as (i) residential land, (ii) commercial land, and (iii) a mix of commercial and residential land proportional to the current composition of the city's urban spaces. The results are summarised in Figure 29 and show that brownfield development increases Ekurhuleni's property rates revenues by R72.85-billion, or 1.61% (under the most lucrative scenario). This increase is minimal relative to the increases from a similar greenfield development.

Estimated annual property rates revenue increases of:

FIGURE 28: Full urban development of 10% agricultural land in Ekurhuleni

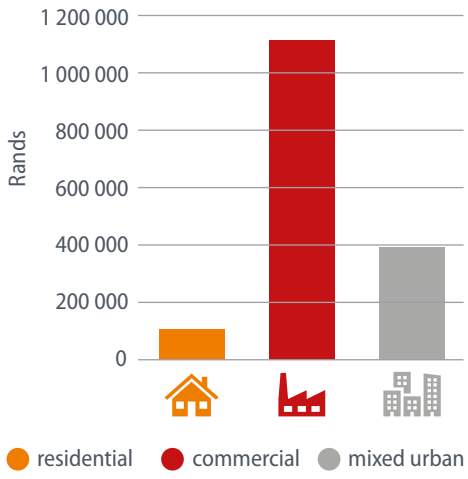
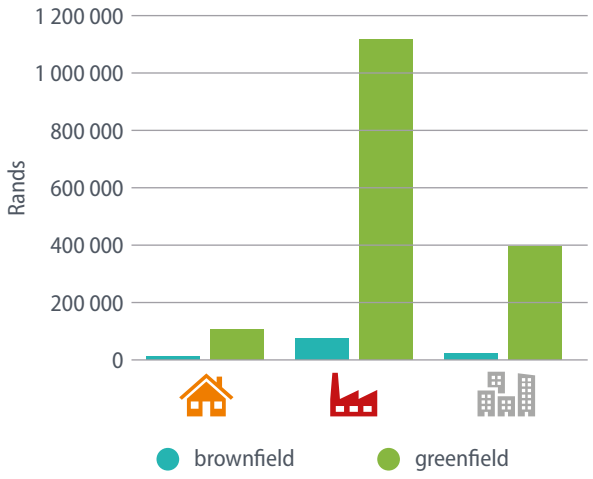
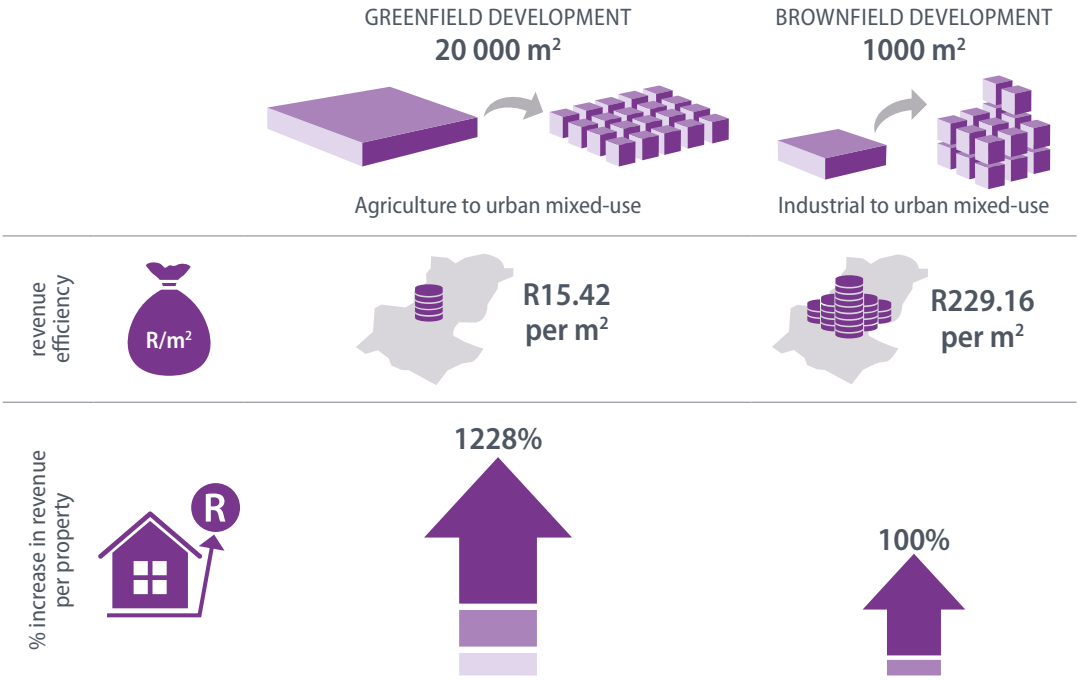


FIGURE 29: Full urban development of 10% of agricultural and urban land in Ekurhuleni



Impact of different development models on city property rates: The latent value of agricultural land

Relatively typical greenfield (similar to Waterfall Estate, Johannesburg) and brownfield (similar to Maboneng, Johannesburg) developments[30] were modelled to compare the impact of converting to mixed use. The model[31] looked at the development of 20 units on a greenfield site (of 20 000 m^2) compared to a brownfield site (1000 m^2). The property values are based on current Johannesburg properties of similar condition, and the cent-in-the-rand rates are based on the 2016/2017 City of Johannesburg property rates policy.



A completed greenfield development will generate significantly higher revenue from property rates because of the lower value of rates payable on agricultural land. In contrast, the rates base of a brownfield site is relatively high and so converting to mixed use produces a lower (but still significant) growth in revenue. However, the revenue per square metre (m^2) tells a different story, with the brownfield redevelopment providing far more revenue per m^2 of land than the agricultural redevelopment. Furthermore, no rezoning is required when industrial and commercial use properties are converted to residential use, which means that the new subdivided properties – even if residential in nature – will be rated as commercial use by the city. In comparison, developing agricultural land to urban use always requires rezoning.

A fully established greenfield development results in far more property rates revenues than a fully established brownfield development (Figure 29). This enormous difference, relative to the nine-city simulation run earlier, comes from the latent land value density (i.e. value per area of land) in agricultural land relative to land already under urban use. This causes a two-fold effect that dramatically increases revenue once agricultural land is converted to urban use, whereas redeveloping existing urban land parcels might not require zoning changes and is unlikely to increase the value of the land as drastically as converting agricultural land.

The above scenarios clearly demonstrate that cities can increase their own revenues significantly by rezoning agricultural land to urban land, and subsequently developing it. The fiscal incentive to allow, or even facilitate, such redevelopment is obvious given the current revenue logic, where property rates are the predominant leverageable tool for increasing city own revenues. Under current rates policy, agricultural properties are levied at far lower rates than urban properties, and rates are based on the value of the property, not the land. This essentially dictates that cities maximise property rates revenues through sprawl-promoting development. While many factors, including speculative developers, come into play, cities have to take the final decisions, in the face of competing pressures, to restrict sprawl and to ensure an adequate revenue base that meets growing demands.

Towards an Alternative Revenue Logic

The analysis in this chapter provides clear evidence of the perverse spatial impact of property tax. There is an inherent contradiction between compact cities and the financial incentive for municipalities to promote greenfield development. Given the overarching policy emphasis on spatial transformation, an alternative revenue logic is required. In moving towards a revenue logic that is more closely aligned to spatial transformation, three interlocking issues need to be considered.

Align the functionality of property rates to spatial transformation

Property rates in and of themselves are not a driver of sprawl; it is how they are structured in relation to space that facilitates sprawl-inducing, revenue-seeking practices. Currently, property rates are levied on the value of the property as a whole, and so any developments on the property will affect the charges levied. Taxing these property developments disincentivises the intense development of land, which reduces the capital-to-land ratio, a defining feature of urban sprawl (Banzhaf & Lavery, 2010; Brueckner & Kim, 2003). Property taxes can be implemented in alternative ways.

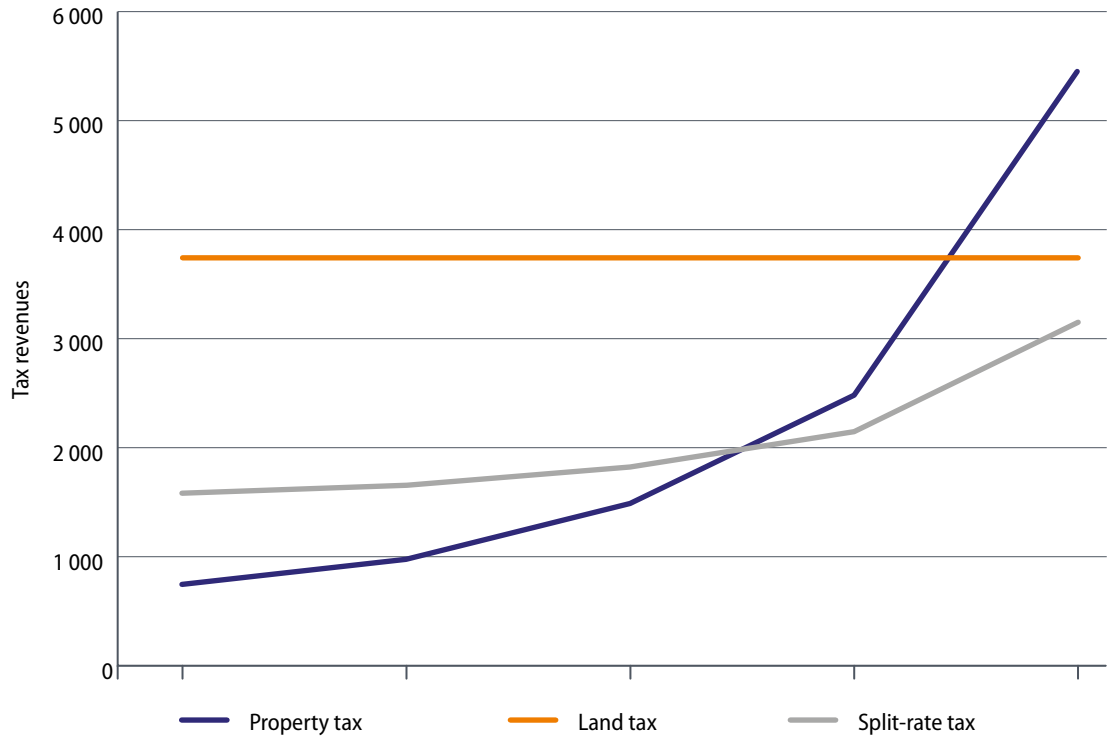
The land tax

In essence, all properties have two components: a parcel of land and a set of improvements made on that land. A land tax means taxes are levied on the value of a parcel of land, not on the built structures or improvements made. Such a tax incentivises the intense development of land, as improvements do not attract additional taxes, which increases the capital-to-land ratio and reduces sprawl (Banzhaf & Lavery, 2010). Moreover, a land tax is more reliable and non-distortionary than the current property tax, as the supply of land in cities is fixed. When set at a sufficiently high rate, as is the case in many East Asian countries, a land tax has reduced urban sprawl and discouraged land speculation (Collier et al., 2017). However, a pure land tax tends to be regressive, as rich and poor landowners are charged the same tax for land of a similar value, irrespective of the structures built on that land. Therefore, the tax will proportionally burden poorer landowners more than rich landowners. Moreover, to capture the same revenues as those from a property tax, municipalities would have to set a pure land tax at such a high rate that it would prohibit poor residents from owning land at all.

Split-rate taxes

These taxes are a compromise between the pure property tax and the pure land tax. Like the property tax, rates are levied on both the land value and the value of the improvements made, but different rates are applied. A lower rate is applied to improvements than to the land, in order to incentivise development. Reducing the tax burden on land-intensive developments promotes densification and discourages sprawl (Bengston et al., 2004). Evidence from several cities in Australia, Denmark and the state of Pennsylvania in the USA shows that implementing a split-rate tax results in reduced sprawl and increased urban redevelopment. In Figure 30, the split rate tax line has a gentler slope than the property tax line, indicating that it incentivises more intense development of land, and a lower starting point than the land tax line, indicating less of an unfair burden on poor landowners.

FIGURE 30: Relationship between tax revenues and level of improvement on land



Geographically differentiated property tax

According to Banzhaf and Lavery (2010), property taxes have both a "density effect", which disincentivises improvements to the land and promotes less dense development, and a "dwelling size effect", where households respond to increased property taxes by using less housing capital. If the dwelling size effect is stronger than the density effect, reducing dwelling sizes, as a response to property tax, results in reduced sprawl (ibid). A study across many urbanised areas found that higher property rates in the urban core lead to reduced urban density and increased sprawl, but higher property taxes in non-urban areas of the cities encourage more compact cities (Ermini & Santolini, 2015). This suggests that implementing a property tax regime, which taxes non-urban properties at a higher rate than properties in the urban core (whether through a land tax, property tax or split-rate tax), could promote density in the urban core and reduce sprawl.

Use city spatial planning powers more effectively and consistently

The Spatial Planning and Land Use Management Act (No. 16 of 2013) gives municipalities the power to manage land use and urban expansion. The Act specifically refers to spatial justice, calling on municipalities to explore ways of making property and shelter affordable for poorer residents. However, not allowing undeveloped peripheral land to be developed drives up land and property prices in urban areas (WCPG, 2013) – less land is available, which pushes up the premium for land. The municipality only captures this increase in land value when the valuation roll is updated, but the higher land cost drives up the cost of development and ultimately excludes the poor from accessing such property. Land value capture principles are also based on a "maximise value" approach, which makes including the poor challenging: "if the aim is to maximise revenue, inclusive development cannot be a priority" (SACN, 2017a: 68). Therefore, if municipalities reject all new peripheral development and facilitate infill and redevelopment processes, at the same time new financial arrangements will be needed to ensure that sufficient short-term revenue can be generated, that levels of affordability can be maintained in the city, and that open space networks and biodiversity are valued.

Diversify and expand the municipal revenue mix

Property taxes are a good local tax, providing a stable and discretionary revenue stream for municipalities. However, the over-reliance on property taxes may make it difficult for municipalities to turn down greenfield development. To this end, it is important to look at diversifying municipal revenue sources, so municipalities have several levers that they can use to grow their revenue base. Such revenue sources would have to make revenue and policy sense for cities. Building on the case put forward by the SACN expert panel on alternate municipal finance (SACN, 2017b), Chapter 5 of this report provides a comprehensive analysis of possible local government taxes.

Conclusion

Over the past 20 years, municipalities have received important revenue injections from new developments on the periphery of cities, and the short-term, ongoing revenue gains from rezoning agricultural land cannot be underestimated. This chapter argues that the over-reliance on property rates as the primary discretionary revenue source for municipalities is driving a perverse incentive to facilitate new peripheral developments. While property rates will remain, as they are a good local tax, their functionality is sub-optimal for the spatial developmental policy objectives in South Africa. A new revenue logic is required to address the functionality of the property tax mechanism, the planning and infrastructure support offered by municipalities to peripheral sprawling developments, and the over-reliance on property rates in the municipal revenue profile.

National departments, such as human settlements and transport that deal with the relationship between rezoning activities and property tax, need to take cognisance of the role property rates play in driving the spatial form of cities. Appropriate steps should be taken to address the contradiction between policy intent and the incentives created by making property rates the core source of local government revenue. National Treasury should also incorporate this critique of the over-reliance on property tax into its work of investigating alternative revenue-raising measures for municipalities.

Municipalities have a role to play in ensuring spatial planning is implemented effectively and consistently in line with the policy for compact cities, as well as leading the debate on alternative revenue sources. To date, the financing of spatial transformation has been seen as separate to the existing core revenue model of cities. A rationalisation of this revenue model and all its components is needed, to ensure that the desired spatial objectives are incentivised and built into the day-to-day running of cities. An alternative revenue model should result in cities being financially rewarded (not stifled) for developing and densifying brownfield sites and restricting peripheral greenfield development. Greater collaboration between financial practitioners and spatial practitioners is required to better understand the relationship between finance and spatial development.

Limitations and further research

Data limitations associated with poorly aligned spatial and financial information meant that the statistical (and possible causal) relationship between property rates and sprawl could not be fully examined. Instead, using the prevailing sentiment in the literature on the spatial impact of property rates, a hypothesis was constructed on the functioning of this relationship in South African cities. The available data suggests that sufficient evidence supports this hypothesis.

This chapter does not discuss or quantify the net effect of sprawl – the revenue received versus the expenditure required to develop and service outlying areas. This is an important consideration and might provide valuable financial insight to inform decision making.

Further research is required, and the "spatialising" of financial intelligence in cities is an important step for understanding the relationship between spatial patterns and municipal finance. Channing and Bernard (2015) provide a useful guide to spatialising property registers.

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CHAPTER 4

THE GROWING FUNDING GAP

Key Messages

Metros have a funding gap of between 10% and 38% of their capital expenditure.

Unless this funding gap is closed, metros will not be able to meet their core mandates over the medium to long term.

Cities can and should take steps to close the gap but need policy support at national level.

Cities are the engines of growth in the South African economy, accounting for 63% of national GDP, but their budgets are under pressure. With rapid urbanisation (cities are home to 40% of the country's population), demand has risen for both services traditionally provided by cities and new services that meet the changing needs of city dwellers. This chapter argues that the revenue sources available to South African cities are insufficient to cover their core expenditure mandates and, given the current economic and demographic outlook, this funding gap is likely to grow over the next 10 years. For cities to be able to continue contributing to economic growth and realising South Africa's development objectives, the gap – between available city revenue and capital finance, on the one hand, and operating and capital expenditure, on the other – must be closed.

After analysing the funding gap for the eight metropolitan municipalities (metros), the chapter explores the underlying causes of the funding gap and proposes various interventions aimed at closing it.

Background and methodology

The evidence to support the arguments presented is drawn largely from an analysis of the metros' own revenues undertaken for National Treasury. Two models were used in the analysis:

- The Municipal Services Financial Model (MSFM), which projects the capital expenditure needs of metros and estimates the impact of these capital expenditures on operating expenditures and revenues.[32]
- A Free Cash Flow model, which reflects the results from the MSFM model on a cash basis and estimates the metros' ability to raise debt or finance capital expenditure internally.

The Free Cash Flow model estimates the additional debt that a municipality can take on as the net present value of its free cash flow over the next 10 years. Free cash flow is defined as cash flow not committed for other purposes or required to ensure adequate liquidity. It is the operating surplus plus depreciation, less current capital redemption and cash reserved for working capital and capital projects. These additional own financing sources are combined with capital grants and development charges and compared to the capital expenditure needs from the MSFM to determine the size of any funding gap remaining.

The data analysed was from the Municipal Budget Reporting and Reform (MBRR) A Tables for the 2015/16 Medium Term Revenue and Expenditure Framework (MTREF). Data was used from the full year forecast for 2014/15.[33] This was supplemented by data provided by the metros via a data template. The model base year is 2015/16 and the MSFM is calibrated to the 2015/16 metro budgets.

The Municipal Services Financial Model

The MSFM is the more complex of the two models. It is an Excel-based model originally developed for work on the Municipal Infrastructure Investment Framework (MIIF) for the Development Bank of Southern Africa (DBSA) and the then Department of Provincial and Local Government (now the Department of Cooperative Governance and Traditional Affairs). It calculates:

- the amount of capital that municipalities need to spend on infrastructure over a 10-year period to eliminate backlogs, accommodate household and economic growth, and make progress in renewing the existing infrastructure base;
- the amount of capital finance that can be raised; and
- the impact of the capital expenditure and capital finance mix on the operating account.

The MSFM takes a "top-down" approach[34], estimating infrastructure investment needs based on high-level parameters, such as household growth and economic growth, and making use of unit consumptions (average amounts of water and electricity consumed, and wastewater and solid waste generated per customer) and unit costs (average cost of infrastructure per unit of capacity or per customer and average operating cost per customer)[35].

Model assumptions

The model makes certain assumptions – about household growth, economic growth capital unit costs and the rate of infrastructure renewal required – that are described below.

Household growth

Households are significant municipal consumers, and so household growth rates are important determinants of infrastructure investment needs and ongoing expenditure and revenue. The Community Survey 2016 (Stats SA, 2016) reveals a trend of rapid decline in household sizes in metros. This means that, despite a slower population growth, the total number of households has grown significantly.

TABLE 30: Population and household growth (2011 and 2016)

	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Population growth	2.2%	1.4%	1.5%	2.3%	1.2%	1.9%	1.1%	2.0%
Household growth	5.3%	3.4%	3.3%	4.5%	5.1%	2.6%	2.7%	2.5%

Source: Author's own analysis based on Stats SA (2011, 2016)

The base model run assumed that population and household growth would continue at the rates shown in Table 30. If households continue to grow at this rate, the pressure on metros will be considerable. However, it seems unlikely that household growth can continue at this level indefinitely,[36] and so the model base run probably presents an exaggerated view of household growth in metros, which in turn leads to an overestimate of the funding gap. This was accommodated by running an alternative model scenario that considers the impact of lower household growth (see section "How big is the funding gap?").

Economic growth

Economic growth is a key driver of infrastructure investment needs. In the model, economic growth drives need through two pathways:

i. Higher rates of economic growth are assumed to result in a higher demand for municipal services from non-domestic (industrial and commercial) customers.
ii. Higher rates of economic growth relative to household growth are assumed to result in an improved household income profile,[37] which is typically associated with increased consumption of water and electricity (Jansen & Schulz, 2006; Inglesi-Lotz & Pouris, 2014).

Together, these dynamics mean that positive economic growth has positive implications for a municipality's operating account. Cities can use financial surpluses from providing services to higher-income households and to non-domestic customers to cross-subsidise financial losses from providing services to low-income households. The model also assumes that economic growth results in higher rates of growth in property rates revenue,[38] but the effect is only realised once property evaluation rolls are updated.

The modelling used a national economic growth rate, which was adjusted for the individual metros based on historic metro performance relative to national (Table 31). In 2015, when this modelling was originally conducted, South Africa's projected economic growth rate varied from 2.2% to 2.8% per annum by 2020.[39] On average, metros' economies grew slightly more rapidly than the country's economy between 1997 and 2012.[40]

TABLE 31: Economic growth rates for each metro used in the modelling

	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	NATIONAL
2016	0.8%	1.1%	1.1%	1.4%	0.8%	-0.1%	-0.6%	0.5%	0.4%
2020 onward	2.6%	2.9%	2.9%	3.2%	2.6%	1.7%	1.2%	2.3%	2.2%

Capital unit costs

Capital unit costs were used to estimate the cost of infrastructure investment. The unit costs are average costs per customer or unit of capacity and historically have been developed by consulting engineers based on the costs of capital projects from around the country. For the purposes of analysis here, unit capital costs from 2009 were inflated using the *contract price adjustment factor*.[41]

Rate of infrastructure renewal required

The rate of infrastructure renewal required was calculated based on assumed *estimated useful lives* for the various classes of assets owned by municipalities. On average, the model assumes that the full value of the metro asset base will be replaced over 35 years, which is sufficient to accommodate ongoing wear and tear on infrastructure but does not allow for the rectification of any existing renewal backlog.[42]

How big is the funding gap?

The funding gap is the difference between the metros' available revenue and capital finance, and the operating and capital expenditure required to adequately deliver on their mandates. This shortfall in funding poses a risk to the ability of metros to provide adequate services in the medium to long term.

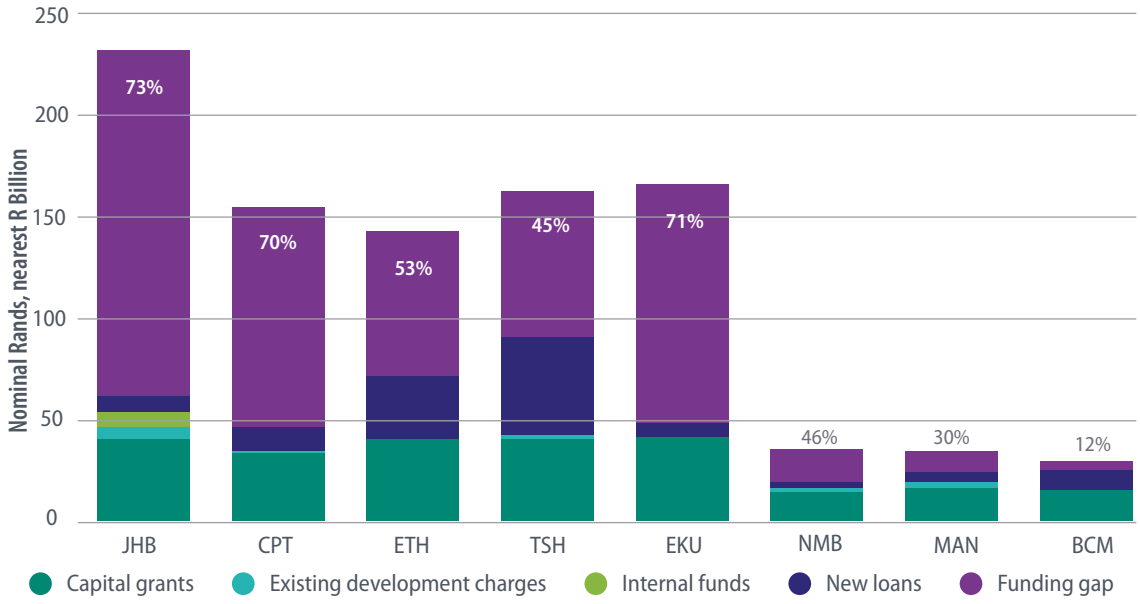
Using forecasted figures of 2015/16 revenues and expenditure, the analysis estimates a funding gap of R18-billion in 2017 which is projected to grow to R83-billion by 2026. This is a total gap of R569-billion over 10 years.

This funding gap appears on the **capital account**, as the modelling finds that all the metros will continue to generate surpluses on their operating accounts. Municipalities in South Africa fund capital expenditure through four main sources:

- capital transfers, which for the metros are primarily the Urban Settlements Development Grant (USDG) and the Public Transport Network Grant;
- development charges;
- internally generated surpluses; and
- borrowing.[43]

While operating revenues are sufficient to cover operating expenditures in the metros, they do not generate enough internal finance to fully fund capital expenditure. The result is a funding gap. Figure 31 shows the projected availability of capital finance and resulting funding gap in the model base run for each metro.

FIGURE 31: Availability of capital finance and resulting funding gap



Source: Author's own calculations based on MBRR and metro self-reported data

The total size of the gap in each metro and in the eight metros combined is shown in Table 32.

TABLE 32: The funding gap per metro 2017–2026 (nominal Rands, R billion)

	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM	TOTAL
Capital expenditure need	232	154	144	162	166	35	33	29	955
Capital grants	40	33	40	40	41	14	16	15	240
Capital grants as % of need	17%	21%	28%	25%	25%	40%	48%	52%	25%
Development charges	6	1	0	2	0	2	3	0	14
Internal funds	7	0	0	0	0	0	0	0	7
New loans	8	12	31	48	7	3	5	10	123
Base funding gap	170	108	71	73	117	16	10	4	569
Gap as % of capital expenditure	73%	70%	50%	45%	71%	46%	30%	12%	60%

Source: Author's own calculations based on MBRR and metros' self-reported data

The gap is typically higher in the larger metros because capital grants cover a smaller proportion of capital expenditure, leaving a larger gap to be funded out of own sources. Within each group, the gap is smaller in those metros with larger projected operating surpluses (eThekwini and Tshwane[44] among the larger five metros, and Mangaung and Buffalo City among the smaller three), as larger operating surpluses improve the ability to raise own-source finance, primarily borrowing.[45]

Possible variability in the size of the funding gap

The funding gap is based on running a model using the assumptions outlined above. These assumptions are then changed, to examine their impact on the size of the funding gap. The model found that, while the funding gap may increase or decrease, the overall conclusion stays the same – metros face a funding gap. It should be noted that each assumption is changed holding all other things constant, which is not realistic, as in reality multiple things change at once.

Both external and internal factors were examined. The external factors tested were household and economic growth, while the internal factors were improved metro fiscal effort and expenditure efficiencies. The internal factors were included to assess whether metro efforts alone are sufficient to close the funding gap.

Effect of household growth

As mentioned earlier, the Community Survey (Stats SA, 2016) found that household sizes in metros declined rapidly, resulting in significant household growth rates, which are unlikely to continue at this level. Therefore, the model base run presented an exaggerated view of household growth and thus overestimated the funding gap. To accommodate this, an alternative scenario of lower household growth was considered (Table 33). The scenario assumed household growth rates that are the same as the population growth rate (i.e. no further decline in household size). The effect is a significant reduction of household growth rates in Johannesburg, Ekurhuleni and Tshwane.

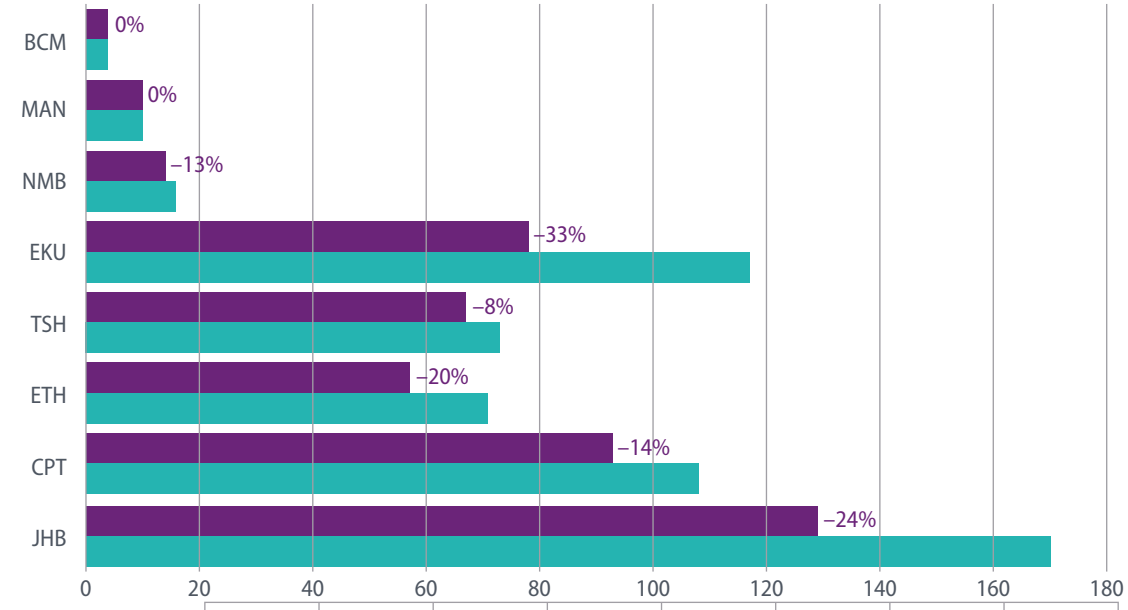
TABLE 33: Household growth rate assumptions in the base and scenario models for all metros (2016)

	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Base model	5.3%	3.4%	3.3%	4.5%	5.1%	2.6%	2.7%	2.5%
Low household growth scenario	2.2%	1.4%	1.5%	2.3%	1.2%	1.9%	1.1%	2.0%

Source: Stats SA (2016)

Lower household growth reduces the overall demand for municipal services in the future, thereby reducing both the capital and operating expenditure over the next 10 years. As a result, the total estimated funding gap reduces by 37%, to R359-billion, which is smaller but still significant. However, the lower household growth scenario has little to no effect on the funding gap of the smaller metros (Figure 32).

FIGURE 32: Effect of low household growth on the funding gap (2017–2026)



	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Funding gap	129	93	57	67	78	14	10	4
Base funding gap	170	108	71	73	117	16	10	4

Nominal Rands, nearest R billion

Source: Author's own analysis based on MBRR and metros' data

Effect of economic growth

The base model, run in 2015, assumed improving economic growth in the next 10 years. The alternative scenario assumes a more moderate improvement in economic growth from 2019 (Table 34).

TABLE 34: Economic growth rate assumptions in the base and scenario models for all metros

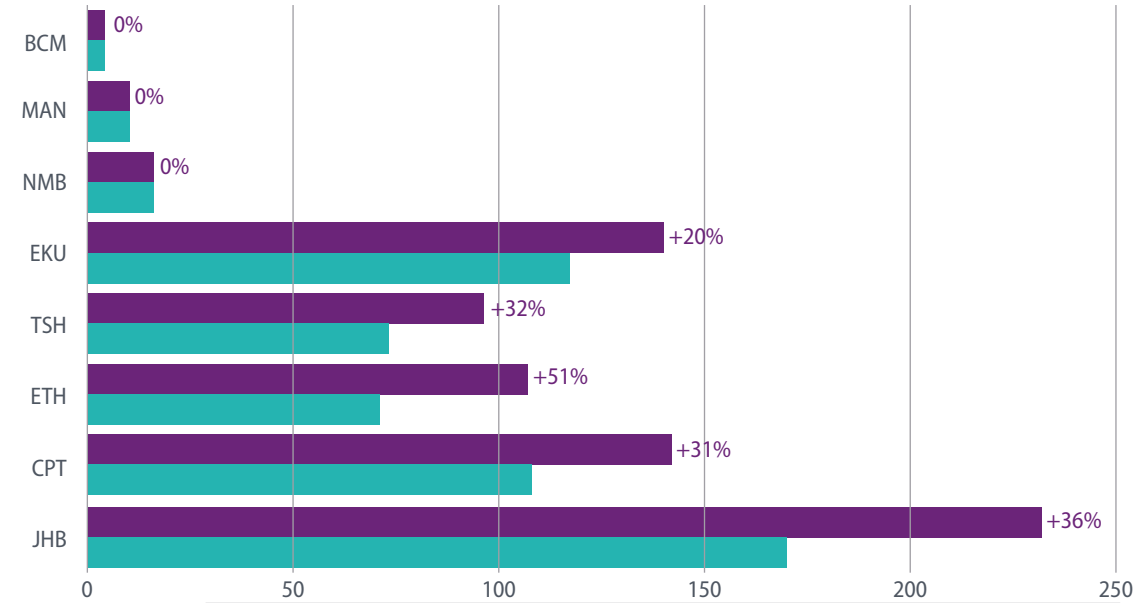
		JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Base model	2019 onward	2.6%	2.9%	2.9%	3.2%	2.6%	1.7%	1.2%	2.3%
Low economic growth scenario	2019 onward	1.6%	1.9%	1.9%	2.2%	1.6%	0.7%	0.2%	1.3%

Source: Author's own analysis based on MBRR and metros data

Lower economic growth can lead to metros experiencing a reduction in own revenues because (i) job losses mean that more domestic customers are unable to pay for services, thereby reducing the revenue base of metros; (ii) businesses are likely to scale back on operations, thus reducing their demand for municipal services.

More moderate economic growth results in the overall funding gap increasing by 15%, to R654-billion over 10 years. The impact will be the greatest for the five larger metros. This finding is significant: between 2015 and 2018, economic growth has been below 1% per annum, and so metros are going to be under pressure if the economy does not turn around.

FIGURE 33: Effect of low economic growth on the funding gap



	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Funding gap	232	142	107	96	140	16	10	4
Base funding gap	170	108	71	73	117	16	10	4

Nominal Rands, nearest R billion

Source: Author's own analysis based on MBRR and metros data

Improved fiscal effort and expenditure efficiency

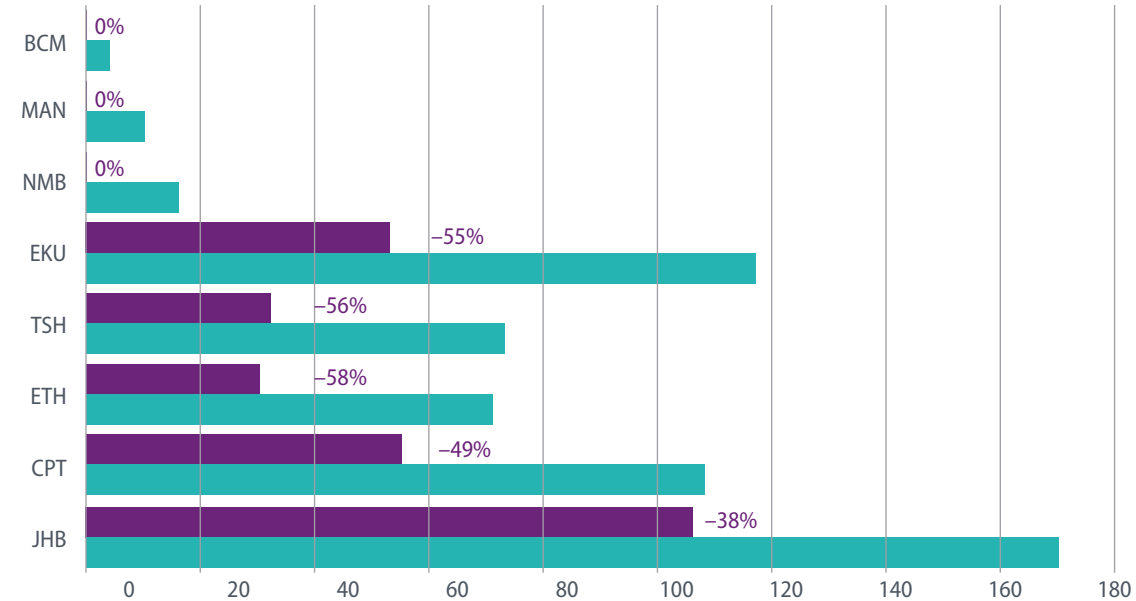
The modelling tested four potential improvements in metro efforts:

- Metros improve collections by at most 5%, with the collection rate capped at 95%, unless the current collection is already at 95% or more.
- Interventions, such as improving the accuracy of billing systems, are implemented and lead to 0.1% increase per annum over 10 years.
- Metros implement average tariff increases that are 0.2% above inflation per annum.
- Operating expenditure is reduced by 0.2% per annum over 10 years through efficiency measures.

These assumptions are not necessarily based on a sound analysis of what is possible but rather on qualitative discussions and are only intended to be indicative.

The result of improving fiscal effort and reducing expenditure efficiencies is to reduce the overall funding gap by 51%, from R569-billion to R276-billion. The improvements eliminate the funding gap in the three smaller metros and reduce the funding gap by between 38% (Johannesburg) and 59% (eThekwini) in the larger metros (Figure 34). This finding is important, as metros can reduce the funding gap significantly through greater internal efficiencies.

FIGURE 34: The effect of improved revenue efficiencies on the funding gap (2017–2026)



	JHB	CPT	ETH	TSH	EKU	NMB	MAN	BCM
Funding gap	106	55	30	32	53	–	–	–
Base funding gap	170	108	71	73	117	16	10	4

Nominal Rands, nearest R billion

Source: Author's own analysis based on MBRR and metros data

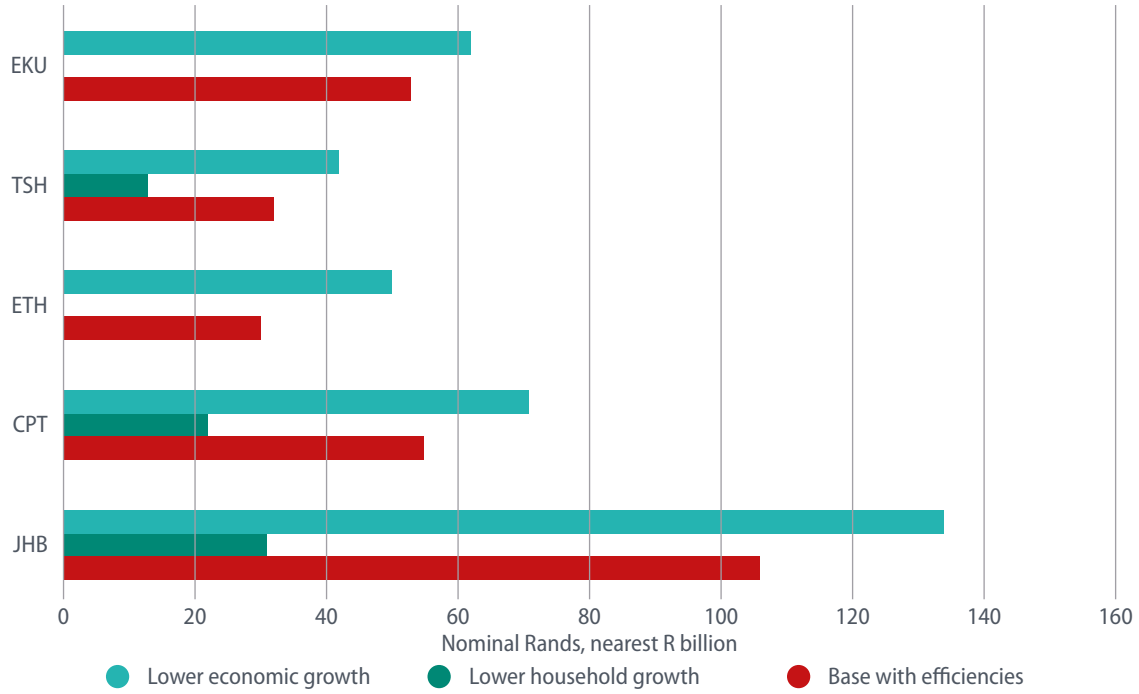
The model then tested the impact of lower household growth and lower economic growth on the funding gap, within a context of improved revenue and expenditure efficiencies. The results show that improving metro fiscal effort and expenditure efficiencies can have a significant impact on the funding gap, but the gap will remain for the larger metros (Table 35 and Figure 35).[46]

TABLE 35: Effect of external factors after efficiency improvements (2017–2026)

	JHB	CPT	EKU	ETH	TSH	NMB	MAN	BCM	TOTAL
Base with efficiencies	106	55	53	30	32	0	0	0	276
Efficiencies plus lower household growth	31	22	0	0	13	0	0	0	67
Efficiencies plus lower economic growth	134	71	62	50	42	2	0	0	362

Source: Author's own analysis based on MBRR and metros data

FIGURE 35: Effect of external factors after efficiency improvements for five larger metros (2017–2026)

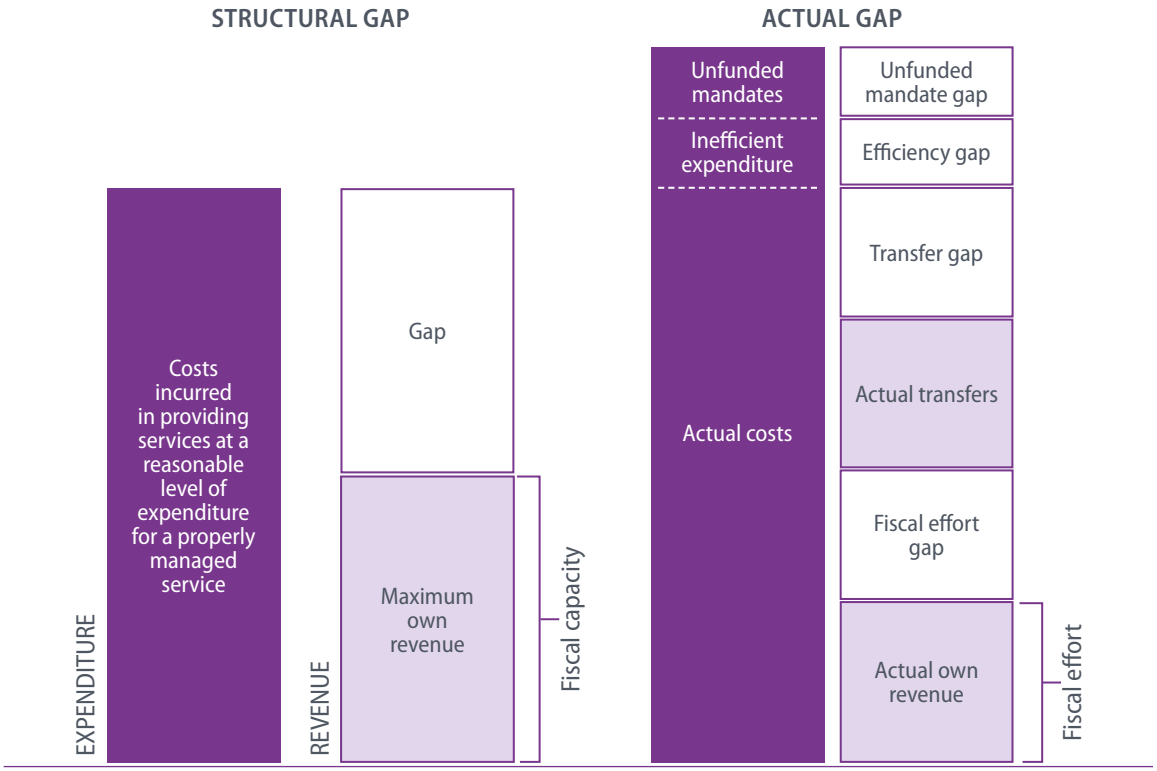


In conclusion, the metros alone cannot close the funding gap through their efforts; multiple interventions are required.

What causes the funding gap?

Before discussing what might be done to close the funding gap, it is useful to consider what causes this gap. In its submission on the Local Government Fiscal Framework, the Financial and Fiscal Commission (FFC, 2012) introduced the concept of a structural and an actual funding gap. This framework is extended in Figure 36 and used as a basis for understanding the underlying causes of the funding gap.

FIGURE 36: Framework for understanding the causes of the funding gap



Source: Author's own adapted from FFC (2012)

The FFC defines two gaps, a structural gap and an actual gap.

The **structural gap** is the difference between a reasonable level of expenditure incurred for a properly managed service and the maximum own revenue generated by the municipality. In a country such as South Africa, with high levels of poverty and thus limited ability to pay for services, the existence of a structural gap is accepted as a given and is the reason for having a system of national transfers that are intended to fill the structural gap. Four possible factors/gaps contribute to the structural gap:

i. *An unfunded mandate gap:* municipalities are incurring expenditure on services and functions that are not in their mandates and for which they do not receive revenues.
ii. *An expenditure inefficiency gap:* municipal expenditures are higher than the reasonable levels required to provide services.
iii. *A transfer gap:* transfers do not completely fill the structural gap.
iv. *A fiscal effort gap:* municipalities do not exert sufficient fiscal effort and collect all the own revenues implied by their fiscal capacity.

The following section examines these gaps in more detail. As most of the gaps cannot be accurately quantified, the analysis focuses on existing data that points to whether or not the gaps exist at all.

Unfunded mandate gap

Metros often indicate that they are required to perform functions beyond those listed in Section 156 of the Constitution, which sets out the powers and functions of local government. The most significant functions are health care services and libraries. This is a topic of debate: one view is that the metros were not forced but have chosen to take on these functions, while the metros indicate that they cannot run a successful city without providing these functions that fundamentally affect development.

Data on unfunded and underfunded mandates is poor, and comparisons are difficult. However, where available, the data does reveal funding gaps. For example, in 2015/16, Johannesburg and Cape Town reported deficits[47] in health care of R603-million and R458-million respectively, representing 1.6% and 1.5% of their total operating expenditure.

Expenditure efficiency gap

Measuring the expenditure efficiency gap requires knowing what a *reasonable* level of expenditure is for a properly managed service, but there are no reliable benchmarks for "reasonable" expenditure.[48] In the absence of such benchmarks, some studies have compared metros' expenditures for insight into whether some metros are performing better than others. While such analyses may point to potential room for efficiency gains, they are often flawed in that they assume homogeneity between the metros. Factors other than efficiency may explain the different levels of expenditure, such as varying levels of service provision in municipalities, institutional service provision arrangements, geographic differences and differences in reporting certain items.[49]

There are many anecdotal causes of municipal expenditure inefficiencies. One that has received substantial attention is the non-revenue water (NRW). NRW is often incorrectly conflated with leaks. In fact, the International Water Association's water balance model divides NRW into (Lambert and Hirner, 2000):

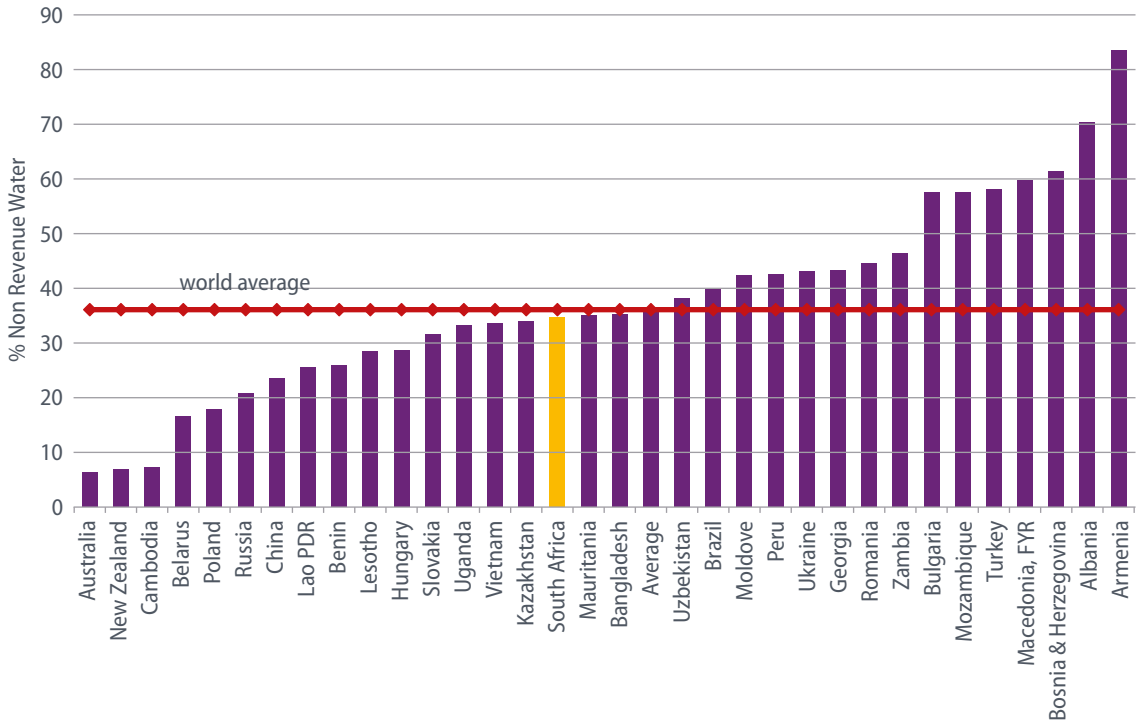
- *real losses,* related to leakages and overflows on storage tanks;
- *apparent losses,* related to customer meter inaccuracies; and
- *unbilled authorised consumption,* related to the authorised use of water, metered and unmetered, that is not billed

In the cases of apparent losses and unbilled authorised consumption, water is not leaking: it is being consumed by someone but not being paid for.

While levels of NRW are undoubtedly high, in 2012 the South African average NRW of 36.8% was similar to the world average (Figure 37).

The best performing countries have NRW percentages as low as 7%. Two of these, New Zealand and Australia, are high-income countries and so are not easily comparable to South Africa, whereas Cambodia, a low-middle-income country, has a NRW percentage of 8%. This suggests that South Africa could do better over the medium to long term.

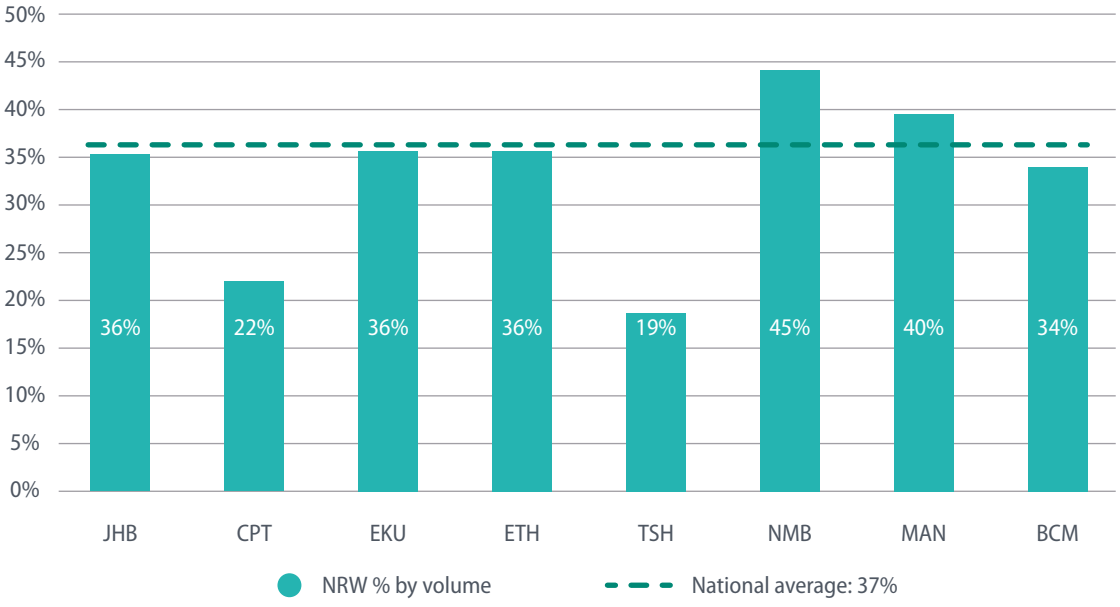
FIGURE 37: International comparison of NRW (2012)



Source: McKenzie et al. (2012)

When the NRW for the metros is compared to the national average, Tshwane and Cape Town are well below, whereas the other metros have scope to reduce their NRW (Figure 38). Johannesburg, Ekurhuleni and eThekwini are close to, and Nelson Mandela Bay and Mangaung are above, the national average and could achieve the greatest efficiency gains.

FIGURE 38: Average NRW percentage by volume (2014/15)



Source: Compiled from data provided by metros; national average from McKenzie et al. (2012)

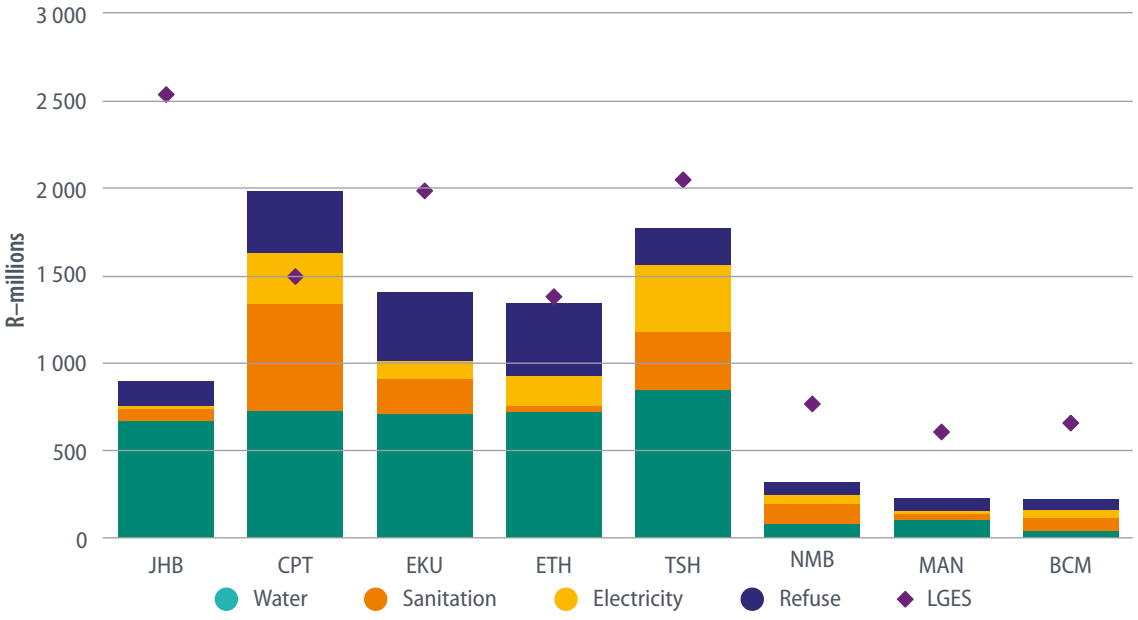
Estimating the breakdown of NRW into real and apparent losses involves a degree of uncertainty. However, the figures reported by the metros as part of the Municipal Benchmarking Initiative in 2013/14 suggest that about half of NRW is due to real losses (leaks and overflow) while the remainder is a combination of apparent losses and unbilled authorised consumption (SALGA, 2015).

Transfer gap

All metros receive operating and capital transfers from national government. The largest operational transfer is the local government equitable share (LGES), which is an unconditional grant intended to cover the cost of providing subsidised services to the poor. A transfer gap is implied if LGES allocations are insufficient to cover the reasonable costs of providing subsidised services.

Figure 39 compares expenditure on providing free basic services (FBS) – water, sanitation, electricity and solid waste – to the LGES allocations received in 2014/15. The LGES is also used to subsidise publicly accessed services through rebates and exemptions on property rates. The magnitude of this subsidy cannot be assessed through expenditure on service provision but through property rates revenue foregone. Therefore, Figure 40 compares the revenue cost of providing free basic services[50] (including property rates rebates and exemptions) to the LGES allocation received.[51]

FIGURE 39: Expenditure on free basic trading services compared to LGES (2014/15)



It is important to note that the data used in Figures 39 and 40 is self-reported by the metros to National Treasury. There is likely to be some variability in the way that metros calculate these numbers and there may be a motivation to either inflate or deflate them. Accepting the data as reported, it is apparent that the LGES allocation is insufficient to cover the cost of FBS in Cape Town and insufficient to subsidise the revenue forgone on all free services, including property rates rebates and exemptions, in Cape Town, Ekurhuleni, eThekwini and Tshwane.

FIGURE 40: Revenue cost of providing free basic services compared to LGES (2014/15)

Source: Expenditure data ex full-year forecast for 2014/15 in Table A10 (MBRR), LGES allocations ex "2016 LGES summary and formula" downloaded from National Treasury website.

Given that the LGES appears not to cover the FBS costs incurred by some municipalities, the question is whether these costs are reasonable. The cost of FBS is a function of the number of households that receive these services, the volumes or level of service provided free, and the unit cost. The data shows that metros are providing FBS to more households than anticipated in national policy. In other words, metros are going further than national policy anticipated and are carrying a transfer gap as a result. For example:

- In 2014/15, Cape Town provided 6kl free water and associated sanitation to all households, and so the number of households was significantly higher than the number of poor households used by National Treasury to calculate the LGES allocation in that year.[52]
- Johannesburg, Tshwane, Ekurhuleni, Nelson Mandela Bay and Mangaung all provided more than 6kl free water, the required free amount specified in national policy, to each qualifying household.

Metros may argue that they provide larger volumes of free services because the volumes anticipated in national policy are inadequate or not suited to local circumstances;[53] in other words, national policy is inadequate and should be revised. For the purposes of this chapter, the available data suggests that there is a transfer gap in at least some of the metros: the LGES does not cover the revenue cost of free services in Cape Town, Ekurhuleni, eThekwini and Tshwane. However, it is a matter of debate whether or not this transfer gap is due to local policy choices in individual metros or to insufficient transfers from national government.

Fiscal effort gap

The fiscal effort gap is the result of metros' suboptimal performance in translating their revenue bases into actual cash revenues. Cash collection efficiency is one available and easily quantifiable measure of fiscal effort. It is the proportion of the billed revenue that the municipality received in cash payments. Table 36 shows the collection rate in metros for 2014/15.

TABLE 36: Current collection rates (2014/15)

	JHB	CPT	EKU	ETH	TSH	NMB	MAN	BCM
Collection rate	93.9%	93.5%	90.9%	96.8%	105.3%	88.3%	80.8%	93.5%

Source: Data from Table SA8 (MBRR) [54]

Only eThekwini achieved a collection rate of above 95%, which is the target set by National Treasury. According to Tshwane, their assumed collection rate is 95%, not the 105.3% presented, which is a result from the model over-estimating the metro's ability to generate own-source capital finance.[55] There is significant room for improvement in Nelson Mandela Bay and Mangaung where collection is at 88% and 81% respectively. As with all the gaps, the fiscal effort gap is difficult to quantify precisely but the variability in collection rates shows that it does exist.

What can be done to close the gap?

The analysis suggests that cities are facing a funding gap that is likely to grow in the next 10 years. Closing this gap will require multiple interventions, which fall into one of three categories:

- *Within metros' control and relatively easy to implement*: improve expenditure efficiencies, improve fiscal effort and extract revenue from city services and assets.
- *Partly within metros' control but requiring national government action*: reduce mandates and focus on the core. Metros can choose to focus on their core service delivery mandates, but a full review of their powers and functions requires action by national government.
- *Within the realm of national policy*: increase the magnitude of transfers to metros, introduce a new transfer and introduce a new source of revenue. While such measures may be necessary, they will be difficult to achieve in the current constrained economic environment.

Improve expenditure efficiencies

Metros need to be as efficient as they can, but quantifying efficiency is difficult, and so each metro will need to identify areas for improvement. Some examples of how to improve efficiencies are:

- *Reduce the real component*[56] *of NRW.* This is certainly an area for improved efficiency, particularly in those metros with high NRW levels. However, to decrease real losses is likely to require up-front capital expenditure.
- *Adopt energy efficient and renewable energy technologies* in providing services to reduce municipal energy consumption. Short-term interventions include retrofitting traffic-, street- and high-mast lighting to LED, while long-term interventions include improving water heating, ventilation and air-conditioning of municipal buildings and upgrading water and waste water pumping technology (SALGA, 2017). Payback periods are 2–10 years, depending on the old technology in use and the cost of the innovative technology adopted (SACN, 2014). An example is the switch to variable speed drives at eThekwini's Point Pump Station in 2013, which saved an estimated R200,000 (0.9% of total expenditure) and 401 MWh per annum (ibid).
- *Eliminate non-priority expenditure* through improved budget prioritisation. Internationally governments can reduce expenditure by up to 15% through cost-saving initiatives (National Treasury, 2011). The MFMA Circular 82 (National Treasury, 2016) identifies several measures aimed at containing operational costs and eliminating non-essential expenditure.

Improve fiscal effort

- *Improve the integrity of billing information, accuracy of billing systems and ability to collect*, which will increase municipal revenues. These are key points in the municipal revenue chain (National Treasury, 2011). Given the unacceptably low collection rates in some of the smaller metros (see Table 35), improving collection rates alone may be sufficient to close their funding gaps. This is an area that requires immediate attention.
- *Reduce NRW and non-revenue electricity,* i.e. the portion of NRW that is not due to physical leaks, as well as equivalent interventions for electricity.
- *Structure tariffs appropriately,* so that they are better aligned with households' ability to pay. This will generate additional revenue for metros and could potentially alleviate the affordability burden on low-income households, while ensuring improved revenue generation from those who can pay.
- *Improve the targeting of FBS,* as this can increase revenue for the municipality, especially where some metros are offering FBS to all households instead of only poor households. This does not necessarily imply the use of indigent registers, as free services can be targeted through a proxy method such as property value.

Extract revenue from city services and assets

Land value capture is receiving significant attention as a revenue-generating instrument for cities. The underlying concept is that the city acts as a catalytic stakeholder early in the development process, creating value through (for example) zoning decisions or the provision of bulk infrastructure, and can then capture some of that increased value created (World Bank, 2016). Three potential tools for land value capture by South African metros are (ibid):

- Leveraging municipal real estate through strategic selling or leasing of municipal-owned property.
- Special assessment districts, where property owners pay an additional property tax in a defined geographic area that is expected to benefit from public improvements.
- Tax increment financing, where a municipality funds investment by borrowing against the anticipated increase in property tax revenues due to that investment.

All of these tools come with pre-conditions, but there is certainly merit in cities exploring them, and a number have begun to do so already. It should be noted that development charges and property rates are existing land value capture tools available to cities. National Treasury is working on improving the regulation of development charges to promote better use of this finance source.

Reduce mandates and focus on the core

In a very constrained funding environment, the argument could be made for cutting or reducing mandates and focusing on core basic services provision. However, this would be counter to the current trend of increasing mandates for metros and would require strong political will and intergovernmental negotiation. From 2004 to 2014, the level of metro mandates and high-level responsibilities increased by 43% (SACN and City of Tshwane, 2017).

Reducing mandates and focusing on the core may include a full review of the powers and functions of metropolitan municipalities, as suggested in SACN and City of Tshwane (2017), to ensure that assigned powers and functions are fully funded. Alternatively, metros could simply choose to

focus on core service delivery mandates and to provide lower levels of service and expenditure on non-core mandates. Metros should review the services that they provide and ensure that they are appropriately structured. This requires having a strong handle on costs and the ability of customers to pay for the services. For services that are publicly provided, the overall availability of property rates to fund the services should be examined.

Increase existing transfers or introduce a new transfer

The analysis presents some evidence for the existence of a transfer gap, and an argument could be made for increasing the magnitude of existing transfers to metros. Indeed, SACN and City of Tshwane (2017) argue for an overall review of the vertical division of nationally raised revenues, to increase the magnitude of LGES allocated to local government, not only to metros.

Metros are increasingly seen as the engines for South Africa's economic growth that contribute significantly to nationally collected taxes. As such, an argument could be made for diverting existing transfer allocations to metros, through a new component of the LGES formula, or creating a new transfer to metros that focuses not on subsidising social expenditure but on economic expenditure and catalytic projects. However, poor economic performance in recent years means that the overall fiscus is currently constrained. In such an environment, metros will have to make very strong arguments for why existing monies in the fiscus should be diverted to increasing transfers to metros.

Introduce a new source of tax revenue

National Treasury rejected a previous attempt to introduce a local business tax on the grounds that introducing new (or increasing existing) taxes is unwise in an environment of slow economic growth. National Treasury also argued that metros have not fully exploited potential improvements to their own revenue collection and debt management, nor eliminated non-priority expenditure (RSA, 2013). Therefore, metros will need to maximise their current own revenue sources and, more importantly, the economy will need to recover before any new tax instrument can be proposed again.

Nevertheless, SACN and City of Tshwane (2017) have identified several options that involved either reassigning or sharing existing sources, or introducing a new source of tax revenues.[57] The options for reassigning or sharing tax revenues include:

- Property transfer duties, linked to the local property market;
- Tourism levies, linked to use of municipal services;
- Excise duties;
- The fuel levy for municipal roads; and
- Vehicle licence fees and public transport permits, linked to the public transport function.

Possible new tax revenue sources identified include:

- Personal income tax, through a surcharge to the current tax, tax sharing or a piggyback tax;
- Corporate income tax, through a surcharge to the current tax, tax sharing, a payroll tax or a piggyback tax;
- Property transfer duties, through a surcharge to current duties;
- Tourism levies, through a surcharge to current levies;

- A local business tax, through a payroll tax or tax on local turnover; and
- A city congestion charge, through road tolling, a vehicle licence surplus charge or special permit zones.

All options would have broader policy and technical implications and possibly require constitutional and other legislative amendments. Additional analysis is also required to determine the relative effects of these options on the overall funding mix of cities.

Chapter 5 examines potential revenue options for local government, as explored in the Alternative Metro Financing Models (AMFM) process.

Conclusion

Cities are engines of economic growth and home to 40% of the country's population, but their budgets are under pressure. With rapid urbanisation, demand has risen for both new and traditionally provided municipal services. An analysis of the nine metros' own revenues in 2015/16, using the MSFM and a Free Cash Flow model, found an estimated funding gap of R18-billion in 2017, projected to grow to R83-billion in 2026, i.e. a total gap of R569-billion over 10 years. This funding gap is on the capital account, as metros' operating revenues are sufficient to cover their operating expenditures. Despite funding from national and provincial government, and internal finance (including operating surpluses), metros do not have sufficient revenue to fully cover their capital expenditure. The funding gap comprises both an actual gap and a structural gap, which is a result of several factors, including unfunded (or under-funded) mandates, expenditure inefficiencies, inadequate transfers from national government and insufficient fiscal efforts by metros. The funding gap may be due to an individual metro's policy choices or poor performance, as well as to insufficient transfers from other government spheres. This gap is likely to widen further, given the need for climate change adaptation and mitigation and the changing patterns in electricity and water demand.

Closing the funding gap will require multiple interventions, some of which are within the metros' control and relatively easy to implement. These include improving expenditure efficiency and fiscal effort, increasing the revenue extracted from city services and assets, and focusing on their core service delivery mandates. However, the modelling found that interventions by metros alone will not completely close the gap. To achieve this will require interventions by national government, such as re-examining the powers and functions of metros, increasing the magnitude of transfers or introducing a new transfer/revenue source for metros. However, these measures may be difficult to achieve in the current constrained economic climate.

For cities to be able to continue contributing to economic growth and realising South Africa's development objectives, the gap must be closed. If not, metros will be unable to perform their core mandates over the medium to long term, implying unacceptable social consequences such as growing informal settlements and insufficient investment in maintenance of economic infrastructure. While cities can and should take steps to close the gap themselves, they must be supported where necessary by policy revision at the national level.

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CHAPTER 5

LOCALISING TAXATION

Key Messages

Cities need to be sustainably financed in order to meet the National Development Plan objectives and the sustainable development goals.

Under the current local government fiscal framework, metros are allocated a lower per-household equitable share and conditional grants than other municipalities.

An assessment of five possible revenue options found that cities should pursue a tourism levy in the short term and business tax in the long term.

Constant evolution has characterised the local government sphere since 2000, the year that South Africa formally adopted a democratic local government system with the first local government elections. This evolution has been driven by social, political and economic pressures that are most profound at the local government level. Unlike rural and semi-urban municipalities, which face service delivery and social development challenges, South Africa's cities are required to balance these developmental and social needs with the demands of being the country's engines of economic growth.

The local government fiscal framework enables municipalities to respond to service delivery needs within different contexts and an evolving local government sphere. Sections 227 and 229 of the Constitution of South Africa guarantee local government an equitable share of nationally raised revenue and empower municipalities to impose various taxes and levies. The funding model assumes that metropolitan municipalities (metros) have a greater revenue-raising potential than other municipalities because they have higher levels of economic activity (National Treasury, 2018). Therefore, intergovernmental fiscal transfers (via the equitable share and other grants), which are used to minimise the fiscal gap between expenditure needs and own revenues, are relatively biased towards smaller rural municipalities that have a limited tax base. Figure 41 illustrates the distributive nature of the local government fiscal framework. It shows that the equitable share and conditional grant per-household allocations are higher in the non-city (large town, smaller town and rural) municipalities than in metros.

FIGURE 41: Average equitable share and conditional grant per household by municipal type 2018/19 (R'000)

Note: Allocations to district municipalities are reassigned to local municipalities for illustrative purposes
Source: 2018 Annexure W1 to the 2018 Budget Review

With rapid urbanisation and the growing economic role of cities, the mandates of metros and secondary cities have increased, placing pressure on city budgets. Cities are faced with a growing demand for services and economic opportunities; they need to provide infrastructure and economic services, as well as manage climate change and the green economy.

Cities are a key factor for the achievement of South Africa's sustainable developmental agenda and the goals set out in the National Development Plan (NDP). To deliver on their social and economic responsibilities, cities need to be well-managed, sustainable and appropriately financed. A concern is the general revenue management and debt collection of local government, although cities collect more revenues owed to them than other municipalities do (SALGA, 2015). Yet even if cities collected all revenues owed to them, they would have a funding shortfall (as Chapter 4 explains). This structural funding gap[58] makes cities financially vulnerable and compromises their long-term sustainability and their ability to meet their mandates. A solution is to assign greater powers to metros and secondary cities, which would give them greater autonomy to manage their affairs and to fund their additional mandates, leaving national grants to focus on municipalities with lower revenue-raising potential.

The Alternative Metro Financing Models (AMFM) process, driven by the South African Cities Network (SACN) and the City of Tshwane, has explored potential revenue options for local government to bridge the current structural fiscal gap (Table 37).

TABLE 37: Revenue options identified in the AMFM process

NO	OPTIONS	POSSIBILITIES	IMPLICATIONS
1	Personal income tax (PIT)	Surcharge to current tax Tax sharing Piggyback tax	Broader policy and technical implications. Constitutional and other legislative amendments. City fiscal efficiency
2	Corporate income tax (CIT)	Surcharge to current tax Payroll tax Tax sharing Piggyback tax	
3	Property transfer duties (PTDs)	Surcharge to current duties Sharing of duties	
4	Tourism levy	Surcharge to current levies	
5	Local business tax	Payroll tax Tax on local turnover	
6	Wealth tax	Surcharge tax	
7	City congestion tax	Roll tolling Vehicle license surplus charge Special permit zones	

Source: SACN and the City of Tshwane (2016)

This chapter assesses the practicality of the AMFM revenue options using a *revenue assessment matrix,* which comprises:

- the *municipal revenue assessment matrix* that assesses the potential revenue and administrative impacts on city governments of the AMFM revenue sources; and
- the *macro revenue assessment matrix* that measures the economic rationale for AMFM revenue sources and the ease of implementation in the current legal and policy framework of the country.

After briefly discussing the evolution of the local government fiscal framework, the chapter presents principles for assessing potential revenue sources in a decentralised system of government. The *revenue assessment matrix* is then described and applied to the AFMF instruments. The chapter concludes with a summary of the key findings and a set of recommendations.

The Evolution of Local Government Taxation

A comprehensive legal framework underpins the local government fiscal framework, starting with the Constitution. Chapter 7 of the Constitution defines local government's powers and functions within South Africa's three-sphere intergovernmental fiscal system. Schedules 4B and 5B of the Constitution lists the functional areas of local government. Chapter 13 of the Constitution assigns the revenue powers required to fund these services. In most cases, revenue assignments are linked closely to expenditure assignments, as the local government revenue source or base is within the functional area of the municipality.

- Section 229 covers municipal revenue sources: municipalities are allowed to impose a tax on property, surcharges on fees for services provided, as well as taxes, levies and duties authorised by national legislation. They cannot impose income tax, value added tax, general sales tax and customs duties (surcharges on these taxes are revenue powers assigned to provincial government, as per Section 228). The constitutional restrictions placed on local government revenues have consequences for some of the options proposed in the AMFM process.
- Sections 214 and 227 allow for an equitable sharing of nationally raised revenues across the three spheres of government, which gives effect to the local government equitable share grant and conditional grants.

In addition, various pieces of legislation enable and regulate municipal own revenue sources: the Municipal Systems Act (No. 32 of 2000), with other sector legislation, regulates municipal tariffs; the Division of Revenue Act regulates transfers to local government, and the Municipal Finance Management Act (No. 56 of 2003) deals with municipal debt financing and public private partnerships.

From 2004, three events resulted in major changes in the municipal fiscal framework:

The enactment of the Municipal Property Rates Act (MPRA)

The MPRA (Act No. 6 of 2004) introduced changes in the way municipalities impose property rates, including different ratios for rateable property and potential upper limits to rates increases, as determined by the legislation.

The enactment of Municipal Fiscal Powers and Functions Act (MFPFA)

The MFPFA (Act No. 832 of 2007) regulates the imposition of municipal taxes (excluding property rates) and surcharges and includes a provision for municipalities to apply for additional taxes to the Minister of Finance. Section 8 allows the Minister of Finance to regulate the imposition of surcharges by declaring norms and standards on various aspects, including maximum surcharge rates. However, this section has yet to be implemented because of institutional issues.[59] Until these issues are resolved, Section 8 of the MFPFA remains a challenge and represents a potential revenue loss for municipalities.

The abolition of the Regional Services Council (RSC) and Joint Services Board (JSB)

This was perhaps one of the most significant changes, as the RSC and JSB levies were a relatively important revenue source for metropolitan and district municipalities, and used to support the provision of basic services infrastructure. The levies were phased out on 30 June 2006 because their design contradicted sound taxation principles (National Treasury, 2005). As an interim measure, to protect the revenue of affected municipalities, an RSA Levy Replacement Grant was introduced, until a suitable replacement for the RSC levies could be found.

In 2009, a share of the general fuel levy officially replaced the RSC levy grants for metropolitan municipalities. Although promoted as revenues to support transport infrastructure, these funds contribute directly to the municipal revenue fund and constitute general revenues (National Treasury, 2009). Similar to an unconditional grant, the fuel levy is distributed to each metro as a share of a fixed sum.[60] Although the RSC levies were abolished for possibly the correct economic reasons, metros have limited control and flexibility over the replacement revenue (a share of the fuel levy). There is still no replacement for the RSC levies in district municipalities.

As the former RSC levies were similar to a local business tax, the possibility of applying for the local business tax via Section 5 of the MFPFA has been proposed in many circles. eThekwini and the South African Local Government Association (SALGA) have made separate applications to the Minister of Finance for a local business tax, but the applications were not successful. The Minister of Finance cited an adverse economic environment as the reason for rejecting these applications. Yet discussions regarding a local business tax continue; such a tax was a key recommendation to emerge from the AMFM process. This chapter includes a local business tax as an AMFM option but does not go into any detail about its design.

Any potential additional revenue sources must work within the comprehensive legal framework that underpins the local government fiscal framework and ensures that municipal fiscal powers are well regulated and mostly aligned with their constitutional mandates. While constitutional and legislative amendments are possible, these processes are prolonged and difficult to implement.

Guiding Principles

In a system of fiscal decentralisation, *finance following a function* is the usual principle that underpins revenue assignment, i.e. it is best practice to assign expenditure to a sphere of government before assigning revenue instruments (Martinez-Vazquez, 2007). Assigning expenditure mandates and revenue powers across different spheres of government is both an economic and a political decision, and such decisions can change over time as a country's social, economic and political context change.

The three general functions that should guide the assignment of expenditure functions and revenue powers are macroeconomic stabilisation, income redistribution and resource allocation (Musgrave, 1959). In general, policy decisions related to macroeconomic stabilisation and income redistribution are best assigned to national government, while policy decisions about using resources to provide optimal goods and services that meet the preferences of different local communities are best assigned to subnational governments (Ajam, 2015).

Two principles are used to assess the fairness of a revenue instrument or tax on society:

1. The *benefit* principle: what people pay should mirror what they receive in the form of services.
2. The *ability to pay* principle: people should pay in terms of what they can afford. Therefore, individuals who earn higher incomes should contribute more to local government taxes or other revenue sources than lower-income individuals.

With regards to the *ability to pay* principle, local government revenue instruments can be either progressive or regressive. Progressive is when people who earn more contribute more to the tax or revenue source. Regressive is when people earning less contribute relatively more of their income to the tax or revenue source. Regressive revenue sources are not ideal in countries such as South Africa that drive a policy agenda of re-distribution.

Another aspect to consider for taxes imposed by municipalities is that people and capital are relatively more mobile across municipalities than across countries or regions. Therefore, municipal taxes should not encourage the unnecessary mobility of resources across jurisdictions, i.e. people or companies should have incentives to move from one municipality to another to avoid higher taxation. Usual best practice for local government is to impose non-benefit (*ability to pay*) revenue instruments on relatively immobile bases and *benefit* revenue instruments on mobile economic units. The ideal is that mobile taxpayers (such as people or companies) see the benefit from a tax that they are paying, and so have no incentive to move to other locations.

Types of Local Revenue

This section describes the different types of local revenue and assesses them in relation to the benefit and ability-to-pay principles.

Local taxes

A tax can be defined as "a compulsory extraction from a taxpayer paid in cash or in kind to the government to provide for the public services of common interest" (Peeters et al., 2005: 7). Taxes usually have four primary characteristics that distinguish them from other local revenue sources. A tax is:

- a compulsory payment to government;
- a payment to government or a state organ;
- *unrequited,* i.e. a taxpayer may not receive a direct benefit equal to the tax amount paid (taxes collectivise the cost of a service and spread the benefits to the wider population);
- imposed for public purposes, i.e. to buy public goods or as an intervention to limit negative externalities (e.g. pollution created when someone drives a car).

Taxes usually hold up better to the ability to pay principle than to the benefit principle. In South Africa, the main local government tax is the property tax, or property rates. Property taxes are levied as a percentage of the assessed value of all (residential, commercial, industrial) properties and parcels of land located within a municipal jurisdiction. Property rates take the true meaning of a tax, as the proceeds form part of a municipality's general revenue fund that is used to provide general services and meet its mandates. In other words, revenues from property rates are not earmarked for specific expenditure items, and taxpayers receive no direct benefits relative to what they pay (although there are indirect benefits that can accrue to higher paying individuals).

Fees

The difference between fees and taxes is that the individual paying the fee derives a benefit proportionate to the fee paid. In other words, an individual pays fees for a specific benefit or privilege gained from the use of a good or service, whereas a tax is a payment without a direct exchange of a good or service. Like taxes, fees are an important revenue source for government. An additional benefit of charging fees is that, by quantifying the benefit placed on providing the good or service, they function as a "price" for the local good or service (Martinez-Vasquez, 2007). This in turn leads to resources being allocated appropriately for the delivery of the good or service by the public sector.

Fees can be divided into regulatory fees (e.g. inspection fees); user charges for consuming a service provided by government (e.g. electricity tariffs, refuse removal) and licence fees. User charges, fees and taxes that are related closely to benefits received by the payer are all appropriate for goods and services that are characteristic of private goods.[61] User charges are often used to cover the costs of providing the good or service, not for general governmental needs, and can vary depending on the customer's location, the type of service provided or other variables that differentiate customers.

In South Africa, the main fees charged by local government are user charges for services rendered. User charges allow (i) municipalities to recover the costs of service delivery and (ii) customers to benefit directly from the service that they are paying for. Therefore, fees adhere better to the *benefit* principle than to the *ability to pay* principle. It can be argued that user charges are regressive, as poor households tend to pay more for services relative to their incomes than richer households. South Africa's free basic services (FBS) policies are intended to minimise the apparent regressive nature of user charges. This suggests that South Africa applies the *ability to pay* principle to both taxes and user charges, although the theory suggests that this principle applies more to taxes than to fees.

Levies

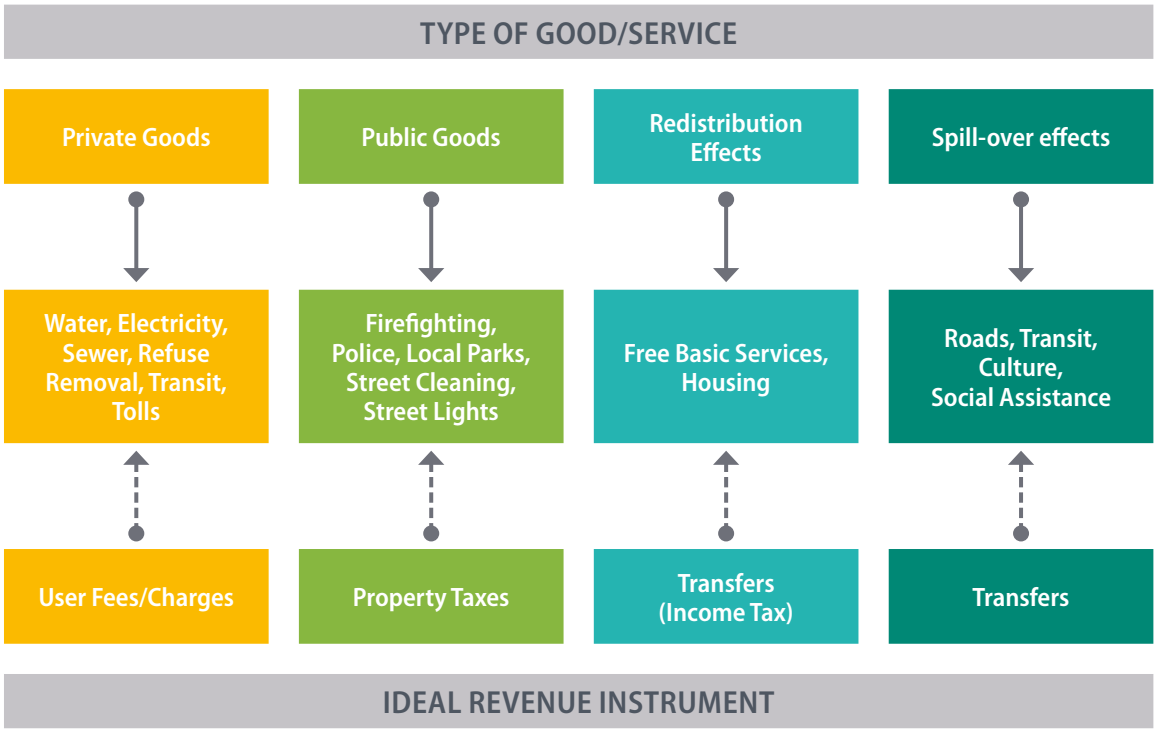
Unlike fees, a levy is usually a temporary measure to raise revenue for a specific social or economic purpose, or to mitigate (e.g. environmental) crises, or where a municipality incurs a temporary cost, such as in the case of development charges/levies. Temporary levies have a tendency to become permanent, e.g. the fuel levy in South Africa has been in existence since 2006. This suggests that the distinctions between levies, fees and even taxes are becoming blurred. The literature also shows that society is often more willing to pay levies than taxes because of the belief that levies are temporary and are imposed to fulfil a well-established social or public need.

Linking Revenue Instruments to Service Types

There are some generally accepted norms of how to use the revenue instruments explained in the previous section to fund different local government services. Figure 42 provides an overview of how each good or service should ideally be funded (Slack, 2009).

- User charges are preferable for services that are excludable (private goods) such as water, electricity and refuse removal, because the fee attaches a price to the benefit received by the customer and does not promote unnecessary movement of people and businesses.
- Taxes are applicable for public goods,[62] such as fire-fighting, street cleaning or street lights, because these goods provide a communal benefit, i.e. the entire community benefits.
- Transfers are preferable for goods/services with either redistributive or spill-over effects.

FIGURE 42: Linking revenue instruments to service delivery



Source: Slack (2009)

Criteria for a good local revenue instrument

In addition to the theoretical principles that should guide the assignment of revenue powers across spheres in a decentralised governmental system, other principles and criteria are used to assess whether a revenue source can be considered a *good* local revenue source. A good revenue source, specifically a good tax, should be fair and effective in the sense that it raises the needed revenue for governments to carry out their mandate and it is efficient, minimising the burden on citizens (Bird, 2001; Swianiewitz, 2003). Table 38 summarises 12 characteristics of a good local revenue source/tax.

TABLE 38: Characteristics of an ideal revenue source/tax instrument

	CHARACTERISTICS	DETAILS
1	Revenue adequacy	The administrative burden of the revenue source should not outweigh the revenue generated.
2	Certainty	Certainty in a revenue system is essential, as government and taxpayers can neither budget nor plan effectively without certainty. Government and consumer spending plans should be based on realistic assessments of expected revenue flows.
5	Equity and fairness	The revenue system should be equitable, fair and affordable. A quality tax system should be both vertically equitable (i.e. taxpayers with different incomes should pay according to their ability to pay) and horizontally equitable (i.e. taxpayers in similar circumstances should be treated similarly).
6	Correspondence	The revenue instrument should not be levied on citizens who are not part of the local community nor should the burden of the revenue overlap to adjacent jurisdictions whose citizens do not benefit from the expenditure of funds.
7	Revenue buoyancy	The tax base should be stable, especially during economic cycles. Revenues from a local tax should be buoyant during times of economic growth and not vulnerable to negative turns in the economy.
8	Efficiency, economic neutrality and simplicity	A good tax should cause the lowest possible economic distortion and have a minimal impact on the spending and business decisions of firms and individuals. It should be simple to administer and easy for the average citizen to understand.
9	Politically acceptable	The revenue system should be sensitive to the historical and institutional framework in the country.
10	Balance and reliability	An effective revenue system should be broad based, avoid special exemptions and use a low overall tax rate with few loopholes.
11	Complementary	The tax system should recognise the complementary roles of different orders of government and assist in maintaining a healthy relationship among different spheres of government. Each organ of state should be mindful of how its tax decisions affect other spheres of government.
12	Competitiveness	The tax system should be responsive to the global competitiveness of a country and its goods and services. It should be used to attract investment and foster economic development.
13	Enhanced local fiscal autonomy	The sub-national government should have sufficient control over all aspects of the revenue source or tax to improve the lines of accountability with its citizens.
14	Limited horizontal fiscal imbalances	The revenue source should not create large imbalances among municipalities.

Source: FFC (2012); Martinez-Vazquez (2007)

The characteristics described in Table 38 are not exhaustive, and several criteria are similar in their measurement or interpretation. In practice, it is extremely unlikely for any revenue instrument to adhere to all of these criteria. There are likely to be trade-offs when determining the appropriateness of a revenue instrument for local government and subjective views when prioritising the characteristics (resulting from a country's unique economic, social and political stance in a given period). Therefore, developing a *revenue assessment matrix* using some of the criteria above provides a quasi-quantitative method by which new revenue instruments can be assessed for their practicality and ease of implementation.

The argument for localising taxation

In South Africa, national government collects most of the country's revenue and accounts for just over half of total government spending, followed by provincial government and local government (approximately 20% takes place at local level).[63] Faced with rising debt-servicing costs and an increasing debt-to-gross-domestic-product (GDP) ratio, national government is under pressure to consolidate the national budget. In this macroeconomic environment, it is difficult to argue for additional taxation or revenue powers for local government – the proposed local business tax in terms of Section 5 of the MFPFA was rejected because of concerns that additional local taxes would depress the economy.

Yet South Africa's Constitution explicitly recognises the role of local government in service delivery and local economic and social development. While the bulk of revenue collection lies with national government, local governments (especially cities) face the immediate pressure of rapid urbanisation, growing unemployment, climate change and other social needs. Although faced by cities, these pressures are of national priority and thus require an immediate fiscal response. This is not taken into account appropriately in the current assignment of revenue powers and functions and the design of intergovernmental fiscal transfers. In fact, the equitable share and conditional grants to metropolitan municipalities and secondary cities can be considered as blunt instruments to deal with the pressures faced by modern cities.

Over time, the assignment of revenue powers shifts to reflect changes in expenditure responsibilities and to address challenges specific to a certain sector of government. In this regard, the differentiation of municipalities (recognising the unique situation of cities) becomes paramount. Differentiation should be applied not only to the design of intergovernmental transfers, but also to the assignment of revenue powers and functions. City governments have the economic base and a relatively better institutional capacity to take on more revenue sources that will allow them to tackle challenges, which other municipalities, and even national government, do not face. Assigning additional revenue sources to city governments will empower them to deal with certain pressures that are unique to them but are issues of national policy priority. Therefore, the country should prioritise localising some revenue sources that meet key design and implementation criteria, as this will assist in dealing with various national issues.

Assessment of the AMFM Revenue Options

To assess the impact of some of the AMFM options highlighted in Table 37, a two-pronged Excel-based *Revenue Assessment Matrix* was developed, comprising:

- A *municipal revenue assessment matrix* that assesses the impact of the new revenue source on the city's finances and the ease of administering it. In other words, the matrix describes the "internal" impact of a new revenue source.
- A *macro revenue assessment model* that assesses whether the new revenue source is a "good" revenue source, i.e. it adheres to the economic principles in Table 38, and the ease of implementing it in the current legal, policy and economic environment. In other words, the matrix looks at the macroeconomic and legal implications of a new revenue source.

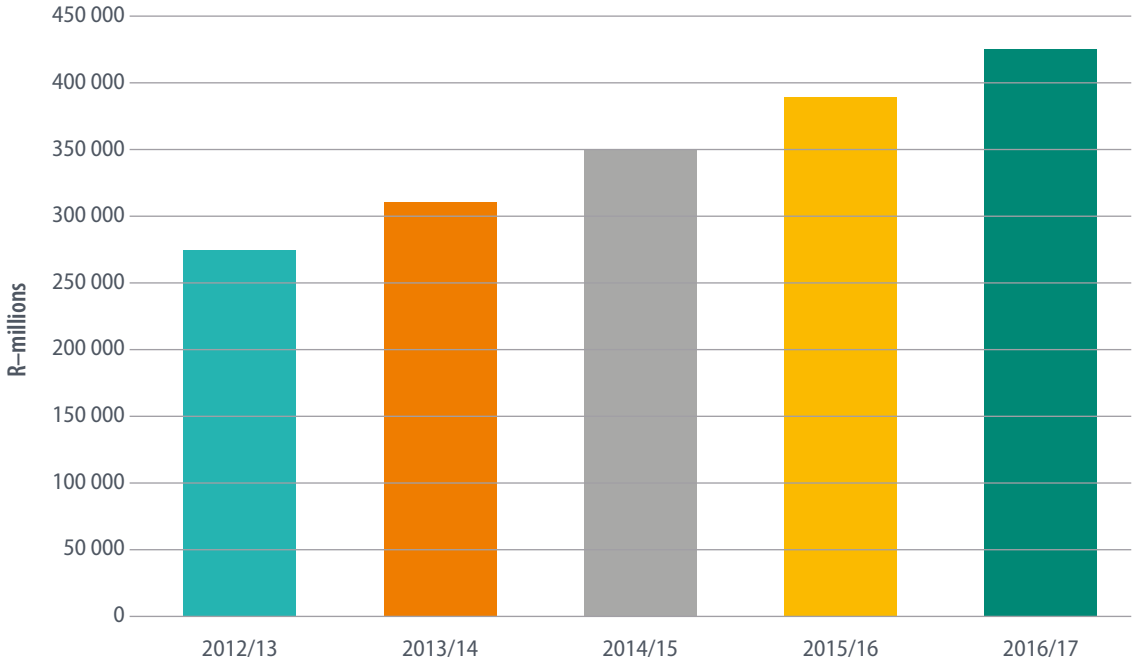
The Annexures provide details of the sub-factors used to measure the primary factors described above, and the assumptions placed on filtering the revenue options through the two matrices.

Only the first five options are assessed using the municipal and macro-revenue assessment matrices. More in-depth analysis is needed to make an informed judgement on the criteria. This section provides a brief analysis of the impact of each AFMF revenue option on a city's finances and administration (*municipal revenue assessment matrix*) and the legal and macroeconomic implications (*macro revenue assessment model*).

Personal income tax

Personal income tax (PIT) is one of the most important taxes for the national fiscus, contributing 37% of total tax revenues in 2016/17 (SARS, 2017). Over the past five years, PIT revenues have grown consistently, reaching R424-billion in 2016/17 (Figure 43).

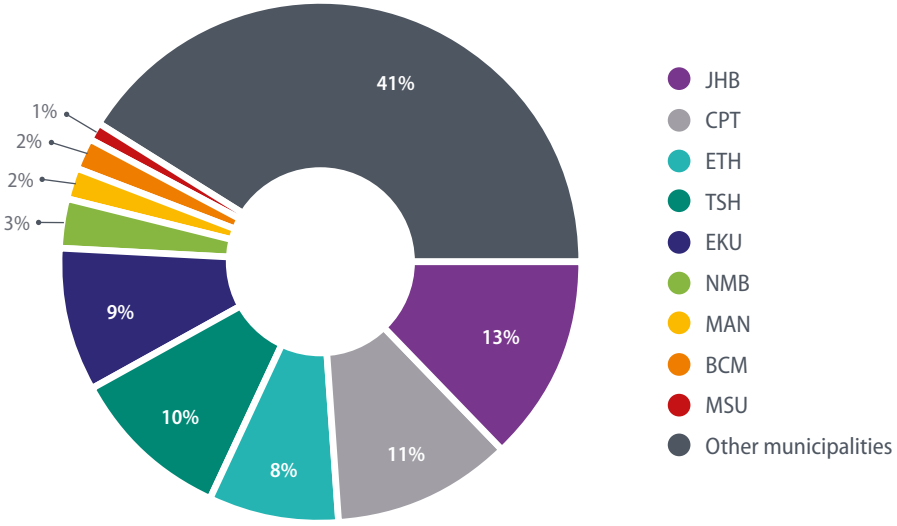
FIGURE 43: Growth in PIT revenues (2012/13–2016/17)



Source: SARS (2017)

PIT is constitutionally assigned to national government, but provinces are allowed to apply a surcharge to the national tax rate (yet this right has never been exercised). The potential revenues from PIT are considerable, through both a surcharge to benefit local government and a sharing mechanism. A surcharge of 10% would generate R40-billion, while 59% of revenues would go to the metros if the sharing mechanism were based on the number of individual taxpayers or contribution to income tax revenues (Figure 44).

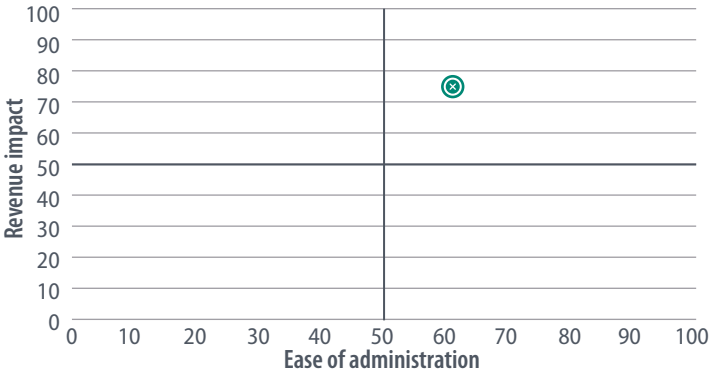
FIGURE 44: Share of assessed taxpayers by metro (2016)



Source: SARS (2017)

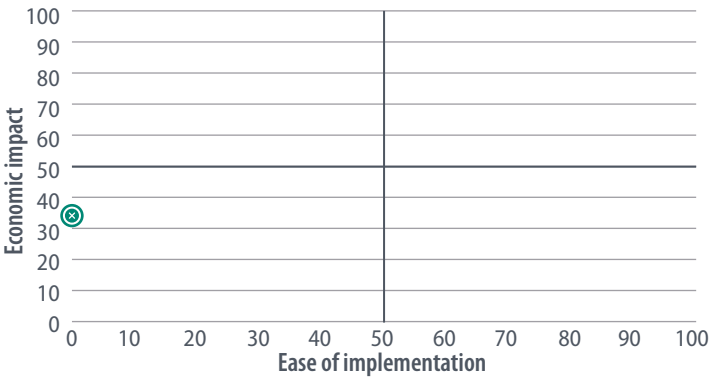
Figures 45 and 46 illustrate the impact of a PIT sharing or surcharge arrangement on municipal revenue and on macro revenue.

FIGURE 45: Municipal revenue assessment – PIT



The PIT option would be a strong municipal revenue source and fairly easy to administer. If the South African Revenue Service (SARS) continues collecting the tax or collects on behalf of the municipality, implementing this tax would not result in additional costs.

FIGURE 46: Macro revenue assessment – PIT



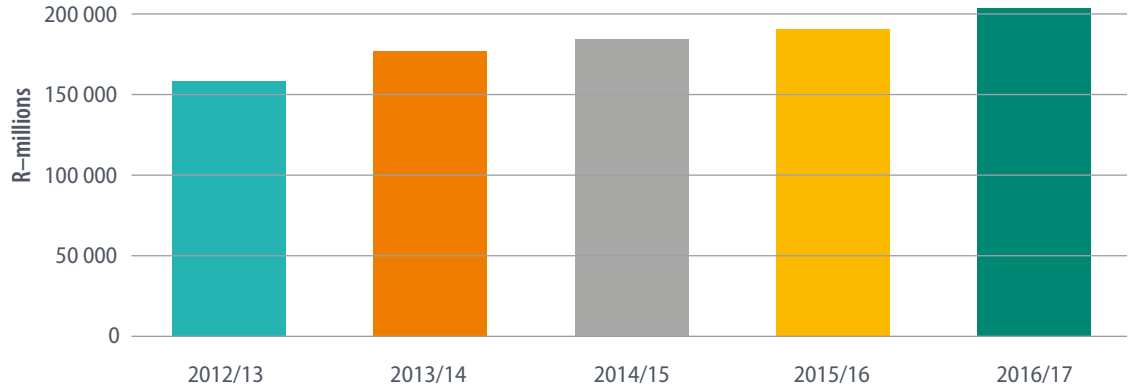
Difficult to implement because a constitutional change would be required for local government to levy a surcharge, as currently this is a provincial government right.

Negative economic impact if different surcharges in different cities, as individuals (mobile tax bases) might move to avoid tax.

Corporate income tax

Corporate income tax (CIT) is also an important national government tax, contributing about 18% of total tax revenues in 2016/17 (SARS, 2017). Over the past five years, CIT has grown by about 28%, exceeding R200-billion in 2016/17 (Figure 47).

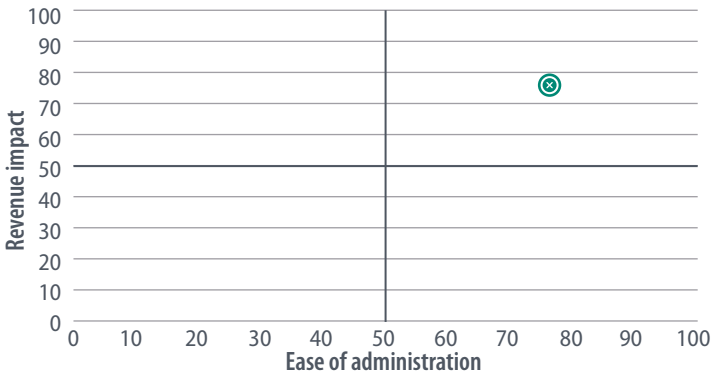
FIGURE 47: Growth in CIT revenues (2012/13–2016/17)



Source: SARS (2017)

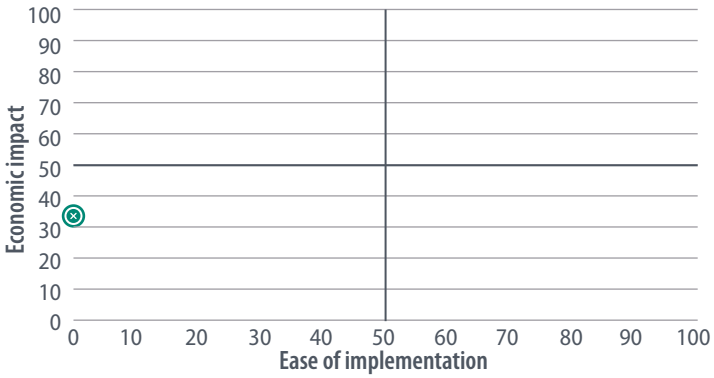
Although not as high as PIT, the CIT option can still contribute significantly to city budgets. A 10% surcharge applied to local government would contribute over R20-billion in revenues.

FIGURE 48: Municipal revenue assessment – CIT



The CIT option generates substantial revenues, is easier to administer than the PIT option and (assuming SARS collects the revenue) will not result in extra costs. A surcharge would afford greater control over the tax rate than a tax-sharing arrangement.

FIGURE 49: Macro revenue assessment matrix – CIT



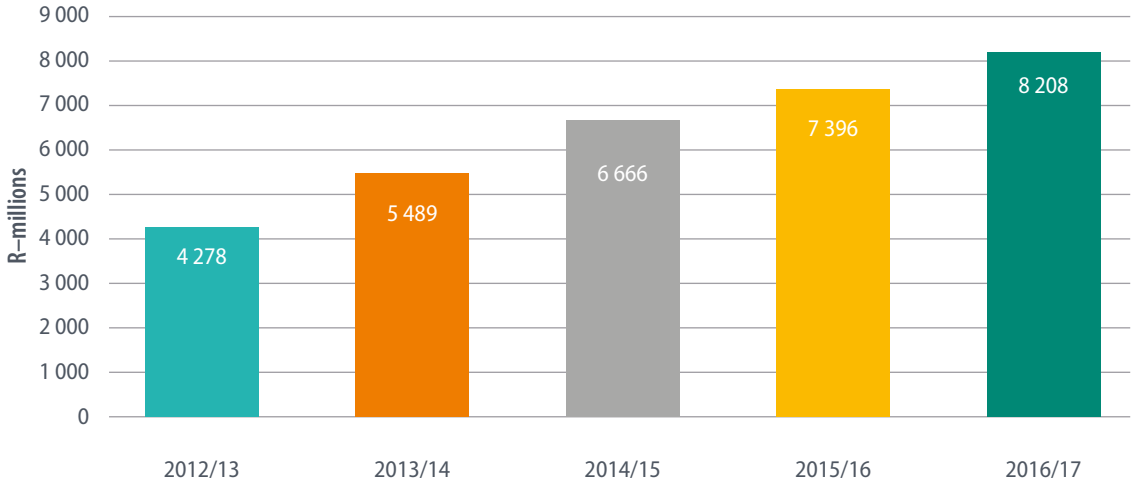
Difficult to implement in short/medium term because of the need for a constitutional change (as with PIT).

Negative economic impact, as individuals (mobile tax bases) might move to avoid tax if cities have different surcharges.

Transfer duties

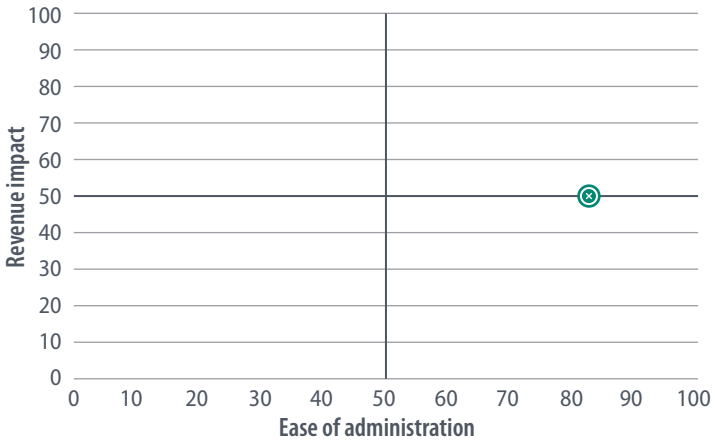
Transfer duties are taxes paid when property is transferred during a sale and are collected by national government. Over the last five years, revenues from transfer duties have almost doubled, from R4.2-billion to R8.2-billion in 2016/17 (Figure 50).

FIGURE 50: Growth in transfer duties (2012/13–2016/17)



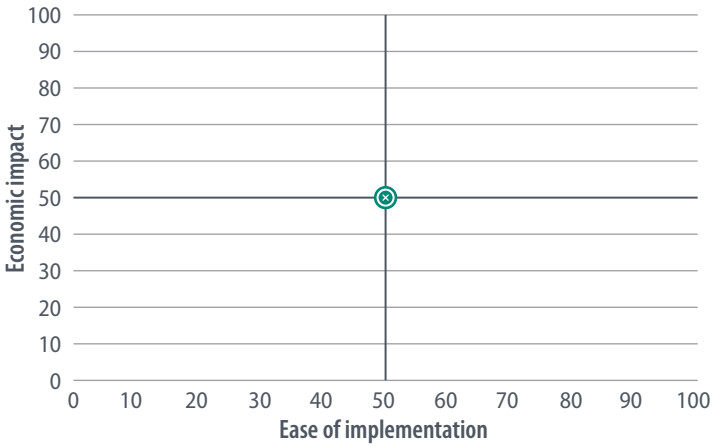
Compared to the CIT or PIT options, a sharing or surcharge arrangement on transfer duties would not generate a substantial amount of revenue. To have a substantial impact on city budgets, all transfer duties would have to be assigned to local government. Given that municipalities also levy property rates, the administration and infrastructure would be in place to take over the tax.

FIGURE 51: Municipal revenue assessment – transfer duties



Would not generate substantial revenues (average score), but the ease of administration is high because arrangements are likely to be similar to those for the CIT and PIT options.

FIGURE 52: Macro revenue assessment – transfer duties



Easier to implement than the CIT/PIT options, as would only require a legislative change (e.g. to the Tax Amendment Bill).

Fiscal constraints mean it is unlikely that this tax would be assigned to local government, especially in the short/medium term.

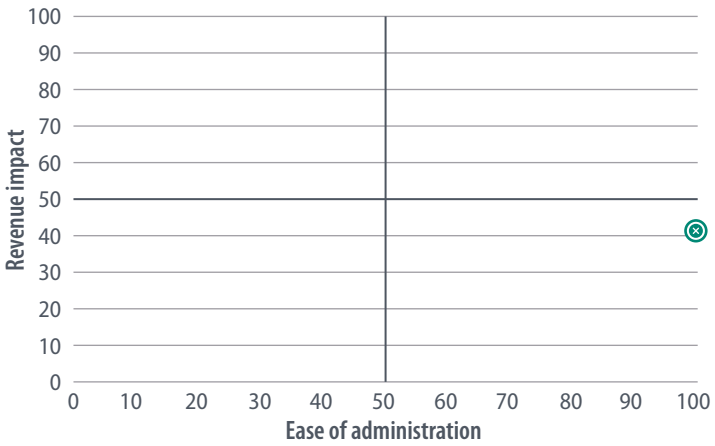
This is a good local tax, as transfer duties are linked to an immobile tax base.

Tourism levies/occupancy tax

Tourism levies[64] are a potential revenue source for cities, either through a surcharge or a share of the levies. While tourism levies remain a viable option, the occupancy tax option was assessed for the purposes of this chapter. An occupancy tax (hotel or transient occupancy tax) is charged to guests temporarily occupying a room in a hotel, bed-and-breakfast, boarding house or Airbnb and in some instances camping sites. It is a tax because taxpayers experience no direct benefit from the municipality, and it can be used to fund municipal general revenues. Most cities in the USA have this tax – in New York City, the tax is based on the rental amount of the room and is paid by the person occupying the room and collected by the person providing the service of the room.

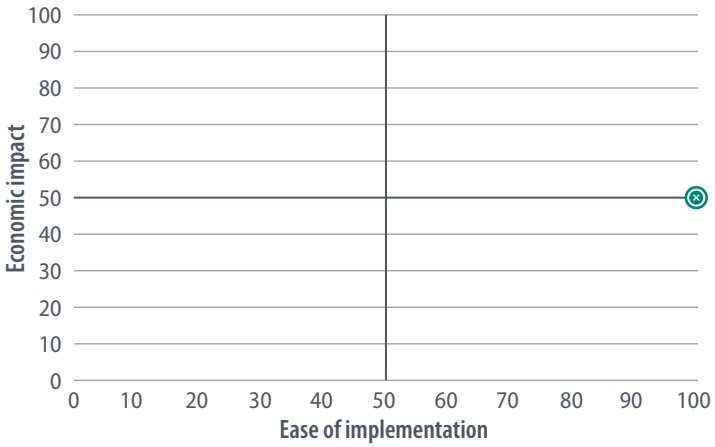
To properly assess the revenue potential of an occupancy tax would require estimating the revenues that could be generated and comparing these to municipal budgets and the fiscal gap requirements. However, as the data available is insufficient to be able to make any major assumptions about the potential revenues, the comparison is limited to the other taxes analysed in the chapter.

FIGURE 53: Municipal revenue assessment – occupancy tax



Compared to the PIT and CIT options, revenues would not be substantial but could be an important revenue source for cities. Furthermore, existing systems could be used to implement the tax.

FIGURE 54: Macro revenue assessment – occupancy tax



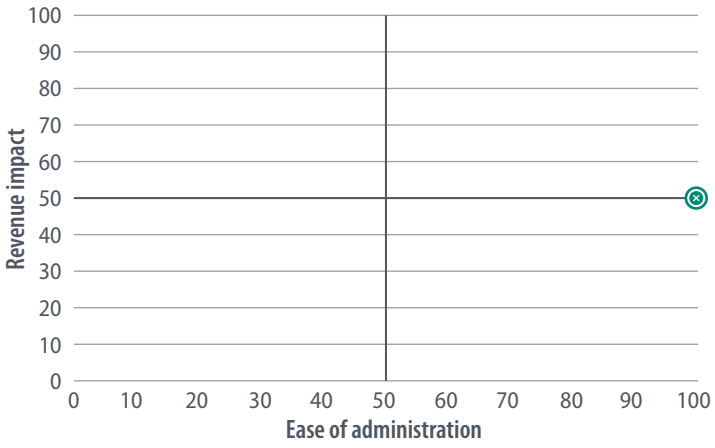
Easily implementable and would have an average economic impact. This suggests that, of all the taxes, the occupancy tax would be the most viable option based on the macro revenue assessment.

Local business tax

A local business tax has been proposed several times as the ideal replacement for the abolished RSC levies because it would mirror the design of the RSC levies by linking revenues to business turnover and payroll. The chapter will not go into extensive detail about such a tax's design and implementation.

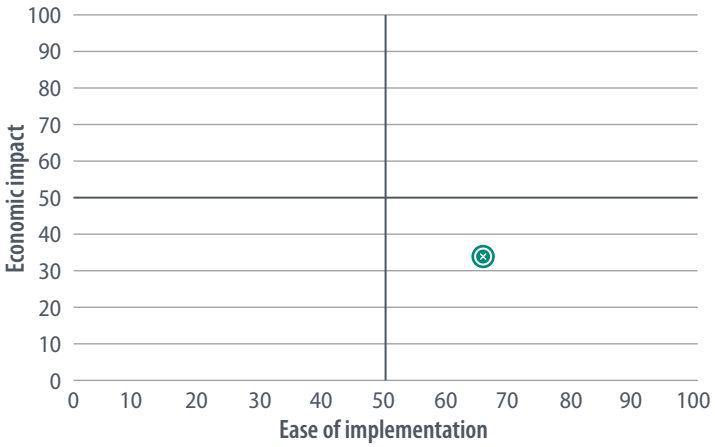
As with the other revenue instruments discussed thus far, the local business tax remains a very easy tax to implement immediately in local government from a municipal perspective. See Figure 55. Assuming that the revenues from the local business tax would not be too dissimilar to that of the RSC levies, the local business tax would have a medium revenue impact. The local business tax is also a good option for local government.

FIGURE 55: Municipal revenue assessment – business tax



Easy tax to implement immediately in cities and, assuming that the revenues would be similar to the RSC levels, it would have a medium revenue impact. Therefore, a local business tax is a good option for cities.

FIGURE 56: Macro revenue assessment – business tax

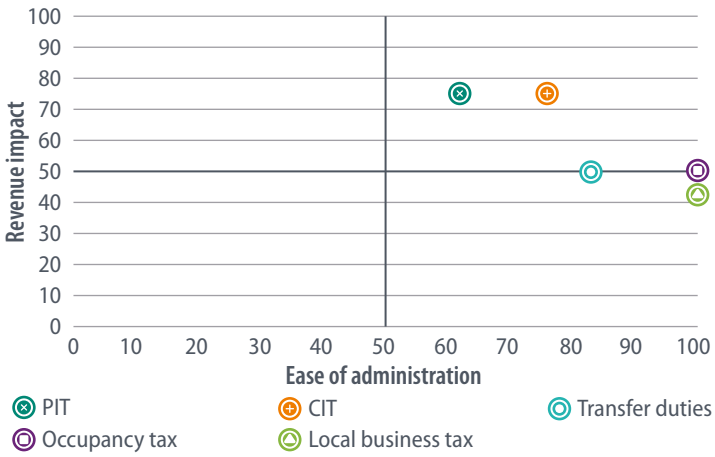


The tax is quite implementable in the current political and legal environment. However, given the current state of the economy, a local business tax could depress economic activity, affecting economic growth. This impact remains an obstacle to the tax, as general economic growth is required in the short-to-medium term.

Summary of revenue options

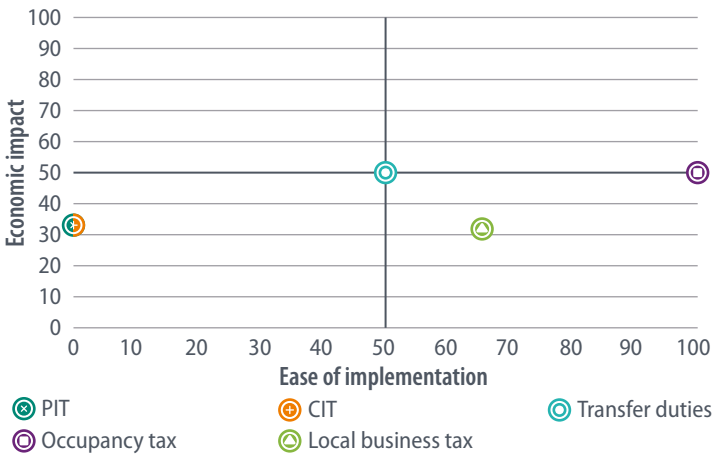
Figures 57 and 58 summarise the scores from both the matrices of all the revenue instruments assessed.

FIGURE 57: Municipal revenue assessment – summary



Most of the taxes will have an important impact on city revenues and will be easy to administer. The PIT and CIT options will have the highest impact on revenue.

FIGURE 58: Macro revenue assessment – summary



The PIT and CIT options would be difficult to implement in the short term because of constitutional constraints and would have a negative impact on the economy (because of tax mobility). The occupancy tax would not have a negative economic impact and would be the most easily implementable option.

Conclusion

Cities are the country's engines of economic growth but are under pressure from rapid urbanisation and the increased demand for services. Because of their higher levels of economic activity, under the local government fiscal framework, metros are allocated a lower per-household equitable share and conditional grants than other municipalities. However, despite having better revenue management and debt collection than other municipalities, metros have a funding shortfall (as explained in greater detail in Chapter 4). This structural funding gap, which would exist even if metros collected all revenues owed to them, compromises their sustainability and ability to fulfil their mandates. One solution is to assign greater powers to metros, giving them greater autonomy to manage their affairs and fund additional mandates. The AMFM process, driven by SACN and the City of Tshwane, has explored potential revenue options for government.

Before assessing the practicality of various AMFMs, this chapter explained the evolution of local government taxation in South Africa, and described the underlying principles that have to be borne in mind when devising a city-based taxation system. The principle that underpins revenue assignment in a fiscal decentralisation system is "finance following a function", i.e. it is best practice to assign expenditure to a sphere of government before assigning revenue instruments. The two principles used to assess the fairness of a revenue instrument or tax on society are the *benefit* principle and the *ability-to-pay* principle. These two principles were used to assess the different local revenue instruments (i.e. local taxes, fees and levies), which were matched to the type of good/service to be delivered.

Five of the seven revenue options identified in the AMFM process were then assessed using a municipal revenue matrix (to assess the potential revenue and administrative impacts on city governments) and a macro revenue matrix (to assess the economic rationale and ease of implementation in the current legal and policy framework). Municipalities can use the results of these assessments when considering imposing new revenue sources or when applying for a new tax instrument via the MFPFA. The analysis found the following:

- PIT and CIT would be strong municipal revenue sources and fairly easy to administer. However, they would be difficult to implement because they would require a constitutional change and would have a negative economic impact.
- Transfer duties (property taxes) would not bring in substantial revenue but would be easy to administer. While easier to implement than the PIT/CIT, this tax is unlikely to be assigned to local government because of national fiscal constraints.
- Occupancy tax would also not bring in substantial revenue but could be an important revenue source for cities. It would be easily implementable and would have an average economic impact. Off all the options, the occupancy tax would be the most viable one based on the macro revenue assessment.
- A local business tax would be easy to implement and is a good option for cities. However, the obstacle to such a tax is its potential negative impact on economic growth.

In brief, to generate more revenue, cities should consider introducing an occupancy tax in the short term, while continuing research on a local business tax for implementation in the medium term.

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Annexure: The Development of a Revenue Assessment Matrix

The two-pronged Revenue Assessment Matrix[65] comprised:

- A *municipal revenue assessment matrix* that assesses the potential impact of new revenue sources on the financial position or budget of the city as well as the potential burden of administering the revenue source.
- A *macro revenue assessment model* that assesses primarily whether new revenue sources introduced at city level adhere to the criteria of a *good* revenue source and whether such a revenue source can be implemented in the current legal, policy and economic environment.

Municipalities or organised local governments (i.e. SALGA) that are considering the imposition of a new revenue source or tax are required to do so via the process and prescripts of the existing legislation. If municipalities want to impose new taxes, they must apply via the MFPFA. Therefore, the *municipal revenue assessment matrix* is a descriptive tool that cities can use to determine the potential "internal" impact of a new revenue source. This can assist in evaluating the merits of new revenue sources for a potential application via the MFPFA.

While a revenue source can have significant impacts on the budgets of cities and the benefit of imposing the tax outweighs any administrative or internal other costs, the National Treasury must also look at the overall macroeconomic and legal implications of such a tax when considering an application via the MFPFA. To this end, the *macro revenue assessment model* evaluates the revenue source against economic factors, such as the efficiency and equity of the revenue source, and the potential legal or policy implications of the tax.

Municipal revenue assessment matrix

The *municipal revenue assessment matrix* consists of two primary factors: the *revenue impact* and the *ease of implementation* of the revenue source. Various sub-factors are used to measure the two primary factors (Table 39).

The *revenue impact* primary factor is informed or measured by three sub-factors that measure:

- the potential revenue that the tax or revenue instrument can generate;
- the buoyancy of these revenues;
- whether municipalities benefit from the "head office" problem.

The *ease of administration* factor comprises three sub-factors measuring:

- whether the potential revenue source is transparent and acceptable to local politicians and communities;
- the degree of control over the revenue source;
- the infrastructure needed to impose the revenue source.

TABLE 39: Primary factors and sub-factors of the municipal revenue assessment matrix

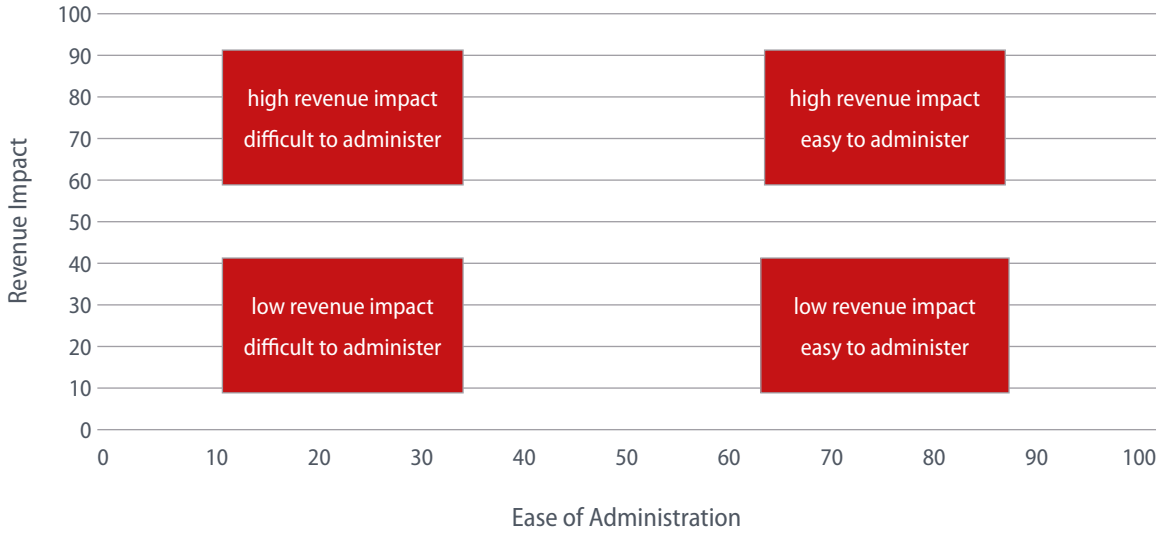
REVENUE IMPACT	EASE OF ADMINISTRATION
Potential revenue yield and certainty	Local transparency and acceptability
Revenue buoyancy and stability	Degree of control of revenue source
Fiscal imbalances	Infrastructure to implement revenue source

Table 38 provided 12 criteria that can be used to assess a *good* local government revenue instrument. The *municipal and macro revenue assessment matrices* both use the 12 criteria to develop a set of sub-factors for the two primary factors. To be able to place a revenue instrument on a four-quadrant plane, a quantitative depiction of the applicability of the revenue source is required, not a qualitative assessment. However, this is difficult when the assessment method is qualitative in nature, i.e. a revenue source adheres to a criterion fully, to a certain extent or not at all. To address this issue, each sub-factor is given an equal weighting, which sums up to 100 for each primary factor. For example, the *revenue impact* and *ease of administration* factors each scored 100 points.

As the matrix places the tax on a four-quadrant plane, revenue instruments should not be assessed based on the sum of both factors, i.e. adding the scores of both factors. This is because both factors have the ability to counter each other. For example, a revenue instrument can have quite a high overall score, but the score is skewed towards either one of the factors – the tax may be easy to administer but will not have as large an impact on revenues. It is also possible to have a tax that has a lower overall score but is both easy to administer and will have a greater economic impact than others, although on a lower scale.

Figure 59 shows a four-quadrant diagram with the *revenue impact* score on the one axis and the *ease of administration* on the other axis. For a tax to be considered a good tax in both matrices, the overall score of the tax must fall in the upper, right-hand quadrant, i.e. the tax is both easy to administer and has a large revenue impact. Revenue sources in the lower, left-hand quadrant are the least desired, while revenue sources falling on the remaining two quadrants are skewed to one of the two factors.

FIGURE 59: Quadrant analysis of the ranking of revenue instruments



As indicated in Table 39, three sub-factors inform the two primary factors that make up the *municipal revenue assessment matrix*. In turn, each of these sub-factors is measured by criteria. The details of these criteria and their scoring in the *municipal revenue assessment matrix* are given in Table 40.

TABLE 40: Scoring criteria for the municipal revenue assessment matrix

REVENUE IMPACT	SCORE
Potential Revenue Yield and Certainty	**50,00**
High revenue impact	50,00
Medium revenue impact	25,00
Low revenue impact	16,67
Revenue Buoyancy and Stability	**50,00**
A relatively growth/income inelastic revenue base	50,00
A relatively growth/income elastic revenue base	25,00
Fiscal Imbalances	**0,00**
Creates the "head office" benefit for municipality	0,00
Does not create the "head office" benefit	0,00

EASE OF ADMINISTRATION	SCORE
Local Transparency and Acceptability	**33,33**
Revenue instrument is likely to be politically acceptable	33,33
Revenue instrument is likely to be socially acceptable	16,67
Revenue instrument is unlikely to be accepted	0,00
Degree of Control of Revenue Source	**33,33**
Control over all three elements (base, rate and administration)	33,33
Control over two elements (base, rate and administration)	16,67
Control over one element (base, rate and administration)	11,11
Revenue sharing/grant	0,00
Infrastructure to Implement Revenue Source	**33,33**
No need for initial capital investment for new infrastructure	33,33
Can piggyback on existing internal infrastructure to implement revenue instrument	33,33
Can piggyback on existing external infrastructure to implement revenue instrument	11,11
Need for new infrastructure to implement revenue instrument	0,00

Table 40 shows the criteria that inform the *municipal revenue assessment matrix*. As explained earlier, the sub-factors are scored equally to add up to 100, i.e. each sub-factor is given equal weighting and importance in determining the *revenue impact* and *ease of implementation* of a new revenue instrument. The criteria and subsequent score for each sub-factor were determined by a qualitative list of criteria that best described whether sub-factors were achieved or not. For example, municipalities should ideally have control over all aspects of a tax or revenue source, i.e. the tax rate, base and administration, because such control allows for flexibility in imposing taxes that meet the expenditure needs of the municipality and the wishes of local communities. Therefore, this sub-factor gets a full score when the municipality controls all aspects of the tax, which ensures that the factor is fully adhered to. A partial score is awarded if this factor is partially adhered to, e.g. if the municipality controls only the tax rate and administration. If the municipality has no control over the revenue source, i.e. it is a grant or revenue-sharing mechanism, the criterion is violated and thus a score of zero is awarded. The "partial" scores that are awarded when a criterion is only partially adhered to are simply a share of the total value of the sub-factor. This partial score is determined by the total score of the sub-factor divided by the number of criteria that make up the sub-factor.

The *revenue impact* factor consists of three sub-factors, each with its own set of criteria to assess whether the sub-factor is adhered to or not. It is important to note that when a score is awarded to a sub-factor based on a potential revenue source adhering or partially adhering to a sub-factor based on the criteria, the assessment is undertaken under the economic assumption of *ceteris paribus,* i.e. all other things being equal. In other words, it is assumed that the criteria are mutually exclusive and that a revenue source can adhere to one criteria only and not to another within the same sub-factor. These criteria are discussed as follows:

Revenue impact

- Potential revenue yield and certainty: For a municipality, a new tax or revenue source is considered ideal if it contributes substantially to municipal revenues. A high-impact revenue-generating instrument is preferred for a municipality. The judgement of what is considered a high revenue generating tax depends on specific municipal budgets and needs to be determined by valued analysis.
- Revenue buoyancy and stability: Whether the potential new revenue source is stable or buoyant, e.g. its revenues will not decrease considerably if there is a downturn in the economy. This is important to ensure the stability of the revenue source, protecting the municipality's financial position in an economic downturn. A full score was given if the revenue source is *income inelastic,* i.e. the demand for the good or service that is the base for the revenue source does not change if people's income change. A lower score was given if the revenue base is sensitive to income changes or changes in the economy. Revenue buoyancy is a criterion that should ideally be quantified when using the matrix through an analysis of the tax instrument.
- Fiscal imbalances: This assesses whether certain cities would benefit from additional revenues at the expense of other cities if the head office of a taxpayer falls within its jurisdiction. One of the key characteristics of the former RSC levies was that large companies with subsidiary branches paid the RSC levy to the municipality where its headquarters or head office was based. This resulted in certain municipalities gaining unfairly relative to others. Corporate income tax would likely be susceptible to such a trend. As individual municipalities can use the *municipal revenue assessment matrix* to assess the revenue impacts of a potential revenue source, this factor was included in the model. However, for the purposes of this chapter, this factor is set to zero.

Ease of administration

- Degree of control over revenue source: All aspects of a potentially new revenue source should be within the control of the municipality to enhance local autonomy and local accountability to communities in the design and use of the revenue funds. In this regard, a local revenue source consists of a base (what is being taxed), a rate (the size of the charge of tax or revenue source) and the administration (control of the collection of the revenue source). A full score was given for this sub-factor if all three aspects were adhered to. Partial scores were given if only one or two of these aspects were adhered to, while a score of zero was awarded if the municipality did not control any of these aspects, as would be the case if the new revenue source were a grant or a revenue-sharing arrangement (like the sharing of the general fuel levy with metros).
- Infrastructure to implement revenue source: The initial investment costs and running costs of a new revenue source should not be excessive, and thereby negate potential revenues. A full score was awarded to a new revenue source that did not require substantial investment in new infrastructure, but a score of zero was awarded if a substantial investment in new infrastructure was required to impose the tax or charge. Partial scores were awarded if the municipality could use existing internal or external systems to impose the new revenue source, assuming there is a cost to these options. The current design of this sub-factor assumes an assessment for the short-term implementation of the revenue source. It is likely that certain revenue sources require a large initial investment but generate substantial revenues in the long term.
- Local transparency and acceptability: A lesson learnt from the electronic tolling (e-toll) system in the country is that new taxes or revenue sources need to be acceptable to the public. In other words, the new charge needs to be transparent in its application, and the people must be able to hold local government accountable for the imposition and subsequent use of the charge. However, prior to being considered socially acceptable, a revenue source must also be politically acceptable. In this case, politicians need to support this new revenue source and discuss it with their constituents. A full score was awarded if the new revenue source is likely to be politically acceptable and thus accepted in council. A partial score was awarded if it is socially acceptable, while a score of zero was awarded if the new revenue source is politically or social unacceptable.

Macro revenue assessment matrix

The call for localising taxation should support the growing funding pressures faced by city governments and, simultaneously, have a minimal impact on national macroeconomic policy and the current legislative framework. The latter factors are key when considering the application of new taxes via the MFPFA. Therefore, the two primary factors considered for the *macro revenue assessment matrix* are:

- the *economic impact* of the revenue instrument, which assesses whether the potentially new revenue source adheres to the economic principles described in Table 38 so that adverse impacts of the tax are limited;
- the *ease of implementation* of the revenue source, which assesses whether the revenue source can be easily implemented within the current legal, policy and economic environment. These two primary factors were further assessed against various sub-factors (Table 41).

TABLE 41: Primary factors in the macro revenue assessment matrix

ECONOMIC IMPACT	EASE OF IMPLEMENTATION
Efficiency	Legal implications
Benefit principle	Macroeconomic implications
Ability-to-pay principle	Policy implications

The design and operation of the *macro revenue assessment matrix* follows the same rationale and format as that of the *municipal revenue assessment matrix*. This includes the scoring criteria and the rationale for assigning scores in the matrix. To reiterate, each sub-factor contributes equally to the total score for each factor; and full, partial or no scores were awarded based on whether the sub-factor was adhered to fully, partially or not at all. The relative scores themselves was calculated by dividing the total score by the number of criteria in each sub-factor. The four-quadrant analysis of the revenue source also applies here, where revenue instruments on the upper right-hand quadrant adhere to both the *economic impact* and *ease of implementation* factors. Table 42 shows the scoring criteria for the *macro revenue assessment matrix*.

TABLE 42: Scoring criteria for the municipal revenue assessment matrix

ECONOMIC IMPACT	SCORE	EASE OF IMPLEMENTATION	SCORE
Efficiency	**33,33**	**Legal Implications**	**33,33**
Minimising a negative externality	33,33	Change of Constitution	0,00
Relatively price inelastic revenue base – scope for minor behavioural changes	16,67	Change of supporting legislation	16,67
Relatively price inelastic revenue base – scope for major behavioural changes	11,11	No change in any legislation	33,33
Can potentially change location decisions	0,00		
Benefit Principle	**50,00**	**Macroeconomic Policy Implications**	**33,33**
Direct benefit received from paying – fees and levies	33,33	Purely a local revenue source with no major effects on economic activity	33,33
Indirect benefit received – earmarked tax	16,67	Revenue instrument can depress economic activity	16,67
Unable to see benefit	0,00	Revenue instrument can be imposed nationally	0,00
Ability to Pay Principle	**33,33**	**Policy Implications**	**33,33**
Progressive	33,33	No change in existing policy required	33,33
Potentially progressive	16,67	No contradiction in existing policy	16,67
Potentially regressive	11,11	Contradiction in existing policy	11,11
Regressive	0,00	Change of existing policy	0,00

The *economic impact* factor consists of five sub-factors, each with its own set of criteria to assess whether the sub-factor is adhered to or not.

Economic impact

- **Efficiency:** The efficiency of a revenue source refers to its impact on the economy, which should be minimal. In other words, the revenue source should not impair people's decisions and result in an inefficient allocation of resources. A tax or revenue source can also have a positive impact on society as a whole if it discourages behaviour that generates a negative externality on society. Given this, a full score was given to a revenue source aimed at reducing a negative externality on society, i.e. if it would have a positive impact on society. A relatively higher score was given to a revenue source whose base is relatively price inelastic, i.e. people's behaviour does not change as much as expected when the price of the good or service increases. In economic theory, the less a person's behaviour changes with a price increases through a tax, the less likelihood of inefficient impacts on society. While it is possible for certain revenue sources to meet both these criteria, for scoring purposes they are considered mutually exclusive. Consequently, a relatively lower score is given to a potential revenue source that is likely to change people's behaviour if the price increases with a tax, i.e. if there is a relatively price-elastic revenue base. Lastly, a score of zero is given to a revenue source that will definitely result in a change in people's behaviour, i.e. a change of where they locate their household or business.

- **Benefit principle:** A full score was given if the payer of the revenue source receives or can see a direct benefit from paying. This will probably apply if a revenue source is a user charge or a fee. A partial score is given where the revenue is linked to the provision of a service. This can occur when revenues, usually from a tax, are earmarked for a specific purpose. While this is not exclusively a tax design decision, such a decision would be considered ideal in this case. Lastly, a score of zero was awarded if the taxpayer cannot see a direct benefit from the tax. It is important to note that the last criteria does not technically violate any theoretical principle, as taxes are intended to fund general revenues and thus provide an indirect benefit to the taxpayer, even if it is disproportionate to the tax payment. The reason for awarding a score of zero to this criterion is rather due to the socio-political environment of contemporary South African society, where people are less likely to pay for revenue sources from which they cannot see direct benefits.

- **Ability to pay:** In terms of this principle, taxes should be progressive, so people who earn more pay more. This ensures that the poor are protected from having a high tax burden relative to their income. A full score is awarded if the potential revenue source is fully progressive and partial scores are awarded if the revenue source is partially progressive or partially regressive. A tax that is likely to be fully regressive is given a score of zero.

Ease of implementation

- **Legal implications:** The Constitution is clear about which revenue sources can and cannot be imposed by municipalities. Amendments can of course be made to the Constitution, but if a potential new revenue source requires constitutional or legislative changes, it will be difficult to implement, at least in the short to medium term. A score of zero was awarded if the new revenue source would require a change to the Constitution, while a lower score was awarded it it required a legislative change. A full score was awarded if the new revenue source could be implemented within the current legal framework.

- **Macroeconomic implications:** Given the current macroeconomic climate, potential new local revenue sources should not counter-balance the goals of national or provincial government. Taxes that are purely local, i.e. best placed at the municipal level and likely to have minimal impact on the local economy, received a full score. A partial score was awarded if the new local revenue source could change economic behaviour and impact on the collection and buoyancy of national revenue sources, while a score of zero was awarded if national government can implement the tax. In terms of the last two criteria, this is usually a make-or-break factor when assessing taxes via Section 5 of the MFPFA, as shown by the previous applications for a local business tax having been rejected by the Minister of Finance. With national government in a revenue squeeze, it might be more appropriate for national government (not local government) to consider local revenue sources proposed for cities that potentially can be implemented across the country.

- **Policy implications:** New local revenue sources should not require a change in the policy direction of national government, given that South Africa operates in a unitary state, nor should it contradict existing policy. In this regard, a full score was given if the new revenue source would not require a change in policy, and a relatively higher partial score was given if the new revenue source did not contradict existing policy. Likewise, a lower score and a score of zero were awarded if the new revenue source contradicts existing policy or would require a change in policy, respectively.

Annexure: Revenue Options

Revenue option 1 – personal income tax (PIT)

Application through the municipal revenue assessment matrix

Name of Revenue Source	Income Tax Options

REVENUE IMPACT	WEIGHTING	CHOICE	SCORE
Potential revenue yield and certainty	50	High revenue impact	50,00
Revenue buoyancy and stability	50	A relatively growth/income elastic revenue base	25,00
Fiscal imbalances	0	Tax creates "head office" benefit for municipality	0,00
Total Score – Revenue Impact	**100**		**75,00**

EASE OF ADMINISTRATION	WEIGHTING	CHOICE	SCORE
Local transparency and acceptability	33	Revenue instrument is likely to be socially acceptable	16,67
Degree of control of revenue source	33	Control of all elements (base, rate and administration)	11,11
Infrastructure to implement revenue source	33	No need for initial capital investment or new infrastructure to implement revenue instrument	33,33
Total Score – Ease of Administration	**100**		**61,11**
Total Tax Assessment Score	**200**		**136,11**

Application through the macro revenue assessment matrix

Name of Revenue Source	Income Tax Options

ECONOMIC IMPACT	WEIGHTING	CHOICE	SCORE
Efficiency	33	Can potentially change location decisions	0,00
Benefit principle	33	Unable to see benefit	0,00
Ability-to-pay principle	33	Progressive	33,33
Total Score – Economic Impact	**100**		**33,33**

EASE OF IMPLEMENTATION	WEIGHTING	CHOICE	SCORE
Legal implications	33	Change of Constitution	0,00
Macroeconomic implications	33	Revenue instrument can be imposed nationally	0,00
Policy implications	33	Change of existing policy required	0,00
Total Score – Ease of Implementation	**100**		**0,00**

Revenue option 2 – corporate income tax (CIT)

Application through the municipal revenue assessment matrix

Name of Revenue Source		Corporate Tax Options	
REVENUE IMPACT	**WEIGHTING**	**CHOICE**	**SCORE**
Potential revenue yield and certainty	50	High revenue impact	50,00
Revenue buoyancy and stability	50	A relatively growth/income elastic revenue base	25,00
Fiscal imbalances	0	Tax creates "head office" benefit for municipality	0,00
Total Score – Revenue Impact	**100**		**75,00**
EASE OF ADMINISTRATION	**WEIGHTING**	**CHOICE**	**SCORE**
Local transparency and acceptability	33	Revenue instrument is likely to be politically acceptable	33,33
Degree of control of revenue source	33	Control of all elements (base, rate and administration)	11,11
Infrastructure to implement revenue source	33	No need for initial capital investment or new infrastructure to implement revenue instrument	33,33
Total Score – Ease of Administration	**100**		**77,78**
Total Tax Assessment Score	**200**		**152,78**

Application through the macro revenue assessment matrix

Name of Revenue Source		Corporate Tax Options	
ECONOMIC IMPACT	**WEIGHTING**	**CHOICE**	**SCORE**
Efficiency	33	Can potentially change location decisions	0,00
Benefit principle	33	Unable to see benefit	0,00
Ability-to-pay principle	33	Progressive	33,33
Total Score – Economic Impact	**100**		**33,33**
EASE OF IMPLEMENTATION	**WEIGHTING**	**CHOICE**	**SCORE**
Legal implications	33	Change of Constitution	0,00
Macroeconomic implications	33	Revenue instrument can be imposed nationally	0,00
Policy implications	33	Change of existing policy required	0,00
Total Score – Ease of Implementation	**100**		**0,00**
Total Tax Assessment Score	**200**		**33,33**

Revenue option 3 – property transfer duties

Application through the municipal revenue assessment matrix

Name of Revenue Source **Corporate Tax Options**

REVENUE IMPACT	WEIGHTING	CHOICE	SCORE
Potential revenue yield and certainty	50	Medium revenue impact	25,00
Revenue buoyancy and stability	50	A relatively growth/income elastic revenue base	25,00
Fiscal imbalances	0	Tax does not create "head office" issue	0,00
Total Score – Revenue Impact	**100**		**50,00**

EASE OF ADMINISTRATION	WEIGHTING	CHOICE	SCORE
Local transparency and acceptability	33	Revenue instrument is likely to be politically acceptable	33,33
Degree of control of revenue source	33	Control of all two elements (base, rate and administration)	16,67
Infrastructure to implement revenue source	33		33,33
Total Score – Ease of Administration	**100**		**83,33**
Total Tax Assessment Score	**200**		**133,33**

Application through the macro revenue assessment matrix

Name of Revenue Source **Corporate Tax Options**

ECONOMIC IMPACT	WEIGHTING	CHOICE	SCORE
Efficiency	33	Relatively price inelastic revenue base – scope for minor behavioural changes	16,67
Benefit principle	33	Unable to see benefit	0,00
Ability-to-pay principle	33	Progressive	33,33
Total Score – Economic Impact	**100**		**50,00**

EASE OF IMPLEMENTATION	WEIGHTING	CHOICE	SCORE
Legal implications	33	Change of supporting legislation	16,67
Macroeconomic implications	33	Revenue instrument can be imposed nationally	0,00
Policy implications	33	No change of existing policy required	33,33
Total Score – Ease of Implementation	**100**		**50,00**
Total Tax Assessment Score	**200**		**100,00**

Revenue option 4 – tourism levies/occupancy tax

Application through the municipal revenue assessment matrix

Name of Revenue Source		Corporate Tax Options	
REVENUE IMPACT	**WEIGHTING**	**CHOICE**	**SCORE**
Potential revenue yield and certainty	50	Low revenue impact	16,67
Revenue buoyancy and stability	50	A relatively growth/income elastic revenue base	25,00
Fiscal imbalances	0	Tax does not create "head office" issue	0,00
Total Score – Revenue Impact	**100**		**41,67**

EASE OF ADMINISTRATION	**WEIGHTING**	**CHOICE**	**SCORE**
Local transparency and acceptability	33	Revenue instrument is likely to be politically acceptable	33,33
Degree of control of revenue source	33	Control of all three elements (base, rate and administration)	33,33
Infrastructure to implement revenue source	33	Can piggyback on an existing internal infrastructure to implement revenue instrument	33,33
Total Score – Ease of Administration	**100**		**100,00**
Total Tax Assessment Score	**200**		**141,67**

Application through the macro revenue assessment matrix

Name of Revenue Source		Corporate Tax Options	
ECONOMIC IMPACT	**WEIGHTING**	**CHOICE**	**SCORE**
Efficiency	33	Relatively price inelastic revenue base – scope for minor behavioural changes	16,67
Benefit principle	33	Unable to see benefit	0,00
Ability-to-pay principle	33	Progressive	33,33
Total Score – Economic Impact	**100**		**50,00**

EASE OF IMPLEMENTATION	**WEIGHTING**	**CHOICE**	**SCORE**
Legal implications	33	No change in any legislation	33,33
Macroeconomic implications	33	Purely a local revenue source with no major effects on economic activity	33,33
Policy implications	33	No change of existing policy required	33,33
Total Score – Ease of Implementation	**100**		**100,00**
Total Tax Assessment Score	**200**		**150,00**

Revenue option 5 – local business tax

Application through the revenue assessment matrix

Name of Revenue Source **Corporate Tax Options**

REVENUE IMPACT	WEIGHTING	CHOICE	SCORE
Potential revenue yield and certainty	50	Medium revenue impact	25,00
Revenue buoyancy and stability	50	A relatively growth/income elastic revenue base	25,00
Fiscal imbalances	0	Tax does not create "head office" issue	0,00
Total Score – Revenue Impact	**100**		**50,00**

EASE OF ADMINISTRATION	WEIGHTING	CHOICE	SCORE
Local transparency and acceptability	33	Revenue instrument is likely to be politically acceptable	33,33
Degree of control of revenue source	33	Control of all three elements (base, rate and administration)	33,33
Infrastructure to implement revenue source	33	Can piggyback on an existing internal infrastructure to implement revenue instrument	33,33
Total Score – Ease of Administration	**100**		**100,00**
Total Tax Assessment Score	**200**		**150,00**

Application through the macro revenue assessment matrix

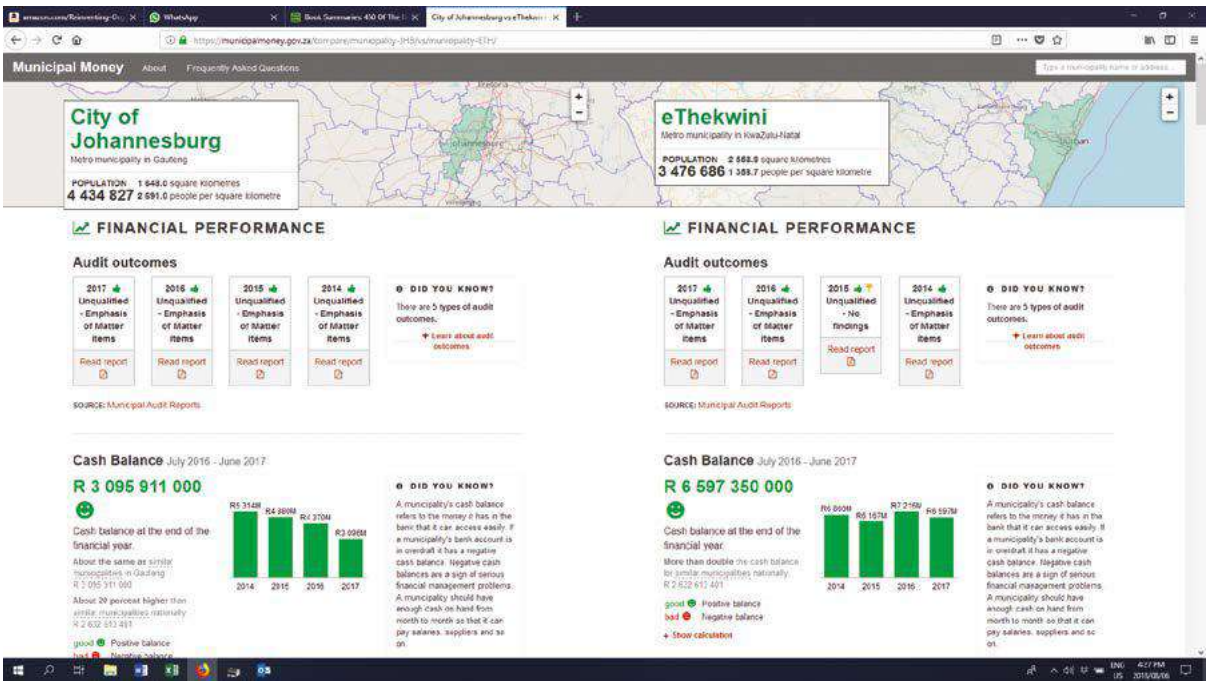
Name of Revenue Source **Corporate Tax Options**

ECONOMIC IMPACT	WEIGHTING	CHOICE	SCORE
Efficiency	33	Can potentially change location decisions	0,00
Benefit principle	33	Unable to see benefit	0,00
Ability-to-pay principle	33	Progressive	33,33
Total Score – Economic Impact	**100**		**33,33**

EASE OF IMPLEMENTATION	WEIGHTING	CHOICE	SCORE
Legal implications	33	Change of supporting legislation	16,67
Macroeconomic implications	33	Revenue instrument can depress economic activity	16,67
Policy implications	33	No change of existing policy required	33,33
Total Score – Ease of Implementation	**100**		**66,67**
Total Tax Assessment Score	**200**		**100,00**

DIGITAL GOVERNANCE

Digital technology has the potential not only to optimise municipal management and governance but also to improve citizen engagement and participation. The use of technology can enable municipalities to deliver services and manage administration more efficiently, reduce administrative costs and increase city revenue, through smarter payment systems that result in better tax collection. Digital technology can also improve communication between government and the people, and transform citizen participation.



e-payment

Cities use revenue raised from charging residents and businesses for property rates and services, such as the provision of electricity, water, waste and sanitation. By shifting transactions – such as paying bills, registering for licences, etc. that were formerly face to face – to online platforms accessible through the internet and smartphones, cities will save on the time spent by staff in processing such transactions. A study conducted by the Smart Cities Council found that online payment platforms, which allow citizens to pay municipal accounts online, can contribute to a 5% increase in revenue.[H]

e-procurement

Cities can also save money by digitising the payment of suppliers. The Smart Cities Council estimates that cities could save as much as 30% of operational costs by placing the entire procurement process online.[I] In addition, by limiting direct interactions between suppliers and officials, such e-procurement systems increase integrity and reduce corruption.

e-trust

Digital technology reduces corruption and increases transparency, which in the long term will lead to citizens having greater trust in government. In South Africa, civil society organisations have worked to improve communication between municipalities and residents. Corruption Watch, for example, collected evidence of corruption in the Johannesburg Metro Police and then worked with the city to design responses.[J] A good start is to be able to access information on government activities and finances on an easily navigable website. In South Africa, the National Treasury's Municipal

Money website (https://municipalmoney.gov.za) contains four years of municipal finances presented in an accessible, easy-to-understand way.

e-communication

Cities have to deal with complex problems involving large, highly mobile populations and a range of stakeholder communities. This makes communicating with city constituents challenging. In South Africa, most city residents have mobile phones (often with access to the internet), that provide the opportunity to develop new communication channels. For example, in Indonesia, citizens can send complaints to the Regent of Bojonegoro's phone via a special SMS line, while in Tanzania, the *Kijana Wajibika* project uses mobile messaging to connect young people and local government decision-makers.[K] In Spain, the Mayor of Jun has a twitter account with more than 400 000 followers, and all public officials accept complaints and feedback from residents through twitter.[L] In South Africa, the City of Johannesburg communicates with electricity users through @CityPowerJHB (which has more than 600 000 followers) about the progress of repairs and outages, while the City of Cape Town has an open data portal (http://web1.capetown.gov.za/web1/opendataportal/default) that lists tenders, water consumption, property valuations and other datasets.

e-participation

Cities must ensure public participation in many processes, from budgeting and spatial planning to the introduction of by-laws and the development of city policies. However, it is widely acknowledged that existing participation mechanisms in South Africa are deficient and ineffective. Digital tools can help develop more open and responsive city government but do not in themselves address participation in governance. In fact, many (if not most) attempts to use digital technologies for accountability and governance fail.[M] Research from programmes in 14 countries in Asia and Africa found reasons for this failure:[N]

1. Not all participation problems are (only) communication problems. Although digital technologies can improve communications, if managers ignore the feedback from participation processes, the technologies will not be effective.
2. Participation requires trust, and developing trust usually requires deeper engagement than simply communicating via social media channels.

When digital services replace traditional engagement systems with government services, unintended consequences are a danger. For example, the province of Gauteng introduced a centralised online school registration system, which could not be easily completed on a mobile phone, the device most lower-income people use to connect to the internet. And parents without internet access had to travel to education department offices, as registration at local schools was no longer possible.

Although many examples show how technology can improve services and provide information, few examples exist of digital technologies being effective in extending participation in South Africa. Yet digitised participation processes have the potential to mobilise communities. For example, the Integrated Development Plan (IDP) is the blueprint for planning and budgeting in municipalities, but IDP public consultation takes time and the public meetings are often held at times and dates that mean many citizens cannot attend. Digitising the process, through improved communication, remote participation and online voting, would enable governments to better identify citizens' priorities. To encourage participation, local governments could post visualisations on how strategic plans are being implemented, from targets to the actions being taken to achieve those targets.

CHAPTER 6

FINANCING PUBLIC TRANSPORT

Key Messages

The current public transport financing model in cities does not provide just and equitable, or sustained financing for improving the travel experience of poorer public transport users.

Private vehicle charges can provide a significant contribution to the costs associated with cities' increasing public transport responsibilities, and ensure that these costs are not passed on to the users of public transport.

Implementing parking or congestion charges, and ringfencing the revenue is the most effective way in which cities can ensure the continuous improvement of public transport is sustainably financed.

South African cities face burgeoning fiscal gaps and increasingly strained traditional revenue sources. Moreover, the taxes received are not dedicated to specific activities such as public transport, but fund the wide range of services provided by government. As a result, public transport must compete for resources with various other socially desirable public services (Ubbels et al., 2001; Ubbels & Nijkamp, 2002), and so cities need to identify alternative financing mechanisms specifically for public transport.

Cities are burdened with public transport systems that require high levels of upfront capital investment in order to reach the necessary critical network density and scope. Although cities have invested heavily in public transport networks, ridership remains below capacity, fare-box revenues are inadequate and operating costs are much higher than expected. As a result, the new public transport systems rely heavily on operating subsidies, but national government is reducing funding for public transport because of fiscal constraints (SACN, 2015).[66] The Department of Transport (DoT) has recognised that this reliance on operating subsidies is not sustainable and acknowledged the need to reduce state subsidies of transport operations in the long term (DoT, 2017). As the last State of City Finances report recognised, cities need to seize the challenge of funding public transport because "effective public transport systems contribute substantially to urban economic productivity" (SACN, 2015: 165). To meet their commitments to modernise public transport networks, cities need to develop additional sources of revenue that they can borrow against for capital expenditure in the short-to-medium term and that they can use to subsidise operations in the long term.

Cities also need to seek ways of incentivising commuters to continue using public transport into the future or to switch from private vehicles to public transport, which can only work if an effective, viable alternative is available. This is not the case in South African cities, where public transport is currently characterised by limited services and routes, providing the opportunity for minibus taxis to service parts of cities that are poorly served by public transport. However, as the services and routes improve, financed by revenue from private vehicle use charges, public transport may become an increasingly attractive alternative to private vehicle use. In this regard improving the minibus taxi industry is a critical component of the overall improvement in the public transport system (SACN, 2014). Therefore, while alternative financing mechanisms should generate revenues for improving public transport infrastructure and services, a change in the policy posture towards public transport services is also needed.

Sustainable financing of public transport requires two elements: generating revenue through the appropriate taxes and charges, and increasing the number of public transport users. More people using public transport will mean higher fare-box revenues, while fewer people using their private vehicles will result in road infrastructure and maintenance cost savings. Therefore, cities also need to find ways of encouraging citizens to shift from using private vehicles to travelling by public transport.

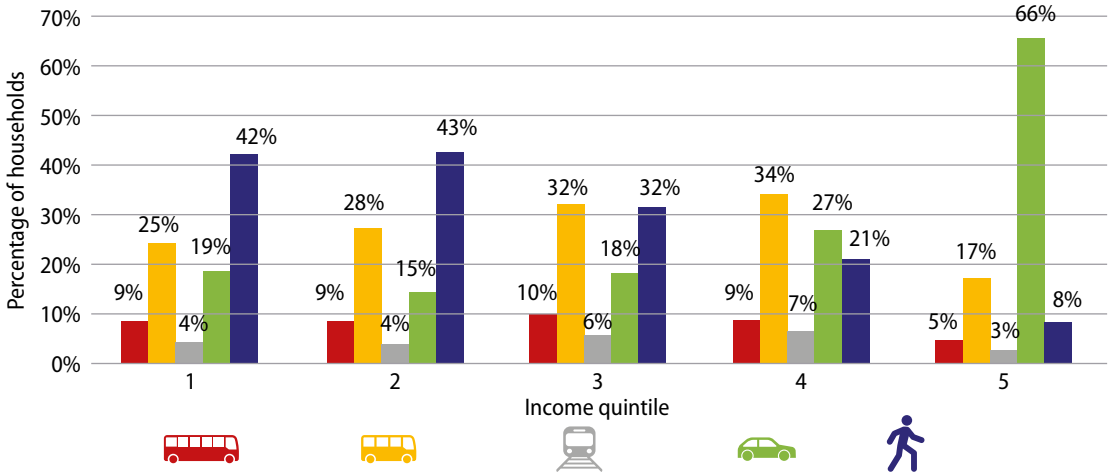
In South African cities, private vehicle use is relatively high (on average about 40% of work trips) and so has the prerequisite revenue potential for capital investment and operational subsidies. It would be logical to ringfence these revenues for public transport investment, while the increased charges should discourage private vehicle use and facilitate a shift towards public transport. There is also an inherent fairness and transparency in generating revenues for financing public transport from within the transport system.

This chapter explores the potential of private vehicle use charges to finance public transport in South African cities. After providing an overview of the South African transport context and reasons for financing public transport, the chapter examines the true cost of private vehicle use. The different types of private vehicle use charges are then described and assessed both generally and within the South African city context. Eight criteria are used to identify the charges best suited to the South African city context, and simulations are run to assess the potential of implementing these charges in a South African city, using the City of Joburg as a case study. After presenting the findings of the simulations, some recommendations are made.

The South African Transport Context

The spatial, economic and political legacies of apartheid continue to influence transport in South Africa. The transport system comprises a private transport system, in which mainly wealthier residents use private vehicles, and a public transport system, in which mostly poorer residents travel by rail, bus, paratransit (minibus taxi) and non-motorised modes. This is clearly illustrated in Figure 60, which shows the modal choice of commuters by household income quintile.[67] The majority of people rely on public transport, mainly minibus taxis, to get around (SACN, 2016).

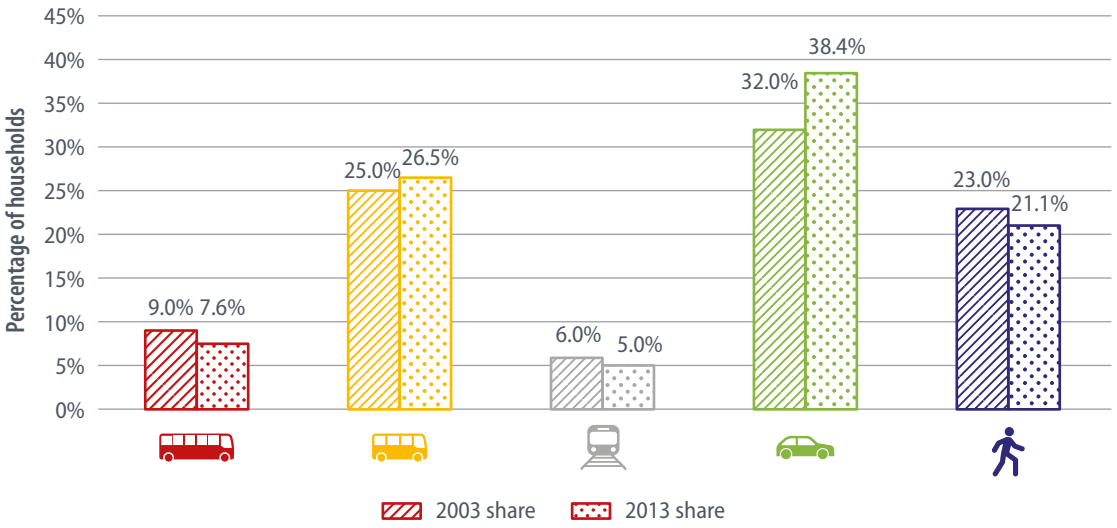
FIGURE 60: The share of transport mode by income quintile (2013)



Source: Adapted from the 2013 National Household Travel Survey (Stats SA, 2014a)

The intent and focus of post-apartheid transport policy (White Paper on National Transport Policy of 1996) was to develop affordable and reliable public transport and non-motorised modes that had traditionally served poorer residents of South African cities. However, these goals have not been realised. Private transport continues to dominate transport planning practices, which have largely focused on improving conditions for vehicles (SACN, 2013). Over the past decade, private vehicle use has been the fastest growing mode of transport in urban areas, increasing by 24% in the metros, whereas bus and rail travel has decreased (Figure 61). These trends differ from the DoT's desired ratio of 20:80 for private transport and public transport use (DoT, 2017).

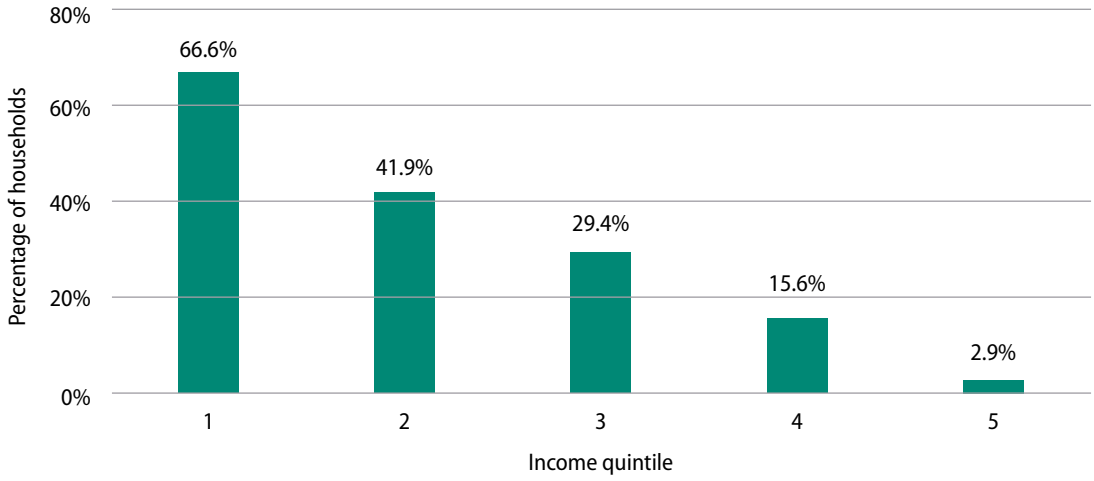
FIGURE 61: Transport mode used by households to go to work (2003 and 2013)



Source: adapted from the 2003 and 2013 National Household Travel Survey (DoT, 2005; Stats SA 2014a)

Public transport remains expensive for lower-income users, with two-thirds of households from the lowest income quintile spending on average more than 20% of their disposable income on public transport (Stats SA, 2015). In some metros, this proportion can be as much as 60%.[68] Public transport is considered affordable when commuters spend less than 10% of their disposable income on their travel.

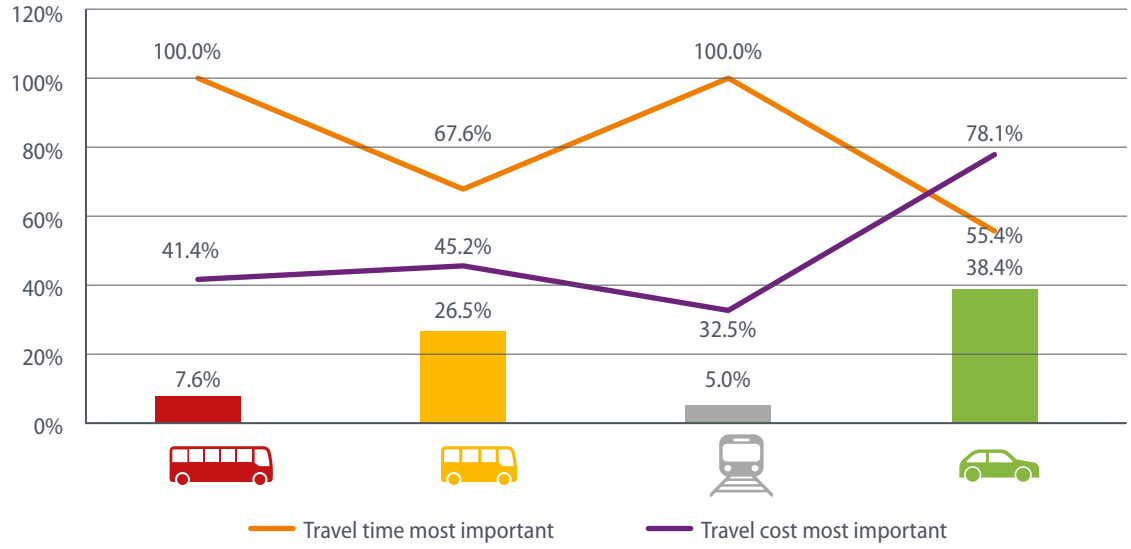
FIGURE 62: Households that spend more than 20% of their disposable income on public transport (2013)



Source: Adapted from the 2013 National Household Travel Survey (Stats SA, 2014a)

Yet for commuters, time – not cost – is the most important determining factor in their choice of transport mode. The importance of travel time for commuters is a consequence of apartheid-era spatial planning that relegated most commuters to homes situated a considerable distance from their places of work. The indirect relationship between travel time and travel cost revealed in Figure 63 indicates that commuters would be willing to pay more for the convenience of shorter travel times. What is interesting is the inverse relationship between travel time and modal choice, i.e. the longer the average travel time for a transport mode, the less likely a commuter is to select that mode, regardless of travel cost.

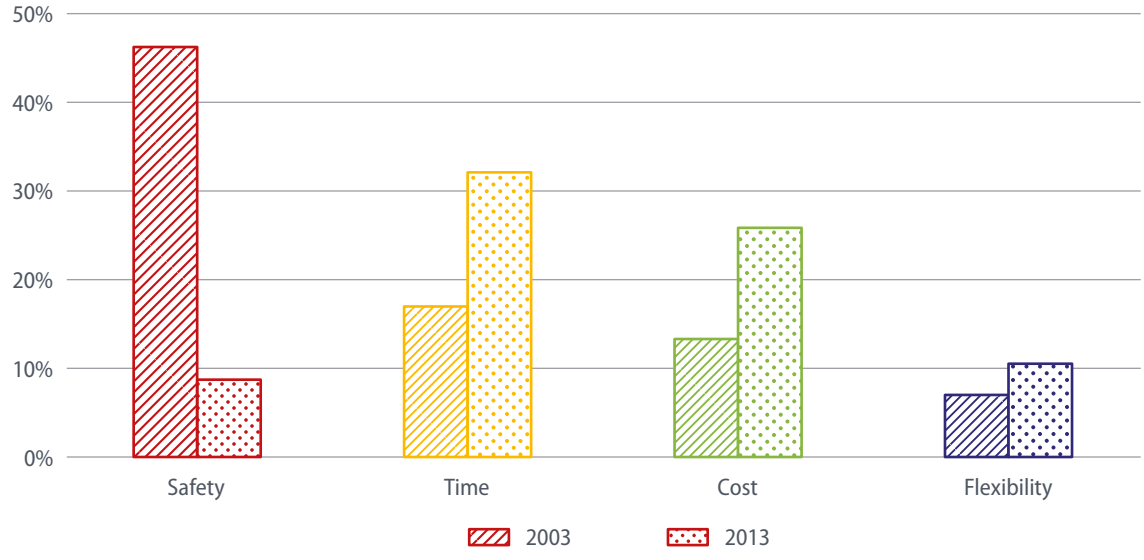
FIGURE 63: Modal choice for travel to work relative to travel time and travel cost (2013)



Source: Adapted from the 2013 National Household Travel Survey (Stats SA, 2014a)

Between 2003 and 2013, the proportion of commuters for whom travel time was the most important determining factor almost doubled, from 17% to 32%. Travel time refers to the entire journey, from origin to destination (not just the time spent in the transport mode), and is affected by factors such as network coverage, operating times and frequencies, first-mile and last-mile availability, and modal integration. The increased importance of travel time for commuters suggests that public transport services are worsening. Major problems identified by public transport users were bus availability, infrequency of bus departures and excessive walking times to reach bus terminals (Stats SA, 2014a). In 2013, 11% of commuters in metros waited for more than 15 minutes for public transport, which is a marked increase from 6.1% in 2003. This suggests a significant and burgeoning problem with the provision and scope of public transport services in the metros, indicating a need for increased investment in the public transport system.

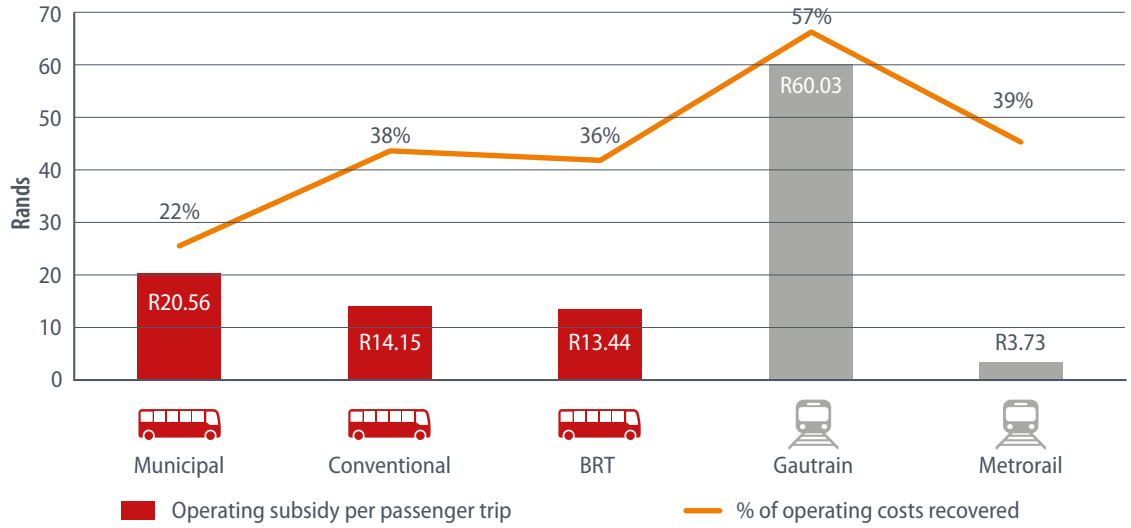
FIGURE 64: Most important determining factors in transport modal choice (2003, 2013)



Source: Adapted from the 2013 National Household Travel Survey (Stats SA, 2014a)

Investment in the public transport system is typically through grants and loans for capital costs, and a combination of subsidies and fare-box revenues for operating costs. Throughout the world, subsidising public transport operating costs is fairly common, as complete cost recovery from fare-box revenues is rare. In most regions, the cost recovery is quite high, ranging from 56% in US cities to 91% in European cities, which means a relatively small gap between costs and revenues that requires subsidies. In contrast, in South Africa only the Gautrain has a cost recovery of above 40%, with municipal bus services as low as 22% (Figure 65). As a consequence, public transport systems in South African cities are heavily subsidised, by between R13.44 and R20.56 per passenger trip on typical bus modes. This level of subsidisation is considerably above the global average and is both undesirable and unsustainable for South African cities.

FIGURE 65: Average operating subsidy per passenger trip and operating cost recovery rates by public transport type



Source: National Treasury (2014)

Reasons to Subsidise Public Transport

Globally, local and national governments subsidise public transport because they are motivated by social considerations and the need to offer an alternative to private car use (Ubbels & Nijkamp, 2002). Public transport may collect revenues through fares but is considered a public service and thus subsidised accordingly. The previous State of City Finances Report (SACN, 2015) includes empirical evidence for subsidising public transport. Below are some of the arguments for subsidisation:

1. **Social welfare.** When the price of a good or service is equal to its marginal cost, social welfare is maximised (Mattson & Ripplinger, 2011). Public transport has high fixed costs and relatively low variable costs, and usually operates at less than capacity. Consequently, marginal costs per passenger (i.e. the cost for adding an extra passenger to a trip) are far lower than the average cost per passenger (i.e. total cost of providing public transport divided by total number of passengers). For fare-box revenues to cover costs, fares would have to be set at a price equal to the average cost per passenger. However, if prices are kept at the welfare-maximising level, the fare-box revenues will be less than the total cost of providing public transport (ibid) and so subsidies are needed to make up the difference.

2. **Equity**. Subsidising public transport can be considered a form of income redistribution, as poorer sections of the South African population typically rely on public transport and so benefit most from the subsidy. The subsidisation of public transport is an implicit act of redistribution when the service provider passes on the subsidy relief to the commuter through lower fares.

3. **Positive externalities**. Increased use of public transport results in fewer private vehicles on the road, and reduced congestion, travel time, noise and air pollution, accidents and road maintenance. These positive externalities accrue to the benefit of all residents of the city, not just public transport users (Ubbels et al., 2001; Ubbels & Nijkamp, 2002).

4. **Economic growth.** Improved public transport increases accessibility to the labour market, leading to clustered employment opportunities. A study of more than 300 metropolitan areas found that expanding public transport services resulted in increased employment, wages, labour productivity and economic growth (Chatman & Noland, 2014).

The True Cost of Private Vehicle Use

New commercial and residential developments, supported by substantial investment in freeways, have exacerbated urban sprawl[69] (National Treasury, 2014). This sprawl intensifies public transport difficulties and results in more private vehicles, placing financial pressure on households who grow increasingly dependent on private vehicle use to meet their mobility needs (ibid).

The current road use charges do not reflect the actual marginal costs of drivers using the road (Bowerman, 2007). Apart from the economic costs of purchasing, maintaining and running a private vehicle, the use of private vehicles increases (Smith, 2006):

- environmental costs: local noise and air and aesthetic pollution (i.e. despoiled landscapes);
- accident costs: the costs of injuries and fatalities to individuals and property from road accidents, which are particularly high in South Africa;[70]
- congestion costs: overcrowded roads increase journey times; and
- road maintenance costs: vehicles cause physical degradation of and damage to roads.

Although road pricing schemes aimed at private vehicle users have been designed and implemented around the world (Croci, 2016), formulating appropriate policies for taxing private road use is not straightforward because of social and external costs and intergovernmental relations (Smith, 2006). Ideally, an efficient road-user tax charges each private road user for their precise social or external cost, but in practice this cost can only be approximately reflected by the available tax instruments. In addition, without an accurate understanding of who will bear the cost of additional road use charges and taxes, poorer road users and commuters might be inadvertently burdened with the increased costs of road travel. Therefore, it is preferable to tax private vehicles, as poorer households are more dependent on public transport (ibid), which is demonstrably true in South Africa (Figure 60).

Private Vehicle Use Charges and Taxes

Public transport financing mechanisms should ideally generate revenues from within the transport system and send appropriate pricing signals aimed at moving consumers away from private vehicle use to public transport (Ubbels et al., 2001; Ubbels & Nijkamp, 2002). Charging road users is logical for cities, as it captures the costs that private vehicle use places on cities, the environment and other road users, thereby reflecting more accurately the true cost of using the road (Bowerman, 2007). Theoretically, drivers unwilling to pay the price can either change their travel patterns or shift transport modes. And, as more people shift from private vehicles to public transport, fare-box revenues will increase, reducing the reliance on subsidies and making the public transport system more sustainable.

Charging private vehicle users can have several fiscal benefits for cities:

- Sufficient revenue can be generated to justify borrowing to cover the capital costs of expanding bus networks and services, instead of having to rely on grant funding.
- In the long term, a sustainable revenue stream is generated that subsidises public transport operating costs.
- The costs recovered better reflect the costs associated with private vehicle use.
- The shift away from private vehicle use to public transport increases ridership and revenue from fares.

The primary goal of private vehicle use charges should be to generate revenues for improving public transport infrastructure and services, but the secondary goal (and long-term impact) of these charges is the change in behaviour towards public transport services.

Table 43 analyses the suitability of 12 potential private vehicle use charges, some existing and some proposed new charges, as identified in the literature and South African policy and legislation:[71] a national fuel levy, provincial fuel levy, CO_2 tax, vehicle sales tax, vehicle import duties, road tolls, vehicle registration and licensing, parking charges, congestion charges, per km charges, pollution charges and employer/employee charges.

As Table 43 shows, transport and travel-related taxes and charges are collected (and resources allocated) at different levels of government. This fragmentation is reflected in the institutional arrangements, with public transport functions being split across the three spheres of government, which makes coordination difficult (National Treasury, 2014; Thomas, 2016). National government provides overall guidance through legislation and setting policy, while provincial governments are responsible for the "legacy" bus service (the provincially subsidised bus services) and for regulating public transport, including the minibus taxi sector. Local governments are responsible for transport planning, municipal bus services, managing taxi ranks and the new bus rapid transit (BRT) projects (National Treasury, 2014).

In assessing possible private vehicle use charges, only those that are within the purview of cities are included. Therefore, the assessment did not include charges 1–5 in Table 43, as these are implemented at the national or provincial level.

TABLE 43: Applicability of identified private vehicle use charges to local government administration

	#	CHARGE/ TAX	DESCRIPTION	IMPLEMENTATION
EXISTING CHARGES	1	National fuel levy	A general fuel levy (GFL) and a Road Accident Fund (RAF) levy on petrol and diesel sales. A fuel levy is easy to implement, has low administrative costs, little risk of evasion, and generates high revenues.	**National Government.** Current level: GFL R3.15/litre petrol, R3.00/litre diesel. RAF R1.63/litre.
	2	Provincial Fuel levy	Each province would have the discretion to introduce a provincial levy in addition to the national GFL, after applying for permission from National Treasury. Revenue from the levy would go directly to the province.	**Provincial Government.** The Western Cape successfully applied for this levy but has not implemented it (nor have the other provinces).
	3	CO_2 tax on vehicle emissions	Introduced in 2010 and 2011, the tax's main objective is to encourage the use of energy efficient and environmentally friendly motor vehicles. Added to the vehicle's sale price, the tax can be absorbed in part by manufacturers/dealers.	**National Government.** Current level: Passenger vehicles R90 per g CO_2/km above 120g CO_2/km. Double-cabs R125 per g CO_2/km above 175g CO_2/km.
	4	Vehicle sales tax	Sales taxes levied on new vehicles include VAT and an ad valorem tax.	**National Government.** Current level: VAT is 15%. Ad valorem is [(0.00003 x A) – 0.75%], where A is the recommended retail price, excl. VAT and less 20%.
	5	Vehicle import duties	Customs duty and ad valorem customs duty are payable on permanent vehicle importations into South Africa.	**National Government.** Current level: Customs duty 36% of the market value of the car, 20% for cars older than 20 years. Ad valorem 0.75%–20%, depending on the value.
	6	Road tolls	Tolls collected on a specific road are used to repay the loans that financed its building, upgrading or maintenance. Tolling is a "user-pay" charge and equitable, as motorist only pays for the section of road used.	**SANRAL.** Tolls are collected at toll plazas or via an electronic tag system Current level: Varies by class of vehicle and section of road.
	7	Vehicle registration and licensing	Vehicles must be registered with relevant authority, and motor vehicle registrations are recorded on the national traffic information system (eNaTIS). Each province determines its own registration and licence fees.	**Provincial Government.** Current level: fees levied based on tare weight of different vehicle types.
	8	Parking charges (and fines)	Revenue from these mechanisms is not currently ringfenced for funding public transport, but there are successful international examples.	**Local Government.** Current level: Charges and fines vary according to area and duration of parking and offense committed.
NEW CHARGES	9	Congestion charges	The approach depends largely on the spatial structure of congestion-prone areas: area pricing for monocentric/radial archetype cities, and value pricing for polycentric/grid-like cities.	**International examples:** Singapore, London, Rome, Stockholm and Milan.
	10	Per km charges	To reduce traffic congestion, motorists are charged per km travelled in specific areas, with higher rates for rush hour and less fuel-efficient vehicles.	**International examples:** Germany (trucks only). Proposed but not implemented in the Netherlands and Belgium.
	11	Pollution charges	The aim is to reduce pollution levels from private vehicles, by charges based either on distance travelled or the entering of a cordoned area.	**International examples:** London (in addition to the congestion charge).
	12	Employer/ employee charges	All firms above a threshold level of employees pay a local payroll tax, unless employees are housed on the premises or provided with transport.	**International examples:** Paris (France) and Portland (USA).

● Suitable for local government ● Currently provincial/national but suitable for local government ● Unsuitable for local government

Assessment of Private Vehicle Use Charges

Each proposed private vehicle use charge is assessed according to criteria that are based on Ubbels and Nijkamp (2002) and Ubbels et al. (2001), adapted to the South African city context (see Table 44). A full breakdown of these criteria, including their measurement and weighting, can be found in the Annexure.

The proposed private vehicle use charges were assessed using eight criteria: revenue-generating potential, behaviour change potential, public/political acceptability, flexibility, complexity, redistributive alignment, legislative environment and policy alignment. Details of these criteria are given in the Annexure.

TABLE 44: Assessment of the applicability of private vehicle use charges to South African cities

CHARGES → CRITERIA ↓	ROAD TOLLS	VEHICLE REGISTRATION & LICENSING	PARKING CHARGES	CONGESTION CHARGES	PER KM CHARGES	POLLUTION CHARGES	EMPLOYER CHARGES
Revenue generation	favourable	neutral	favourable	favourable	favourable	unfavourable	neutral
Behaviour change	neutral	unfavourable	neutral	favourable	favourable	neutral	unfavourable
Public/political acceptability	unfavourable	neutral	favourable	neutral	unfavourable	neutral	neutral
Flexibility	unfavourable	unfavourable	favourable	favourable	unfavourable	unfavourable	favourable
Complexity	unfavourable	favourable	favourable	neutral	unfavourable	neutral	favourable
Redistributive alignment	neutral	neutral	neutral	neutral	unfavourable	unfavourable	neutral
Legislative environment	unfavourable	favourable	favourable	neutral	unfavourable	neutral	neutral
Policy alignment	favourable	favourable	favourable	favourable	favourable	neutral	unfavourable

favourable neutral unfavourable

Next, the suitability of each charge to South African cities was determined by assigning a score for each of the charges in the matrix across the criteria: favourable = 3 points, neutral = 2 points, and unfavourable = 1 point. These scores were then adjusted according to the weighting given to each of the assessment criteria (see Annexure): heavy weighting = multiply score by three, moderate weighting = multiply score by two, light weighting = multiply score by one. Table 45 shows the scores and ranking. In addition, the charges were assessed based on their variance from the average score (of 34.5) – those with a score more than half a standard deviation above the mean were considered most suitable for the South African city context (Table 45).

TABLE 45: Decision scorecard for selecting charges for modelling

CHARGES → CRITERIA ↓	ROAD TOLLS	VEHICLE REGISTRATION & LICENSING	PARKING CHARGES	CONGESTION CHARGES	PER KM CHARGES	POLLUTION CHARGES	EMPLOYER CHARGES
Revenue generation	9	6	9	9	9	3	6
Behaviour change	4	2	4	6	6	4	2
Public/political acceptability	3	6	9	6	3	6	6
Flexibility	3	3	9	9	3	3	9
Complexity	2	6	6	4	2	4	6
Redistributive alignment	4	4	4	4	2	2	4
Legislative environment	1	3	3	2	1	2	2
Policy alignment	3	2	3	3	3	2	1
Total score	29	32	47	43	29	26	36
Rank	5	4	1	2	5	7	3

most suitable neutral least suitable

Parking Charges and Congestion Charges: Case Study

Parking charges and congestion charges were ranked the highest (1 and 2). To assess the impact of these charges on a South African city, a Monte Carlo-style simulation[72] was carried out, using Johannesburg as a case study. The City of Joburg was selected based on the availability of data. Congestion charges and parking charges can take varying form, as described below.

Congestion charges

- Cordon charge: road users are charged each time they pass through a defined cordon area around a city centre, e.g. Singapore.
- Area charges: road users pay a daily charge for driving through and within a cordon, regardless of time spent or number of times passed, e.g. London and other European cities.
- Single facility charges: road users are charged for access to specific facilities on the road such as specific lanes, corridors, or routes, e.g. several US cities charge private vehicles to use high-occupancy vehicle lanes.

Parking charges

- Parking fees and fines: road users are charged a fee for parking in municipal parking spaces, typically within the central business district (CBD), e.g. many South African cities.
- Parking sales taxes: an additional tax is levied on all existing parking transactions, e.g. several cities across the USA.
- Parking levies: owners of non-residential parking spaces are charged an annual fee for each parking space that they own, e.g. many Australian cities.

For the simulation, charges were selected based on their suitability to the city-specific context – in this case Johannesburg, a polycentric city. Single facility-type charges are best suited to polycentric cities, whereas area-type charges are best suited to monocentric cities (e.g. Cape Town). Therefore, the area-type congestion charges were excluded from the hypothetical model. Also excluded from the model were parking fines and fees, as these already exist in Johannesburg. The model interrogated the implications of three private vehicle use charges on the City of Joburg: a single facility congestion charge, a parking sales tax and a parking levy.

Data, assumptions and modelling process

Data came from a variety of sources and, in the absence of required empirical data, several proxies and assumptions were used:

- The National Household Travel Survey: Gauteng Profile (Stats SA, 2014b) provided data on current transport costs, revenues, modal choice and ridership levels within the City of Joburg.
- GIS data from the City of Joburg on property types and areas was used to calculate the number of parking spaces, as well as DoT parking policies.
- Data on transport elasticities came from a meta-analysis of transport impact studies, which provided a distribution of results for various types of transport-related elasticities – these were used as a proxy for possible transport elasticities in the City of Joburg.
- Data on charge compliance was drawn from international case studies of the implementation of the modelled charges – these were used as a proxy for possible charge compliance in the City of Joburg.
- Data on charge levels relative to total trip costs was drawn from international case studies of the implementation of the modelled charges – these were used as an indicator for the potential relative charge level in the City of Joburg.

The Monte Carlo-style simulation was run at various charge levels: a standard charge level, which was most closely aligned to the international average; a high charge level, which represents a higher bound of implementation; and a low charge level, which represents more conservative implementation.

Results and discussion

It is important to note that these simulations are based on hypothetical implementations and proxy data. Therefore, the results are intended to illustrate the potential impact of private vehicle use charges in a South African city and encourage discussion on the potential role of such charges in cities. Tables 46–48 present the results of the simulation at the low, standard and high charge levels respectively.

Tables 46–48 show that these charges could raise significant revenues for public transport, even when set at lower levels. A parking levy produces the highest level of revenues, followed by a single facility congestion charge and a parking sales tax, which is consistent with international studies of alternative public transport financing mechanisms (Irwin & Bevan, 2010).

TABLE 46: Impact of low-level private vehicle use charges in the City of Joburg

	HYPOTHETICAL RATE CHARGED	POTENTIAL DIRECT REVENUES (R-millions)	POTENTIAL DECREASE IN CAR USE	POTENTIAL INCREASE IN BUS USE	POTENTIAL INCREASE IN FARE-BOX REVENUES (R-millions)
Single facility congestion charge	R4.03 per trip	543.7 [542.7, 544.6]	4.52% [4.38%, 4.67%]	19.47% [19.32%, 19.62%]	253.0 [251.0, 255.0]
Parking sales tax	7.5% ad valorem tax	277.1 [276.9, 277.1]	0.20% [0.20%, 0.21%]	5.23% [5.19%, 5.27%]	68.0 [67.5, 68.5]
Parking levy	R750 annually per parking space	1,367.8 [1,365.6, 1,370.0]	2.48% [2.38%, 2.57%]	25.82% [25.63%, 26.02%]	335.6 [333.0, 338.2]

Note: 95% confidence intervals in square brackets

TABLE 47: Impact of standard-level private vehicle use charges in the City of Joburg

	HYPOTHETICAL RATE CHARGED	POTENTIAL DIRECT REVENUES (R-millions)	POTENTIAL DECREASE IN CAR USE	POTENTIAL INCREASE IN BUS USE	POTENTIAL INCREASE IN FARE-BOX REVENUES (R-millions)
Single facility congestion charge	R8.05 per trip	1,033.5 [1,030.0, 1037.1]	8.96% [8.68%, 9.25%]	36.67% [36.37%, 36.97%]	476.6 [472.6, 480.5]
Parking sales tax	15% ad valorem tax	551.9 [551.4, 552.5]	0.41% [0.39%, 0.42%]	10.34% [10.26%, 10.42%]	134.4 [133.3, 135.4]
Parking levy	R1,500 annually per parking space	2,619.1 [2,611.4, 2,626.8]	4.93% [4.74%, 5.13%]	49.04% [48.65%, 49.43%]	637.3 [632.2, 642.3]

Note: 95% confidence intervals in square brackets

TABLE 48: Impact of high-level private vehicle use charges in the City of Joburg

	HYPOTHETICAL RATE CHARGED	POTENTIAL DIRECT REVENUES (R-millions)	POTENTIAL DECREASE IN CAR USE	POTENTIAL INCREASE IN BUS USE	POTENTIAL INCREASE IN FARE-BOX REVENUES (R-millions)
Single facility congestion charge	R 12.08 per trip	1,472.2 [1,464.5, 1,480.0]	13.29% [12.87%, 13.72%]	52.92% [52.51%, 53.32%]	687.7 [682.4, 693.0]
Parking sales tax	22.5% ad valorem tax	825.0 [824.1, 825.8]	0.61% [0.58%, 0.63%]	15.53% [15.41%, 15.65%]	201.8 [200.2, 203.4]
Parking levy	R2,250 annually per parking space	3,760.3 [3,743.4, 3,777.1]	7.39% [7.10%, 7.68%]	70.85% [70.29%, 71.41%]	920.8 [913.4, 928.1]

Note: 95% confidence intervals in square brackets

In terms of behaviour change, the single facility congestion charge has the largest impact on car use, which is consistent with the aim of such a charge, i.e. to reduce the number of private vehicle trips and vehicle kilometres along the facility in question. This confirms the literature's finding of congestion charges being "one of the most effective demand management measures in the industrialised world" (Rivasplata, 2013: 56). Parking levies have less of an effect than the congestion charge because the full costs are not borne by the road user, while the parking sales tax would have a negligible impact due to the relatively small per-trip cost.

Parking levies result in the highest increase in bus use and fare-box revenues, followed by single facility congestion charges and parking sales tax. This is largely due to the increased funding for public transport that accrues from the revenues generated by these charges, and the associated increase in ridership which would accrue from improved and expanded public transport facilities. The high increases in bus use relative to the decreases in private car use are due to modal shift from other forms of transport – taxis, trains and non-motorised modes – which will occur with the improvements to the bus system. It is worth noting that increases in bus use relative to tax revenues generated are highest for single facility congestion charges because such charges will see the highest proportion of private vehicle users shift to buses, in addition to the modal shift from other forms.

Fares currently contribute just 20% of total Integrated Rapid Public Transport Network (IRPTN) operating costs in the City of Joburg, with the balance covered by the city (through revenue support) and the DoT (through the Public Transport Network Operating Grant). For each of the charges modelled, the resulting potential fare-box revenue increases and direct revenues generated would cover the entire annual operating costs of the IRPTN. Moreover, the charges modelled would provide sufficient additional revenues to allow the city to support capital expenditure on the IRPTN. This suggests that introducing these private vehicle use charges would go a long way towards subsidising current and expanded operations and contribute significantly to the cost of expanding the public transport network.

Conclusion

In most South African cities, transport remains divided between a public transport system used by the majority of mostly poorer residents and private vehicles driven by mainly wealthier residents. Although the policy intent is for affordable and reliable public transport, transport planning practices have largely focused on improving conditions for vehicles. Over the past decade, despite significant capital investment in new IPTNs in some cities, ridership is declining, while the use of private vehicles has continued to climb – private vehicle use is the fastest growing mode of transport. The growth in private vehicle use, at the expense of public transport, has significant social costs and is contrary to city spatial planning and growth objectives, driving sprawl, reducing labour mobility and entrenching the economic inequalities that exist across South African cities.

Effective and sustainable public transport systems are key to assisting cities to achieve their goals of economic growth and compact, inclusive development, and underpin the devolution of the transport function to local government. However, devolving this responsibility has cost implications for cities. The current public transport systems are plagued by limited services, decreasing ridership and unsustainably high subsidies, while notably minibus taxi use is also increasing across most cities. Sustainable financing of public transport requires generating revenue through taxes/charges (which are then ringfenced for public transport expenditure) and increasing the number of public transport users, so fare-box revenues increase.

Private vehicle charges are the most logical alternative source of funding for public transport. Charging private vehicle users for the full cost of their road use addresses the private-public imbalances that currently exist in the transport system at large. Improving the transport service (including minibus taxi services) of those who rely on public transport has to be at the heart of transport investment. While disincentivising private vehicle use through road pricing is challenging,

increasing ridership might be possible, as existing users remain public transport users (increasingly out of choice rather than necessity), and growing urban populations choose to use public transport. Generating revenues for financing public transport from within the transport system is both fair and logical. Seven potential charges, which fall within the purview of cities, were assessed against eight criteria: revenue generation, behaviour change, public/political acceptability, flexibility, complexity, redistribute alignment, legislative environment and policy alignment, and ranked according to their suitability for South African cities.

The impact of the two top-ranking charges – parking charges and congestion charges – were then assessed through a Monte Carlo-style simulation using Johannesburg as a case study. The charges most suitable for a polycentric city like Johannesburg were: single facility congestion charge, parking sales tax and parking levy. The simulations found that all three charges could raise significant revenues for public transport, and that the single congestion charge would have the largest impact on car use. A parking levy would result in the highest revenues and the highest increase in bus use and fare-box revenues. Each of the charges would lead to sufficient additional revenue (through fare-box revenues and private vehicle use charges) to subsidise current operations and contribute to capital expenditure of Johannesburg's integrated rapid public transport network.

Limitations

Although the evaluation criteria used to assess this universe of charges and arrive at a set of charges for modelling were robust and rigorously applied, the process was defined for the purpose of this chapter, and the exclusion of any charges from further interrogation should not be seen as prescriptive. Further research into the viability of these charges, in terms of generating revenue and promoting modal shift in South African cities, is required and encouraged.

Similarly, this chapter sought to interrogate the private vehicle use charges most applicable for financing public transport. While these charges are the most logical and practical means for financing public transport, and also address the existing imbalance, the chapter does allude to alternative finance mechanisms, external to the transport system at large, which could be used to raise revenues for financing public transport. These should also be interrogated further to potentially identify unconventional finance mechanisms which may be suitable for South African cities.

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Annexure: Assessment Criteria

TABLE 49: Criteria, measurements and weighting for the assessment of private vehicle use charges

	ASSESSMENT CRITERIA	DESCRIPTION	MEASUREMENT	WEIGHTING
1	Revenue generating potential	Revenue generation is one of the two primary aims of introducing a new tax or charge to fund public transport. The revenue raised is largely determined by the level at which the charge can be appropriately set and the number of private vehicle users who will be liable for the charge.	Where data is available, simple calculations are used to estimate the revenue-generating capabilities matched against the capital and current revenue requirements of cities in funding public transport. Where data is not available, indications from international case studies are used to estimate the revenue potential of the charge.	**Heavy.** This is the key goal of the mechanism – to raise sufficient revenue to finance public transport systems.
2	Behavioural change potential	Another aim is to initiate a behaviour change, away from private vehicle use and towards public transport. The primary factor is the extent to which the driver is affected directly by the new charge.	A meta-analysis of price elasticities of demand for private and public transport use is undertaken to determine a set of illustrative baseline elasticities for this analysis. From here, simple calculations are used to determine the impact of the charge on both short- and long-run demand for private and public transport.	**Moderate.** The mechanism ought to induce a behaviour change away from private vehicle use.
3	Public/ political acceptability	The degree of public acceptability of a funding scheme has often been found to be responsible for its success or failure. Resistance to a proposed charge can determine public compliance, political willingness to implement and, ultimately, the success or failure of the scheme.	The public/political acceptability of each charge is measured based on an extensive literature review and qualitative empirical analysis of public/political acceptability of similar charges in international and, where available, South African case studies.	**Heavy.** Public acceptability and political will are key success factors.
4	Flexibility	The flexibility – in terms of how the scheme is implemented, and whether it allows for fine tuning of the charge level – is important for the success of the charge. Flexibility is important in South Africa, given the differences between cities and the likely impact of external shocks on the charge.	Flexibility is determined based on a comprehensive review of case studies that interrogates the degree of differentiation between the forms of charges across the case studies, the adaptability of the charge to external shocks within each case study, and the ease with which private vehicle users can opt out of the charge.	**Heavy.** Flexibility is vitally important to ensure applicability across nine different metros, and lower susceptibility to expected external shocks.
5	Complexity	Complexity affects the infrastructure, technology and administrative resources required for successful collection and allocation of revenue. This also encompasses how easily the charge is enforced.	The resource requirements for implementing the charge in terms of infrastructure, technology and administration, compared to existing levels of these various factors in South African cities.	**Moderate.** Less complex charges are ideal, but complexity ought not to be a binding restriction.
6	Redistributive agenda alignment	The current tax policy in South Africa mandates the implementation of a progressive tax regime. Therefore, any new tax or charge, or amendment to existing ones, must be aligned to the progressive nature of taxes.	Measuring the redistributive nature of each mechanism requires a case study analysis of best practices of the charges as implemented globally and the progressivity of the charges.	**Moderate.** Any charge on private vehicle use will be somewhat redistributive, as private vehicles are largely driven by the rich.
7	Legislative environment	The legislative environment provides an indication of the potential regulatory difficulties for implementing a new tax or charge. Amended and new taxes or charges would need to adhere to legislation that covers existing schemes and/or might require new legislation.	The legislative alignment of each charge is measured based on a review of current legislation with regards to private vehicle use charges in South Africa. The antecedent legislation required for each charge is then examined and compared to the existing legislative framework.	**Light.** Charges that require little to no legislative change are ideal, but some legislative manoeuvring is to be expected.
8	Policy alignment	Any new charge should not conflict with, or contradict, existing economic and social welfare policies. The indirect consequences of a charge must be considered in terms of any negative impact on other policy outcomes.	The policy alignment is measured based on a case study review of the consequences of each charge, and a critical comparative analysis between these outcomes and the general direction of policies at the various levels of government in question.	**Light.** The normative stance of this paper means that alignment with existing policy is not a priority.

Annexure: Assessment of private vehicle use charges

	1 ROAD TOLLS	2 VEHICLE REGISTRATION/ LICENSING	3 PARKING CHARGES	4 CONGESTION CHARGES	5 PER KM CHARGE	6 POLLUTION CHARGE	7 EMPLOYEE/ EMPLOYER CHARGES
Best practice implementation	A set fee, often determined by vehicle type, for using a public road, used to subsidise/ recoup road construction and maintenance costs. Currently only SANRAL is permitted to charge tolls at national level.	Flat rate charged for mandatory registration and periodic licensing of all vehicles with a central motor licensing authority. In South Africa, registrations (and received revenues) are a provincial government mandate, with all registrations recorded on the National Traffic Information System (eNaTIS).	E.g. (i) Parking fees and fines for municipal parking spaces, (ii) ad valorem charges on existing paid commercial parking spaces, (iii) property taxes on non-residential parking spaces. Only (i) is implemented in SA, administered by local government. Pittsburgh (USA) taxes "each parking transaction by a patron of a non-residential parking place" (City of Pittsburgh, 2013). Melbourne charges for public/private non-residential parking spaces within the CBD (Hamer et al., 2011).	Levied road users in specific traffic-congested road cordons, areas, facilities or corridors. Generally enforced through automatic number plate recognition technology. London has a flat daily congestion charge of GBP11.50 for vehicles operating within a defined congestion charge zone.	Charge based on distance travelled, which uses an on-board GPS unit that transmits to a central facility where the charge is calculated (Renshaw & Brauer, 2010). In Germany, goods vehicles pay a per km charge called the LKW-Maut.	Flat-rate charged on vehicles that exceed emissions benchmarks within a specified cordon; uses automatic number plate recognition. In the City of London, cars that do not meet Euro 4 standards pay a T-Charge (Toxicity Charge) of GBP10, in addition to the congestion charge (London Gov, 2017).	A local payroll tax paid by all firms with above a threshold level of employees whose premises are located within a predetermined range of a public transport route or station. The versement transport is a local tax levied on all companies in the Ile-de-France region of France that employ more than 11 employees. The revenues are used for local public transport capital expenditure and operational subsidies.
Revenue-generating potential	**Favourable.** A core revenue source for financing the construction and maintenance of road and other transport infrastructures. Road tolls can generate significant revenues.	**Neutral.** Should responsibility be devolved to local level, cities would gain large revenues from vehicle registration and licensing.	**Favourable.** Revenue potential depends largely on the type of parking on which the charge is levied. Traditional municipal parking charges cover a small number of parking spaces within a city (and so revenue potential is low), but the number of private/ commercial parking spaces in South Africa's sprawling cities mean that parking taxes, especially parking levies, could bring significant revenues (second highest of the proposed mechanisms).	**Favourable.** Revenue generation is significant – e.g. more than GBP250-million annually. Even at a low rate of R20 per day, a cordon-type congestion charge would generate the third-highest revenues of the proposed mechanisms.	**Favourable.** Assuming a rate of 5 cents per km, which is conservative relative to implemented rate of €15c/km in Germany and the proposed rate of €6.7c/km in the Netherlands, the potential revenue is the highest of the proposed mechanisms.	**Unfavourable.** Pollution charges are typically levied on top of congestion or per km charges, which also have pollution reduction as an implicit goal, to further discourage high-polluting vehicles. Given the low number high-pollutant vehicles, and the small charge compared to (e.g.) congestion charges, a standalone pollution charge would generate negligible revenue.	**Neutral.** Revenue from the versement transport in Paris (and employer charges in Portland, USA) has been sufficient to subsidise much of their public transport systems, the level (more than 2% of the wage bill in Paris) would be impractical in the South African context.
Behaviour changing potential	**Neutral.** Although road tolls traditionally tend to reduce private vehicle travel, the e-tolls system in Gauteng did not result in any significant reduction in private car use.	**Unfavourable.** Vehicle registrations are a once-off payment, unrelated to road use intensity or location, so heavy road users are charged the same as infrequent road users. The lack of correlation between the level of the charge and the frequency, location or length of travel severely limits the potential for behaviour change.	**Neutral.** Parking charges often have a lower per-trip cost than other mechanisms, and so behaviour change is small. Also, parking levies cannot be passed on to road users, which might further soften the impact on behaviour change. However, private vehicle use reduced by 7% in Pittsburgh, and car travel demand reduced by 9% in Melbourne after parking levies were introduced.	**Favourable.** As "one of the most effective demand management measures in the industrialised world", congestion charges result in behaviour change (Rivasplata, 2012). After introducing these charges, traffic volumes reduced by 16% in London and 34% in Milan, while public transit ridership increased by 5% in Rome and 18% in London (Van Amelsfort, 2015).	**Favourable.** A recent study relating to a proposed per km charge in Belgium found that the vehicle-km price elasticity of demand is approximately –0.9, of which approximately one third can be attributed to modal shift.	**Neutral.** While the charge may discourage high-polluting vehicles, whose drivers are generally poorer, the minimal increase to the cost of using a private vehicle will be insufficient to induce most owners to reduce their kilometres or shift towards public transport.	**Unfavourable.** A charge paid by an employer that has no direct impact on the cost of using private vehicles is not likely to induce behaviour change (reduced vehicle kilometres or modal shift towards public transport).

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	1 ROAD TOLLS	2 VEHICLE REGISTRATION/ LICENSING	3 PARKING CHARGES	4 CONGESTION CHARGES	5 PER KM CHARGE	6 POLLUTION CHARGE	7 EMPLOYEE/ EMPLOYER CHARGES
Public/political acceptability	**Unfavourable.** The e-tolls experience in Gauteng indicates that introducing new road tolls at the local level could result in public resistance, and even civil disobedience (non-payment of tolls). Although the public push-back on e-tolls was due to factors unrelated to the charge itself, road tolling now is viewed negatively. Also, Cape Town successfully challenged SANRAL in 2015 over declaring Cape Freeways toll roads (OUTA, 2016). Governments of the highly contested metros are likely to hesitate before introducing such a charge.	**Neutral.** There is likely to be little/no public resistance to the charge itself because it exists. However, provinces are likely to resist this provincial revenue stream being diverted to metros and large cities. Also, there is some potential for conflict about how and where revenue is collected and spent, should different political parties run provincial and local governments.	**Favourable.** Parking charges and taxes already exist, and so public acceptability and political will are likely to be high. Any resistance is likely to come from property owners with lots of parking spaces, as happened when cities in Canada tried to implement such a charge (Real Estate Industry Coalition, 2016).	**Neutral.** A lack of public and political acceptance can prevent congestion charges being implemented, as happened in Hong Kong, New York, the West Midlands and Greater Manchester in the UK. Metros or cities need to have high enough congestion to justify such a charge. Another possible concern is that congestion charges resemble functionally e-tolls, which were opposed.	**Unfavourable.** Significant opposition to a per km charge in the Netherlands because of cost, unavoidability and complexity, and mistrust of GPS trackers in private vehicles (Tillema et al., 2013). In SA, the similarities to the e-tolls system will likely result in opposition, while high installation costs will discourage municipalities.	**Neutral.** While the charge may be relatively small, the road users who will bear the brunt of the tax – trucks and minibus taxis that have high emissions – are likely to resist its implementation.	**Neutral.** This charge relies on municipalities having good relationships with employer organisations (Hall, 2013). South Africa has one of the highest levels of government-business mistrust (WEF, 2017), and so public opposition may be high. Also, the prospect of alienating business – the most robust and influential support base within cities –may reduce the likelihood of implementation.
Flexibility	**Unfavourable.** Road tolls are relatively price-flexible, as they can be easily and uniformly adjusted. However, tolls rely on fixed infrastructure, which is costly to build, so there is little room for spatial flexibility. Also, as shown with the Gauteng e-tolls, drivers can, and likely will, relatively easily opt out of the charge.	**Unfavourable.** If additional fees were introduced at local level, only vehicles registered within the metro/city would be required to pay the charge, making it easily avoidable – owners can easily register their vehicles outside the city.	**Favourable.** Parking charges can take various forms, allowing for flexibility relative to city structures, municipal policies and revenue goals.	**Favourable.** Congestion charges can be tailored to suit the structural form of a city, making implementation very flexible (OECD, 2010). A cordon charge is more suitable for a monocentric city (e.g. Cape Town), while a value charge is more suitable for a polycentric city (e.g. Johannesburg).	**Unfavourable.** Only vehicles registered within the metro or city would be required to pay the charge, making it easily avoidable – by registering vehicles outside metro's boundary.	**Unfavourable.** Pollution charges are relatively inflexible, as they are levied on vehicles with the most harmful emissions Moreover, given that tolls rely on automatic number plate recognition technology, there is little room for spatial flexibility.	**Favourable.** Employer taxes can easily be adjusted to meet public transport financing needs, and the charge can expand to larger areas or exclude smaller businesses (e.g. the versement transport). Tax base is immovable and easily identifiable, so charges can be targeted (more than the other charges discussed here).

continued . . .

	1 ROAD TOLLS	2 VEHICLE REGISTRATION/ LICENSING	3 PARKING CHARGES	4 CONGESTION CHARGES	5 PER KM CHARGE	6 POLLUTION CHARGE	7 EMPLOYEE/ EMPLOYER CHARGES
Complexity	**Unfavourable.** Road tolls have high capital costs, as their functioning relies on the construction of fixed infrastructure. Also, implementing road tolls requires high labour (if traditional tolls) or technology (if newer, more advanced tolls).	**Favourable.** As an existing charge, already levied on all vehicle owners in South Africa, there is no complexity to implementing this charge, unless responsibility were shifted from provincial to local government.	**Favourable.** Municipal parking charges and fines are already in place, and so implementing/ administering additional parking charges is relatively straightforward: the onus is on businesses to recover ad valorem taxes on paid commercial spaces from users (Real Estate Industry Coalition, 2016), while the broader tax on all non-residential parking spaces is simply levied on top of the existing municipal property tax.	**Neutral.** Capital, operating and administrative costs are high compared to other charges, as automatic number plate recognition technology needs to be installed in multiple areas of the city. This complexity is compounded by the variation across metros and large cities, meaning no one-size-fits all solution. Implementation would need to be tailored to each metro or city.	**Unfavourable.** As per km charges require installing GPS and GSM technology in each vehicle, implementation is costly and complex, which was one of the reasons for rejecting this charge in the Netherlands (Tillema et al., 2013).	**Neutral.** Capital, operating and administrative costs are high compared to other charges, as automatic number plate recognition technology needs to be installed in multiple areas of the city. This complexity is compounded by the variation across metros and large cities, meaning no one-size-fits all solution. Implementation would need to be tailored to each metro or city.	**Favourable.** As a charge paid by extant businesses, and levied on an existing tax base, namely employer payrolls, the complexity of implementing this mechanism would be minimal.
Redistributive alignment	**Neutral.** Horizontally equitable, in that all drivers of the same type of car are charged the same amount to use the same road. But such flat-rate charges generally burden poorer road users (the charge represents a larger proportion of their income) more than wealthier road users. Thus, road tolls are regressive in proportional terms.	**Neutral.** Horizontally equitable, as all drivers of same size/class of car are charged the same amount. But such flat-rate charges generally burden poorer road users (for whom the charge represents a larger proportion of their income) more than wealthier road users. Thus, these fees are regressive in proportional terms.	**Neutral.** Horizontally equitable and not progressive/ regressive in absolute terms, as parking charges do not differentiate across users. Parking levies that are not passed on to the road user, but absorbed by the owner of the parking, would be progressive.	**Neutral.** Horizontally equitable, in that all drivers of the same type of car are charged the same amount to use the same road. But such flat-rate charges generally burden poorer road users (the charge represents a larger proportion of their income) more than wealthier road users. Thus, congestion charges are regressive in proportional terms.	**Unfavourable.** As a direct tax on distance travelled, the charge burdens private vehicle users who travel the furthest. Apartheid spatial development has resulted in an inverse relationship between income and distance travelled to work. Therefore, a per km tax would disproportionately burden poorer households in South Africa.	**Unfavourable.** Regressive tax because it targets older vehicles with high emission rates whose drivers are poorer. This contradicts the ability-to-pay principle (National Treasury, 2011).	**Neutral.** While appearing progressive because the charge would be levied on larger, wealthier business owners (who have more employees), linking to the wage bill can put downward pressure on wages and negatively affect poorer individuals.
Legislative environment	**Unfavourable.** Section 27 of the South African National Roads Act of 1998 (RSA, 1998) governs road tolls, which are only allowed at national level. Introducing toll roads at the metro level would require legislative changes and/or new legislation.	**Favourable.** Vehicle registration and licensing is a legal requirement in South Africa, and the legislative framework for this charge is well established.	**Favourable.** Parking charges and fines are an established revenue source in South African cities, and the legislative framework for charges of this nature is well established.	**Neutral.** New legislation would be required to allow metros and cities to implement this new charge, but international precedents for such a charge at the local government level exists (several European cities).	**Unfavourable.** New legislation would be required, which would be burdensome. Only one international example exists, a national tax that targets trucks in Germany.	**Neutral.** New legislation would be required, but the City of London is an international precedent for such a charge at local government level.	**Neutral.** New legislation would be required, but Paris is an international precedent for such a charge at the local government level.

continued . . .

	1 ROAD TOLLS	2 VEHICLE REGISTRATION/ LICENSING	3 PARKING CHARGES	4 CONGESTION CHARGES	5 PER KM CHARGE	6 POLLUTION CHARGE	7 EMPLOYEE/ EMPLOYER CHARGES
Policy alignment	**Favourable.** Already considered an acceptable policy instrument at national and provincial levels for generating transport-specific revenue.	**Favourable.** Vehicle registration and licensing is an established practice in South Africa, and aligned with existing policies.	**Favourable.** As a transport demand management tool that can help curb urban sprawl, parking charges are aligned with city spatial development plans but may be opposed to economic growth because they constitute a burden for larger businesses.	**Favourable.** Congestion control is in line with environmental policy, specifically the National Environmental Management: Air Quality Act of 2004 that covers air quality management, including vehicle emissions (DEA, 2017).	**Favourable.** This charge closely aligns with environmental policy, specifically the National Environmental Management: Air Quality Act that covers air quality management, including vehicle emissions (DEA, 2017).	**Neutral.** The regressive nature of the charge does not align with government growth policies, but its "green tax" nature aligns closely with environmental policy, specifically the National Environmental Management: Air Quality Act that covers air quality management, including vehicle emissions (DEA, 2017).	**Unfavourable.** Levying fees on employers based on their number of employees and wage bill is contradictory to current economic growth policies aimed at increasing employment.

PART

C

THE RISING COST OF CITIES

CHAPTER 7

CITIES AND ENERGY DIVERSITY

Key Messages

Electricity is both a major energy source and a central component of big-city finances. Therefore, the increase in uptake of renewable energy and changes in consumer demand for electricity affects not only city finances but also a city's ability to cross-subsidise low-income residential customers.

Cities need a new business model to stay relevant in the face of fast-changing customer demands for energy and should be taking on a more dynamic role within the national electricity sector.

Cities need to decrease losses from theft and expenditure on bulk purchases (buy from independent power producers), generate revenue through electricity trading and grid/time of use charges, and exploit alternative energy sources.

Electricity is a major energy source for cities, fuelling city economies, generating revenues for city service delivery, and contributing to pro-poor financial redistribution. Therefore, cities must respond – and be enabled to respond – to disruptions in the energy sector. The global megatrends – the uptake in renewable energy and changes in customer demand – are being felt locally. Electricity sales are decreasing, as customers implement energy efficiency measures, switch fuels and install rooftop solar PV (photovoltaic) systems, driven by the increased cost of conventional electricity from coal and nuclear, and the decreasing costs of renewable energy. Compared to energy efficiency and fuel switching, installing rooftop PV systems within the residential sector has an impact disproportionate to the actual electricity unit sales lost. This is because of both Eskom's and the municipal tariff structures, which bundle grid charges, levies, and taxes within the unit charges. Municipalities use surpluses from electricity sales to cross-subsidise low-income residential customers. This means that the municipality's ability to service the poor is compromised when high-income residential customers become more energy efficient and install solar PV.

Cities have the executive authority to reticulate (move) electricity in their areas of jurisdiction, but their role in supplying electricity, either through large-scale generation projects or rooftop PV, and trading electricity through their grids is less clear, and regulations sometimes actively hamper city involvement or innovation.

Cities need a new business model to stay relevant in the face of fast-changing customer demands for energy service. The model should be built on a transparent cost of supply and take into account revenue losses, energy service infrastructure costs, current tariff structures and cross-subsidies, new technologies and business opportunities, escalating Eskom tariffs and service delivery to the poor.

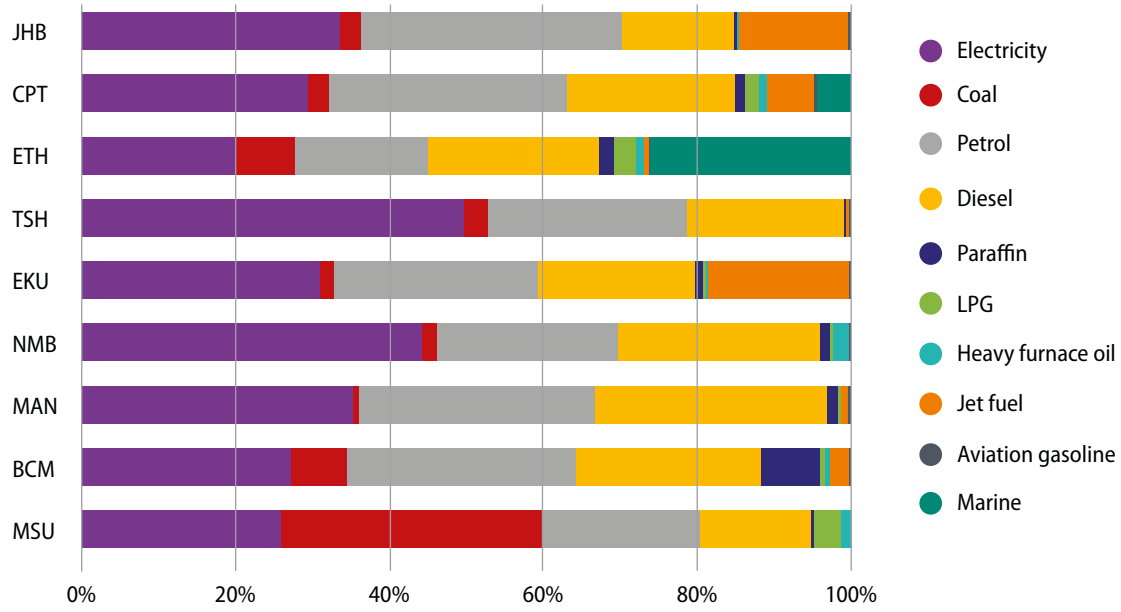
After presenting an overview of energy consumption in cities, the chapter explains the role of cities in providing electricity, and the importance of electricity revenue for city finances. The focus then turns to disruptions to the electricity sector and their effect on cities, and offers some recommendations for cities on responding to these disruptions while remaining sustainable in the future.

Energy Consumption in Cities

As Figure 66 shows, electricity accounts for between 20% and 50% of energy consumption in cities, with transport-related fuels, such as petrol (27%) and diesel (20%), making up the bulk of the remainder.

In South African metros, the transport sector currently consumes half of all energy, mainly in the form of diesel and petrol (Figure 67). In the future, energy consumption in cities may become more heavily skewed towards the use of electricity, as electric vehicles become more widespread and replace diesel and petrol vehicles. France and the UK have announced a ban on petrol and diesel vehicle sales by 2040, while China, the world's largest car market, is considering a similar ban[73].

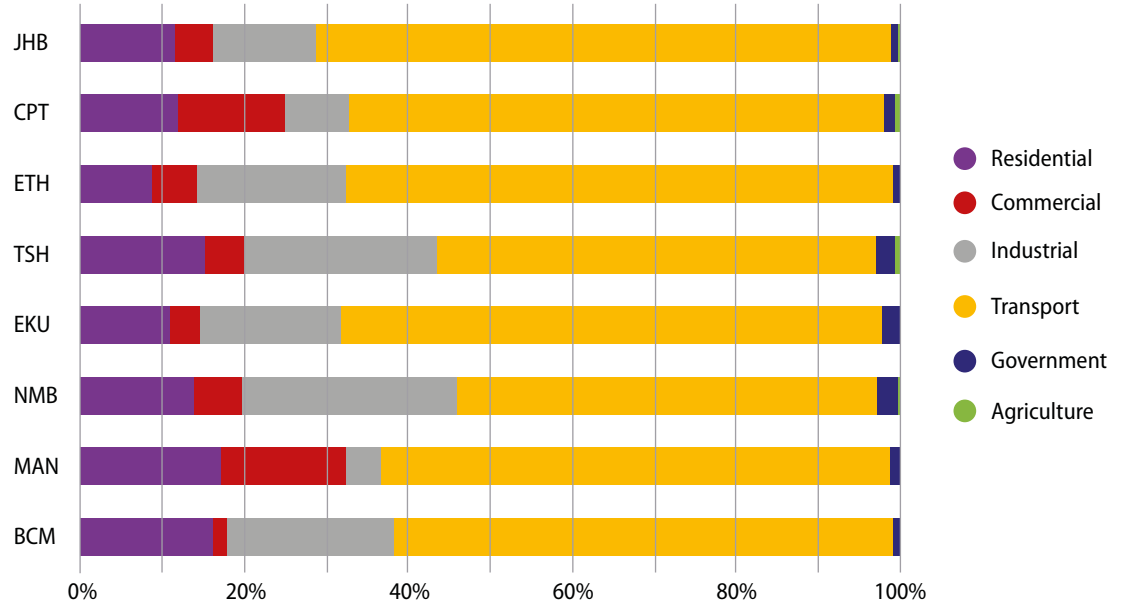
FIGURE 66: Energy consumption by source in South African cities (2011)



Sources: SEA (2011); SEA (2015)

Note: All data is for 2011/12, aside from Msunduzi, which is for 2007. Fuels used for electricity generation are not captured, otherwise there would be double-counting (electricity is already counted). Therefore, the coal use recorded here represents coal used directly, e.g. coal use in industrial boilers or in residential coal stoves.

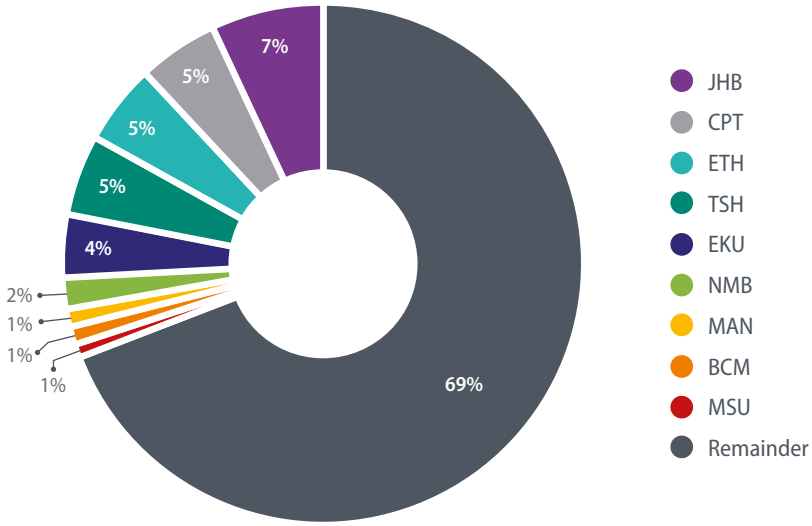
FIGURE 67: Energy consumption by sector in South African metros



Source: SEA (2015)

As Figure 68 shows, the eight metros and Msunduzi account for about a third (31%) of the country's total electricity consumption (SEA, 2011, 2015, 2016a).

FIGURE 68: Proportion of electricity consumed by South African cities (2011)



Sources: SEA (2011); SEA (2015); SEA (2016a)

Note: All data is for 2011/12, except for Msunduzi, which is for 2007.

In 2016, coal-fired power stations generated 82% of the country's electricity, with nuclear and imported large hydropower responsible for most of the remainder and renewables for roughly 3% (DoE, 2016). The only Cabinet-approved and published Integrated Resource Plan (IRP)[74] sets a target of 9% of electricity to be generated using renewable sources by 2030. The IRP has been reviewed and updated, following public consultations, and is expected to be published in the second or third quarter of 2018.

The Role of Cities in Electricity Provision

Municipalities play a key role in the reticulation (moving) of electricity. The Constitution gives them "executive authority and right to administer" electricity and gas reticulation. Eskom is responsible for electricity transmission (moving electricity from power plants to substations), while Eskom, 10 private entities and roughly 180 licensed municipalities are responsible for distribution (moving electricity from substations to customers) (Nersa, 2017). Municipalities distribute to over half (54%) of all electricity customers (DoE, 2017).

According to the Municipal Systems Act (No. 32 of 2000), municipalities are authorities for providing services such as water and electricity. This means that cities can develop service-related policies, by-laws and tariffs, and can decide how to supply the services. The Act (Sections 73 and 78) mandates municipalities to deliver services that are financially prudent and environmentally benign. It also requires them first to assess the costs (including the impact on the environment and human health), job-creation potential and current trends in sustainable service provision. As a result, many cities[75] have produced strategies or action plans aimed at promoting (or increasing the proportion of) energy sourced from renewables because renewable power is less environmentally damaging, provides more jobs per dollar invested (UNIDO and GGGI, 2015) and, in many cases, is cheaper than conventional coal and nuclear power.[76]

However, regulatory challenges and uncertainties beset the municipal role in supplying, as opposed to distributing, electricity. Following Cabinet's single-buyer decision in 2007, which allows only Eskom to buy from independent power producers (IPPs), municipalities wanting to purchase electricity directly from IPPs have to request a determination from the Minister of Energy in terms of Section 34(1)(a) of the Electricity Regulation Act (No. 4 of 2006). Cape Town is challenging this decision in court, arguing that it is unconstitutional and invalid.

In addition, for many years, the national regulations, standards and policies surrounding small-scale embedded generation (SSEG), which includes rooftop PV, were unclear. In September 2011, the first draft consultation paper on standard conditions for SSEG was released and stated that electricity-generating systems smaller than 100 kW did not need a generating licence from Nersa, so long as they were for "own use".[77] The Department of Energy's (DoE's) renewable energy independent power producer procurement programme (REIPPPP) covered systems larger than 1 MW. This left a grey area for systems between 100 kW and 1 MW, which are the sort of systems that large customers (e.g. malls) might install.

This regulatory uncertainty hampered the rollout of rooftop PV by cities. In 2013, Nersa approved Cape Town's pilot SSEG tariff[78] but, for the next three years, turned down SSEG tariff applications from other cities because the SSEG standards were not finalised. Meanwhile, private rooftop PV installation carried on apace, regardless of national or city requirements. In 2016, despite the standards not being finalised, Nersa started approving SSEG applications again. The final SSEG standards were meant to be ready in August 2015, but then Nersa advised that the standards would only be finalised once DoE had released the new licensing regulations. In November 2017, the DoE finally published the Licensing Exemption and Registration Notice, which supersedes Nersa's draft regulatory rules. The 100 kW to 1 MW gap is now addressed: systems of 1 MW and smaller do not need a generation licence but do need to register with Nersa, and systems will only be registered so long as the cap on SSEG, as allocated in the IRP, has not been reached. However, the IRP makes no mention of such a cap (Montmasson-Clair et al., 2017).

The regulations on wheeling, i.e. on the transport of privately generated electricity across municipal grids, are inconsistent and unfair towards cities. In 2012, Nersa released draft regulatory rules on network (grid) charges for energy transported by third parties, in which medium-voltage generators are exempt from grid charges (the fee charged by cities for the use of their grid). This means that the city does not receive any income from a private generator using its grid. However, if the grid is down, the city has to pay the private generator for any lost sales. Similarly, in 2006, Nersa granted a licence to POWERX (previously Amatole Power) to trade electricity, meaning that POWERX could buy from IPPs and on-sell to willing customers, using the city's grid. This is contrary to Cabinet's single-buyer decision in 2007 that allows only Eskom to buy electricity directly from IPPs – municipalities are currently not allowed to purchase power directly from IPPs.

What is still unclear is whether or not a city may trade electricity across their grid. The Municipal Systems Act says that municipalities may only "finance the affairs of the municipality by (i) charging fees for services; and (ii) imposing surcharges on fees, rates on property and, to the extent authorised by national legislation, other taxes, levies and duties" (this excludes trade of electricity). However, the Electricity Regulation Act states that a municipality "has executive authority over and the right to reticulate electricity within its area of jurisdiction in terms of the Municipal Structures Act" and defines "reticulation" as meaning the "trading or distribution of electricity and includes services associated therewith" (SALGA, 2014).

The Role of Electricity Revenue in City Finance

Electricity sales contribute an average 26.8% of municipal revenue (Montmasson-Clair et al., 2017). The surplus from these sales, which is calculated by subtracting the electricity-supply costs (buying electricity from Eskom, maintaining the municipal grid and administering sales) from the electricity costs charged to consumers, is the third-largest contributor to city budgets after property rates and national government grants (Eberhard, 2015c; National Treasury, 2016).

Electricity revenue is a crucial element in the channelling of funds to address energy poverty and carry out progressive service delivery. The free basic electricity (FBE) policy (DME, 2003) provides for the funding of FBE from two sources: (i) the local government equitable share grant[79] from national government, and (ii) municipal electricity surcharges – or surpluses – on certain commercial, industrial, and high-use residential customers. Municipal surcharges are used to cross-subsidise FBE, as well as other services that generally run at a loss, such as water supply and waste removal (PDG, [forthcoming]). Electricity surcharges, therefore, act as a redistributive tax. The DoE's Integrated National Electrification Programme (INEP) funds any actual electricity infrastructure.

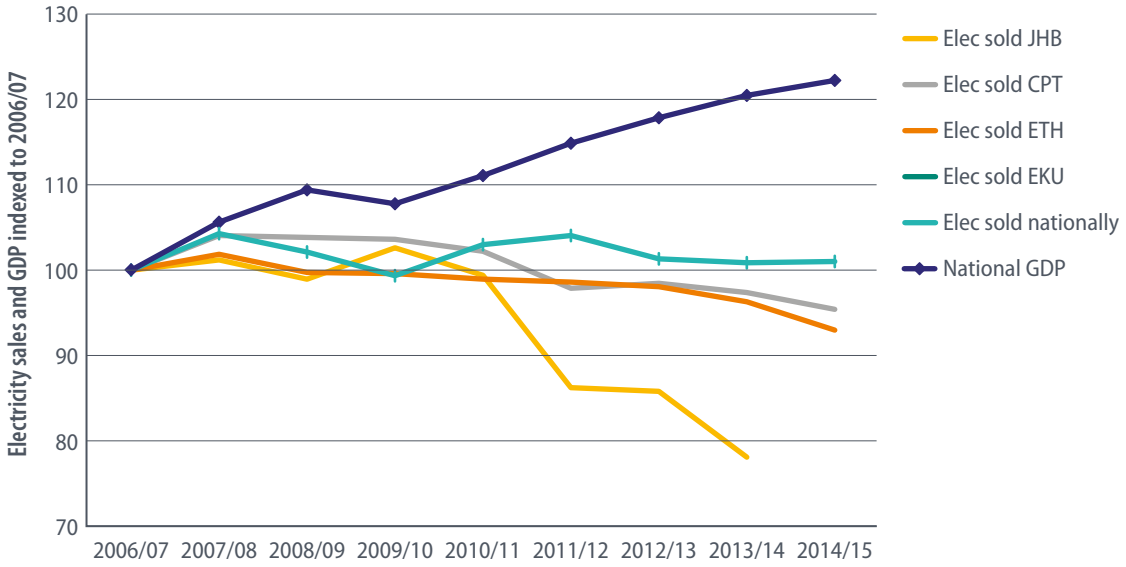
Electricity tariff structures can either help or hinder service delivery to the poor. Progressive cross-subsidisation is assisted through electricity tariff structures that have low connection fees, no fixed charges (i.e. a set daily charge for the use of the grid, regardless of whether electricity is being consumed) and inclining block tariffs (the cost per unit of electricity increases, as the customer uses more) (SEA, 2014).

Energy Sector Disruptions

The global megatrends – the uptake of renewable energy and changes in customer demand (BP, 2017) – are being felt locally. Since 1997, the economy has shifted away from industrial (high-energy users) to commercial businesses (lower-energy users) and, as a result, the amount of electricity used per economic unit of value produced has decreased (Eberhard, 2015a). Nevertheless, electricity consumption and economic growth continued to grow in step, possibly because of an increase in electricity use in the non-economic residential sector. This assumption of correlated growth was used for energy planning. However, since 2007 the pattern has changed, and energy consumption has decoupled from economic growth: between 2007/08 and 2014/15, the economy grew, but electricity sales volumes declined both nationally and in individual cities (Figure 69).

This decrease in electricity consumption in cities is arguably linked directly or indirectly to the trebling of Eskom electricity prices between 2009/10 and 2017/18 (Montmasson-Clair et al. 2017) and the price elasticity of demand (i.e. how customers respond to price increases). Increased electricity prices pushed customers to reduce their grid electricity use and costs through energy efficiency, theft or by switching to alternative energy sources: alternative fuels in the case of the industrial sector and rooftop PV in the case of the residential and commercial sectors.

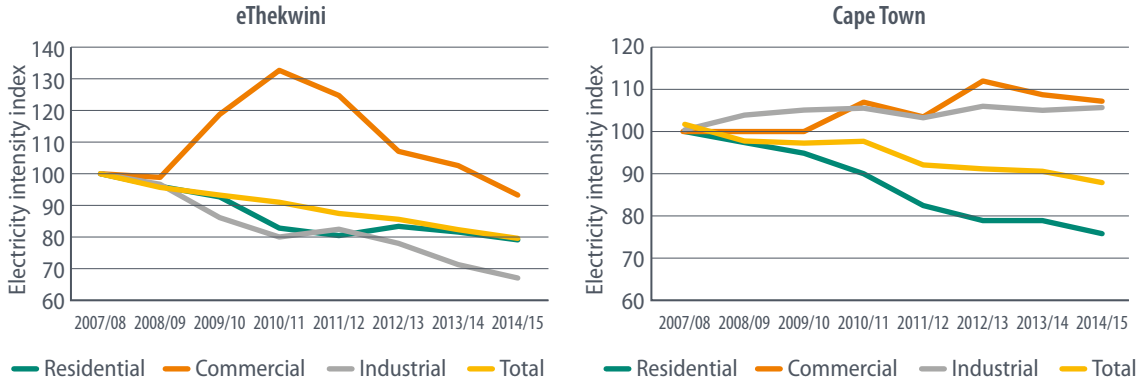
FIGURE 69: Electricity sales in cities vs. national economy (2006/07–2014/15)



Sources: Metro electricity departments and Global Insight

An analysis of electricity sales by customer type in two metros, eThekwini and Cape Town, found that electricity use per customer is decreasing, with the greatest decreases coming from high-use industrial customers in eThekwini and residential customers in both metros (Figure 70).

FIGURE 70: eThekwini and Cape Town electricity sales by customer type (2007/08–2014/15)



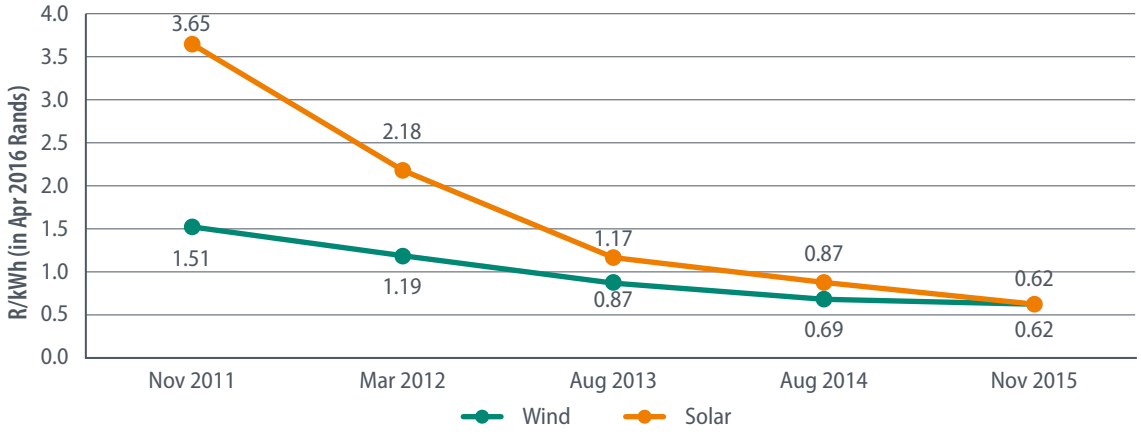
Note: indexed to 2007/08
Sources: eThekwini and Cape Town electricity departments

Heavy-use industrial customers in eThekwini decreased their electricity consumption by switching from electric-arc furnaces (uses electricity) to blast furnaces (uses coal) because of the increasing price of electricity,[80] while residential customers changed their behaviour and/or installed energy-efficient technologies.

The prevalence of electricity theft increased with electricity prices. Higher electricity prices resulted in increased non-technical losses, i.e. electricity losses through theft, non-payment or incorrect billing. As each municipality sets their own tariffs, the electricity price for a certain type of customer varies across municipalities and differs from tariffs in Eskom-supplied areas. Of the metros, Johannesburg had the highest increase in tariffs and in losses, which includes losses from theft (Eberhard, 2015a).

While the price of electricity from Eskom rose, the price of electricity from renewables decreased rapidly (Figure 71). Electricity generated by large-scale wind and solar plants now costs less than electricity from conventional power plants such as coal (CSIR, 2017). Similarly, the cost of rooftop solar PV has fallen to such an extent that it is competing with rising electricity retail prices (the price of electricity after surcharges are added by Eskom and/or the municipality).

FIGURE 71: Decrease in real tariffs of renewables in DoE's REIPPPP



Source: CSIR (2017)

Rooftop PV has a very high return on investment in the commercial sector (malls, offices, etc.), because it generates electricity exactly when needed – air conditioning and refrigeration systems run harder during the middle of the day, when it's sunny. By 2016, an estimated 280 MW of rooftop PV had been installed (PQRS, 2016), which is approximately three times the power generated by the 96 MW Jasper Solar Energy Project, South Africa's largest commercial solar power plant. By 2022, it is estimated that 3 GW of rooftop PV will be installed, or the equivalent of 10% of all electricity distributed by municipalities (SAPVIA, 2017).

The decrease in electricity sales is a structural, long-term trend, driven by the increasing cost of conventional electricity from coal and nuclear and the decreasing costs of renewables (Eberhard, 2015b). These trends were described at the 2017 Association of Municipal Electricity Utilities conference as the "four Ds": decarbonisation (using renewables), decentralisation (many smaller rooftop PV systems rather than a few large centralised power plants), digitisation (digital requirements of a "smart grid" to handle rooftop PV feed-in) and democratisation (people can choose alternative electricity supply options).

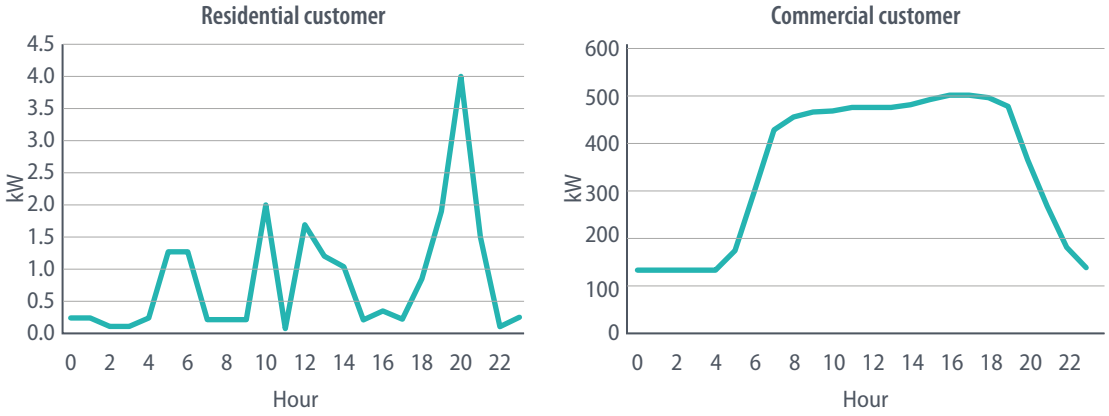
The Implications of These Disruptions for Cities

The responses of customers to increased electricity prices include fuel switching, theft, efficiency and rooftop solar PV installation, which all have a negative impact on city electricity revenue. However, the installation of rooftop PV by residents has an impact that is disproportionate to the actual unit sales lost because of both Eskom's and municipal tariff structures.

Eskom sells electricity to large, urban municipalities at the "Megaflex" tariff, which has different per-unit rates depending on the time of day, the day of the week and the season. Lower rates are charged from September until May (spring, summer and autumn) and during the middle of the day and at night, while higher rates are charged from June to August (winter) and during peak times, generally 6am–10am and 5pm–8pm (Eskom, 2017).

The peak tariffs are high because Eskom must run expensive peak power plants to meet the demand that spikes at the same times and is higher in winter due to additional heating demands. The residential sector is the main driver behind peak electricity demand. As Figure 72 illustrates, the commercial and industrial sectors tend to use electricity during the middle of the day, while the residential sector consumes most during peak periods (morning and evening).

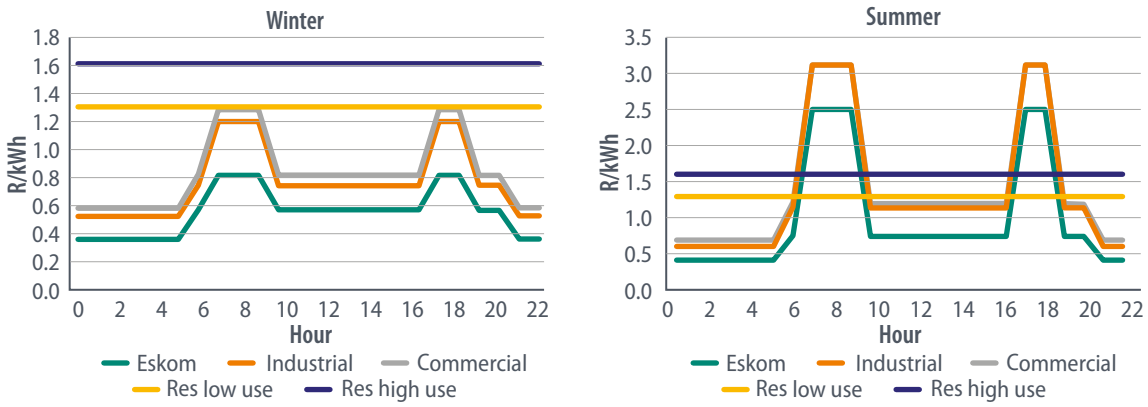
FIGURE 72: Example of demand profiles for a commercial and a residential customer in Tshwane



Source: SEA (2017a)

Most residential households are on a flat tariff: they pay a set price per unit, whatever the time of day or month. This means that during peak times in winter, cities sell at a loss to residential customers, as Eskom's tariffs for the city are higher than the city residential tariffs. These losses are covered through the surplus cities make on sales during off-peak times, when the city residential tariffs are higher than Eskom's tariffs. In contrast, large commercial and industrial customers are more likely to be on a time of use (ToU) tariff, with a lower off-peak rate and a higher peak rate, incentivising them to use less electricity during peak times when the city is buying electricity from Eskom at the highest rate (Figure 73).

FIGURE 73: Eskom Megaflex tariff compared to City of Tshwane tariffs for residential, commercial and industrial customers



Source: SEA (2017a)

The impact of rooftop PV on city revenue is disproportionate to the actual loss of sales because residential customers with rooftop PV generate electricity (and so reduce their consumption of city-supplied electricity) at times when the city stands to make a surplus (in the middle of the day). And during peak times, especially the evenings, customers generate little to no solar energy and so draw electricity from the municipal grid, when the city is providing electricity at a loss during winter. Compounding the problem is that residential customers generally use most electricity during peak times, especially evenings – cities have found that electricity sales have decreased substantially, but peak electricity demand has remained relatively static (Eberhard, 2015c; PDG, [forthcoming]). This means that cities bear the cost of providing a lot of expensive electricity during peak times, while supplying a dwindling amount of electricity during the high-profit-margin periods.

The surplus from residential electricity sales comes from a very small pool of high-use customers – a quarter of households account for half of total residential electricity use. This surplus is used to cross-subsidise the operational costs[81] of customers that are serviced at a net cost to the system, which represent roughly 40% of all households (Eberhard, 2015c) – national government subsidises electricity unit costs through the equitable share grant. An inclining block tariff is meant to act as a progressive tax, as residential high users of electricity are charged more per unit than low users, but it is in fact a tax from which the wealthy can abscond. This tariff acts as an incentive for higher-income residential customers to install PV and other energy-saving technologies. Furthermore, cities responded to reduced electricity sales by raising tariffs to higher-income residential customers (Figure 74) in an effort to maintain revenue, as the maintenance cost of the city's grid remains fixed. This has further incentivised higher-income residential customers to turn to energy efficiency and solar PV, creating a feedback loop that may end in the absolute worst-case scenario for a city. This is when high-income customers decide to defect from the grid altogether, resulting in the city losing their electricity revenue forever. Some customers have already approached City Power (Johannesburg) asking to be removed from the grid altogether.[82]

The impact of rooftop PV installation on city revenue

The scale of impact of rooftop PV installation by residential, commercial and industrial customers on city revenue was modelled for various cities (Cape Town, Ekurhuleni, eThekwini, Johannesburg and Tshwane), taking into account Eskom and city tariff structures, and hourly PV generation and customer demand.

As Table 50 shows, the impact on city revenue from commercial and industrial customers installing rooftop PV is much lower than from residential customers. This is because commercial and industrial customers are on ToU tariffs and so pay close to, or above, the supply price for peak electricity use. They are also charged a fixed service charge (rand per day), aimed at covering grid operation and maintenance.

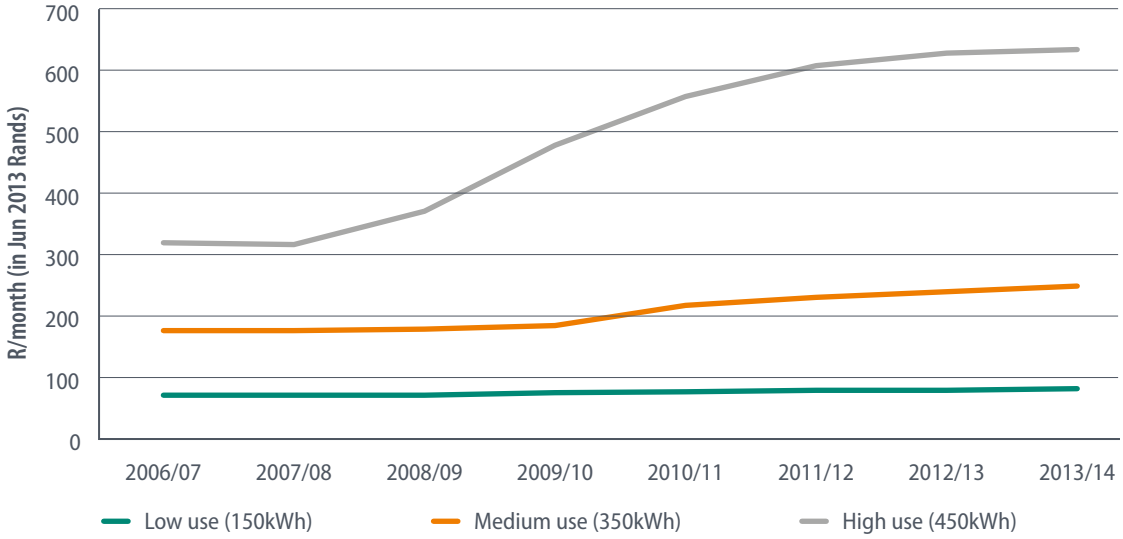
TABLE 50: Rooftop PV impact on electricity revenue (from that tariff/customer type) in Tshwane

ROOFTOP PV PENETRATION	1%	5%	10%	20%
Small business	0.0%	–0.2%	–0.5%	–1.0%
Medium business	0.0%	–0.1%	–0.3%	–0.5%
Large business	0.0%	–0.1%	–0.2%	–0.4%
Residential	–0.2%	–0.8%	–1.6%	–3.3%

Source: SEA (2017a)
Note: The impact on revenue is shown as a percentage impact on each tariff category analysed. For example, a 20% rooftop PV penetration in the residential sector will result in a reduction of 3.3% of electricity sales revenue from customers on the residential tariff.

The impact on **total** city electricity revenue for all cities modelled was 2–2.5% for a 15–20% rooftop PV penetration.

FIGURE 74: Residential electricity cost by usage group (2006/07–2013/14)



Source: Eberhard (2015a)

In addition to decreasing electricity revenue, the municipality's ability to service the poor is compounded by the increasing costs of service provision and stagnating national fiscal transfers aimed at subsidising free basic services to the poor. "National government has been quite clear that municipalities should not expect real increases in allocations and transfers over the medium term" (PDG, [forthcoming]). The severity of the combined impact of decreasing electricity sales revenue and stagnant national subsidies varies, as cities have different electricity tariffs (some cities emphasise rates, others tariffs, in their revenue collection) and make different decisions on how to spend their local government equitable share.

City Responses to the Disruptions

The Energy White Paper of 1998 recognised that South Africa's electricity system inherited in 1994 required transformation, identifying the following as necessary for the success of the electricity supply industry: "giving customers the right to choose their electricity supplier; introducing competition into the industry, especially the generation sector; permitting open, non-discriminatory access to the transmission system; and encouraging private sector participation in the industry".

For cities to stay relevant in the face of fast-changing customer demands, a new business model is needed. Although no-one knows the exact form of the sector in the future, what is certain is that the sector needs some flexibility to be able to respond to decentralisation. This could include greater participation of the private sector and a greater role for cities.

To respond to the financial impacts of changes in the sector, cities need to understand the true cost of electricity supply. Electricity tariffs cover four costs: customer service and vending costs, grid-maintenance costs, demand costs (based on the maximum amount of power a customer or group of customers may draw at any one time) and energy costs (cost per unit of energy used). A cost-of-supply study would assist in setting appropriate, sustainable and cost-reflective tariffs. Based on a cost-of-supply study, a city can follow a three-pronged approach to maintaining revenue:

- Improve internal efficiency by decreasing losses (from theft) and expenditure on bulk purchases (electricity supply), and making use of battery storage.
- Offer grid services to generate revenue through electricity trading (wheeling), grid charges and time-of-use charges.
- Expand into the sale of alternative energy services, while servicing the poor in a financially sustainable manner, through electric vehicle tariffs, solar water heater (SWH) and rooftop PV rollout support programmes, as well as energy service packages.

Improve internal efficiency: chasing the margins

Cities can improve their margins by becoming more efficient, through reducing their losses (from theft), decreasing expenditure on bulk purchases (electricity supply) and storing electricity in batteries to avoid punitive charges for exceeding agreed draw-down limits.

Decrease losses

Cities are recognising the importance of maintaining the electricity surplus by decreasing current losses rather than increasing revenue. In 2017/18, technical and non-technical (theft) losses amounted to R9.2 billion (SARPA, 2017). The industry benchmark for losses is 14–18% (City Power, 2015), but some cities are much higher. For instance, in 2015 City Power estimated that 20% of Johannesburg's power requirements were lost to theft (and total losses, including technical losses, stood at over 30%) and identified that, realistically, losses could potentially be reduced by 0.5 TWh or 4% (ibid).

Interestingly, while the highest *number* of customers who steal are residential (90% of all theft cases), the greatest *volume* of stolen electricity (80%) is by a very few commercial and industrial customers (SARPA, 2017).

Nelson Mandela Bay and EDF, a French electricity utility, undertook a joint feasibility study to improve the city's electricity distribution. In 2015/16, electricity losses cost the city R500–R600-million, or the equivalent of about two years of capital budget. Every additional percentage increase in non-technical losses equated to another R20–R25-million lost. Roughly 20% of the electricity bought from Eskom was not paid for by city customers (NMB & EDF, 2017). Actions identified to deal with losses included:

- Employ more fraud detection staff – in Eskom, one revenue protection staff member can recover R10-million per year (SARPA, 2017).
- Assess the business case to connect currently illegal connections.
- Improve meter design (a split system, with half outside the house, for easier access by the engineer).
- Run communication and awareness campaigns on the dangers and consequences of illegal connections.
- Reinforce management through key performance indicators based on the scale of theft avoided, rather than case numbers.
- Increase connection fees, especially for large customers, which acts as a penalty when they need to be reconnected after being disconnected following theft detection.
- Move from credit to prepayment meters (7% of the city's customers were still on credit meters).
- Reallocate meter readers to the fraud detection department.

Decrease expenditure on bulk purchases

Cities can decrease expenditure on bulk electricity by generating their own electricity, buying from IPPs that have lower tariffs than Eskom and implementing utility-scale storage so that electricity can be bought when tariffs are cheaper (e.g. midday), stored and then used during peak times. Sourcing energy from renewables would have broad economic, social and environmental impacts, including risk mitigation, job creation and meeting city climate change mitigation targets. A "local IRP" electricity optimisation study for Cape Town found that if 55% of electricity were generated by renewables, i.e. wind and solar, the city could save R297-million a year by 2022/23, (CSIR, 2017).

For generating electricity, cities have various power plant ownership or contract options. A city could develop and own a plant, but this requires finance and, generally, only larger cities have the capacity to undertake such projects. The motivation for this type of project to be city owned is usually based on additional benefits, such as sludge management (in the case of biogas-to-energy projects) and emissions reduction, rather than electricity generation alone. eThekwini's 6.5 MW Bisasar landfill-gas-to-electricity plant has substantially reduced the municipality's waste emissions. The project was funded by the municipality, the DoE and the Prototype Carbon Fund (SEA, 2017b), and the city owns the plant, which is operated and maintained by a private contractor.

Another option is a public-private partnership (PPP), where the private partner builds the power station and sells the electricity, with the profit shared between the city and the partner. The plant is considered city-owned, and so the city would not need a Section 34 determination in order to buy from an IPP. However, a PPP requires complex contracting, and the legality of such a contract is still under question by National Treasury, given the restrictions of the Municipal Finance Management Act (MFMA) and the Municipal Systems Act that set out procurement processes. Some cities are also exploring a build, own, operate and transfer model.

The MFMA requirements also need to be taken into consideration if cities buy directly from IPPs through a power purchase agreement (PPA), in the case of larger-scale generators, or SSEG tariffs, in the case of rooftop PV generators. This means that cities cannot buy electricity that is more expensive than Eskom Megaflex rates and, to buy directly from IPPs, require a Section 34 determination by the Minister of Energy. Ekurhuleni is pursuing a plan to partner with and buy from multiple IPPs and sent out tenders for the supply of electricity that included no constraints on the type of power, as long as the tariffs are below Eskom's Megaflex and the emissions are lower than those from conventional coal-fired electricity. Responses to the tenders include 5 MW of landfill gas (1 plant), 139 MW waste-to-energy (6 plants), 288 MW solar PV (32 plants) and 195 MW natural gas (7 plants) (Wilson, 2017). The municipality has received an in-principle approval from the Minister of Energy that a Section 34 determination will be given, as long as Ekurhuleni bundles all applications into one. It remains to be seen whether the determination will be granted, given that South Africa has had four different energy ministers since early 2017.

Implement battery storage

Utility-scale storage can help cities reduce costs by enabling them to avoid the punitive charges incurred when increasing or exceeding their notified maximum demand – the maximum power they are allowed to draw from Eskom at any one time. The City of Cape Town recently commissioned a model to support battery storage decision-making – currently battery costs are too high to be viable, but are dropping. Battery storage provides a relatively mobile and modular infrastructure investment, which can be shifted physically as demand changes. This could lower the capital costs of grid expansion and offer some possibility of tariff shaving through shifting load from peak to off-peak times.

Grid services

There are opportunities to augment or create new streams of revenue via wheeling (electricity transport) charges and the on-selling of electricity received from rooftop PV generators at a higher tariff than paid to the generator. This is already happening in some cities.

Electricity trading (wheeling)

Cities that provide a platform for investors and generators to trade energy through their grid infrastructure will boost foreign and local direct investment, and jobs in the local green economy. Achieving this will require addressing several issues.

Some negotiation with Eskom may be required in cases where, for example, a generator feeds electricity into the city's grid, and then has to go through a portion of Eskom's grid in order to reach a customer. Another issue is that customers based within the city's distribution area may switch from buying their electricity from the city to buying from private generators who are wheeling across the city's grid. This is because municipal-supplied customers generally pay more for electricity than Eskom-supplied customers. Eskom sells electricity to cities at a higher price than to its industrial customers – cities then add a mark-up. In essence, private generators would be in direct competition with the city for electricity customers.

Two cities – Tshwane and Nelson Mandela Bay – have wheeling agreements. Tshwane has a single agreement with one customer: Bio2Watt, a biogas waste-to-energy company. Nelson Mandela Bay has a framework agreement that allows up to 10% of electricity demand to be met through traded renewables, 80% of which must be developed locally.

Grid charges

The fee for the use of the municipal electricity grid is often bundled within a unit charge, especially in the case of residential electricity tariffs. This means that customers who are using less electricity (because of energy efficiency measures or rooftop PV installation) are also contributing less towards grid maintenance, while still using the grid. Customers who install rooftop PV can pay a fixed charge that covers grid maintenance and availability costs (in other words, the cost of having the grid available as "back-up" for when the sun doesn't shine), while a feed-in tariff, which pays a customer for the power they export when they generate more than they use, can encourage a customer to remain grid-linked. Examples of such tariffs are in Table 51.

A pragmatic balance is needed between the often conflicting goals of a cost-reflective tariff and a low-carbon/decentralised transition. A low feed-in tariff and high fixed charge will increase a customer's payback on their rooftop PV, and may encourage defection from the grid if the payback term becomes too long. As a comparison, an off-grid battery storage rooftop PV system has a payback of 18 years[83] (SEA, 2017a). A fixed charge on customers who do not have rooftop PV will also encourage grid defection if they have the means to install rooftop PV, since they are already paying a fixed charge, while a fixed charge on low-income customers would be regressive, as it reverses the effect of electricity subsidisation. Low-income customers should remain on a low, flat-rate tariff.

TABLE 51: SSEG tariffs implemented by cities

COST (excluding VAT)	JHB	CPT	ETH	NMB
Current 'normal' residential c/kWh (high-inclining block tariff)	145.00	200.05	129.39	170.00
Residential SSEG fixed charge (rand per month)	440.00	342.00	220.00	60.00
Residential SSEG energy charge (c/kWh)	140.65	200.05	129.39	175.00 peak 170.00 standard 125.00 off-peak
SSEG feed-in tariff (c/kWh)	42.79	61.47	62.00	150.00

Source: SEA (2017a)

Spreading the cost of maintaining the grid across higher-income groups is important in order to maintain this service for the benefit of all. Municipalities may decide to include the charge for using the grid (or a portion thereof) in the rates bill of higher-income customers. This will ensure that the public service of the grid is still paid for in a redistributive manner and avoid having to load a grid charge onto an electricity bill, which is confusing to customers, especially those on prepaid meters.

By October 2017, 31 municipal distributors were accepting rooftop PV connections to their grid; 23 of them with an official application system and 18 with a SSEG tariff (Ferry et al., 2017). They include Cape Town, eThekwini, Johannesburg and Nelson Mandela Bay. By late 2017, Johannesburg had commissioned 8.4 MW (Vermeulen, 2017).

A city should not dissuade potential rooftop PV customers from feeding into their grid. A study commissioned by Tshwane found that blocking the reverse-feed[84] of electricity from residential customers (who are the most likely to export power) would cut off a substantial potential revenue stream, and that the highest revenue loss would be from illegal connections, which may occur if the application process to install rooftop PV is too onerous (SEA, 2017a). Cities should implement a user-friendly rooftop PV registration process with tariffs that protect city revenue yet enable a reasonable return on investment for the customer. If not, they run the risk of illegal installations that cannot be policed effectively. Cape Town has produced guidelines on safe and legal installation,[85] and in May 2017 the South African PV Industry Association (SAPVIA) launched the PV GreenCard system, which provides a database of accredited installers and all installations, and a resource repository of existing standards.

Time of use tariffs

Time of use (ToU) tariffs may encourage residents to use electricity outside of expensive peak times. It could increase the city's revenue surplus and decrease a customer's electricity consumption, and in some cases decrease the customer's bill. For example, even if a customer uses little electricity, the customer's bill would be lower and the city's sales margin higher if the electricity use is mostly in off-peak times. This is because in off-peak times, the city charges less for electricity but has a greater sales margin, whereas during peak times, the city may charge more but receives smaller sales margins.

Before implementing ToU tariffs, Nersa requires cities to undertake a cost-of-supply study for customers that the city wishes to place on ToU tariffs (Eberhard, 2015c). ToU tariffs are widely used for commercial and industrial customers, but not residential customers, because of the cost of metering infrastructure. Therefore, ToU should be targeted at higher-income households, as the costs may be punitive for low-income households, which often have long travel times to/from work, forcing them to buy electricity during peak times.

Energy services

Instead of focusing only on selling units of electricity, cities can offer a basket of potential alternative energy services, while at the same time increasing their online presence, to remain relevant to customers. Cities also need to consider how to service the poor in a financially sustainable manner. Some innovative energy service examples are suggested below.

Electric vehicle tariff

Cities recognise that electric vehicles (EVs) are potentially a huge new revenue opportunity. Money spent on conventional fuels (diesel and petrol) generally flows out of the local economy and even out of the country (most oil is imported). Therefore, EVs would not only increase local electricity sales revenue but could also bolster a local green economy based on renewable energy generation. The battery storage potential of a fleet of parked and charging electric vehicles could be used to balance grid demand in future. Currently this potential is limited because at least one of the two electric cars (Hyundai i30 and Nissan Leaf) currently available in South Africa does not have the ability to feed electricity into the grid.

Cape Town is investigating the appropriate tariffs for EV owners and owners of EV charging stations, as well as the option of using EV batteries to increase grid load flexibility (i.e. the ability of the city to respond to changes in customer electricity demand). This will be fed into an EV framework aimed at promoting EVs over conventional vehicles. Such a framework will take into consideration the roles of private and public sectors within the current regulatory context. EVs and SSEG are considered in parallel, as both will have a disrupting impact on revenue and both require customers to register in order to be placed on specific tariffs. If customers do not register and decide to charge EVs during peak times, the city stands to lose considerable revenue. An easy EV tariff registration process, alongside tariff incentives, would encourage customers to charge EVs during off-peak times. The city's role is seen as potentially offering public land for lease for charging stations, while the private sector is expected to take up the rollout of charging infrastructure.

Internationally, national policy is a key driver of EV take-up. The top 20 EV cities are in countries that have national efficient transport policies promoting EVs (ICCT, 2017). For example, China's fuel consumption standards and New Energy Vehicle credit system, the EU's CO_2 emission standards and Japan's fuel economy standards. Leading cities also have multiple actions and policies in place. Table 52 illustrates international examples of initiatives that encourage EVs.

TABLE 52: International examples of electric vehicle initiatives by cities

INITIATIVE	EXAMPLE
Electrification of public buses	Shenzhen (China): All buses were electrified by October 2017.
Free public charging	Oslo (Norway): Free charging stations at certain renewable charging points.
Building or parking codes that promote EVs	London (UK): One in five parking spaces must have an EV charging point.
Road or lane preference to EVs	San Francisco (US): EVs can use high-occupancy vehicle lanes and receive reduced bridge tolls.
Vehicle registration benefits	Shanghai (China): Due to high pollution and congestion, an expensive licence plate auction system is in place, but EVs do not need to go through this process.
Parking benefits	Amsterdam (Netherland): Free public parking or priority parking permits (normal waiting time could be years) for EVs.
Purchase incentives	Qingdao (China): EV subsidies.
Taxi electrification	Beijing (China): Government subsidies were used to replace all taxis with EVs.
Electrifying the government fleet	Los Angeles (US): Half of city fleet was electric as of 2017.

Source: ICCT (2017)

Solar water heater rollout support programmes

Cape Town's solar water heater (SWH) accreditation programme allows residential customers to access an online list of SWH installers accredited by the city. Accredited installers meet various criteria, such as compliance with relevant standards and the ability to offer financing options and 5-year warrantees.

Johannesburg undertook a low-pressure SWH rollout programme using funds generated from a 1 c/kWh levy on electricity sales to high-use customers, installing 80 000 SWHs from 2011 to 2014. The DoE's energy efficiency and demand side management grant funding was used initially, but it came with a high administrative burden and the funding source was not secure: cities have to reapply every year to access the fund and are not always successful. An issue experienced with this rollout model, and all others across the country, is continued system maintenance. No matter the installer or implementer – Eskom, national government, local government or a private entity – maintenance issues usually sit with the local municipality. This has prompted some cities, including Johannesburg and Cape Town, to consider taking ownership of these systems, with the potential of renting out the service of hot water to households in exchange for continued maintenance and upkeep. This can be seen as a form of "electricity" service provision.

Rooftop PV rollout support programmes

Cape Town was the first city to implement rooftop PV tariffs. The process created a raft of support documents for customers or other cities wanting to roll out a similar programme. These documents include information on the connection application process; equipment standards; contract templates; guidelines for electrical contractors; and guidelines to consumers on how to choose a system and service provider, and how to install a system legally. eThekwini has an online, interactive solar map to help residential customers calculate potential costs and savings of rooftop PV installations – the customers can draw the size of their system on their roof. The site also lists potential installers. Nelson Mandela Bay is discussing with the private sector the potential of entering into public-private partnerships, where the city supports companies that offer rooftop PV installation and lease agreements on commercial customers' roofs. With a lease agreement, a customer leases the PV system instead of paying for the capital cost of the system. The city would facilitate the process of linking seller to client, while receiving an agreed-upon cut from the installer.

Energy service packages

Johannesburg is investigating alternative energy service options for informal areas that have limited access to grid electricity. Options include gas appliances, efficient lighting and solar PV to supplement grid electricity. Lessons learned include: circuits should be split into essential (e.g. lighting) and non-essential (e.g. heating) loads to manage loads, plots should be regularised to protect the energy infrastructure investment, and communication with the community is critical. Acknowledging that households will resort to theft or dangerous alternative fuels if electricity is unaffordable, the proposal is to offer households 350 kWh (a higher amount than received through FBE) at a flat rate of R150 per month.

Johannesburg is also looking at ways of encouraging mid-income households to remain on the grid, through offering alternative energy packages consisting of a combination of solar PV, gas and conventional grid electricity. Mid-income households account for 21% of all households and 50% of city electricity revenue. These customers use electricity mostly for heating water (47%) and cooking (14%), activities that largely occur during peak times, when margins on sales are low (in summer) or negative (in winter). The solar PV is used for heating water, with spare electricity generated available for other household uses, and gas stoves used for cooking. Grid electricity is used for remaining appliances, such as fridges and TVs. The solar PV and gas stove could be offered as part of a repayment package. For a household using 1000 kWh per month, the package (including energy and repayment costs) would cost less than using only grid electricity, i.e. R1045 per month compared to R1290. The package option also improves sales margins to the city, because less electricity is used during the evening peaks (Magemba et al., 2017).

The Future

Cities are best placed to respond to local demand and load variability, and know the best places to connect to their grid, based on demand and grid infrastructure. Cities can ramp generation up or down and send out price signals dependent on local demand at the time. Demand mechanisms are also best implemented at the local level. Constitutionally, cities are the site of service delivery and redistribution, while electricity services provision is a crucial element in the ongoing sustainability of cities.

> "Technology is only disruptive because we're not prepared."
>
> *Nersa representative at the 66th AMEU (Association of Municipal Electricity Utilities) Convention 2017*

Keeping these factors in mind, cities should be taking on a more dynamic role within the national electricity sector, by engaging in local long-term optimisation studies, and demanding a role in national planning processes, as they have local knowledge on load-balancing within their areas. Local and national government should engage on planning, to ensure that the financial and load-balancing implications for the whole supply system are met, rather than focus on a case-by-case basis for each IPP.

Internally, cities need to get their houses in order through ensuring transparent pricing, reducing losses and having effective pro-poor support. Dynamic business activities will require developing a culture of innovation, investing in research and development, and changes to the skills base, particularly in an increasingly data-driven era.

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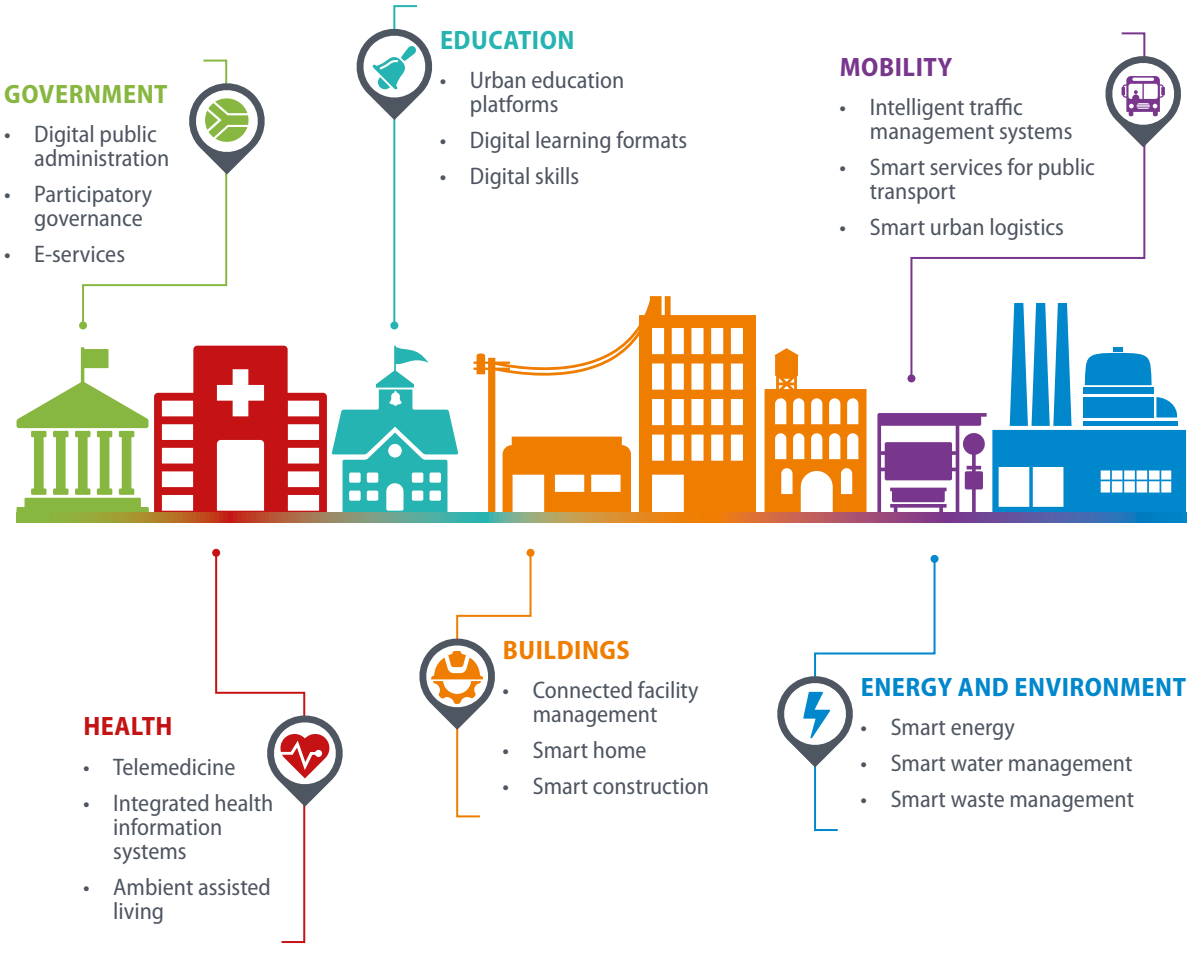
SMARTER, MORE EFFICIENT CITIES

The concept of a "smart city" is still evolving, but one definition is a city that performs well in "a forward-looking way in economy, people, governance, mobility, environment and living" by engaging in activities that make the city more efficient, sustainable, equitable and liveable.[O] A smart city strives to make itself "smarter" by using information and communications technology (ICT) and the internet of things (IoT) to integrate city management, and digital technologies to effectively engage with citizens.[P]

Local government can use "smart" technology to reinforce its capacity to meet the demands of citizens and the challenges of urbanisation. Created in 2014, the Uraía Platform is a collaboration between the Global Fund for Cities Development (FMDV) and the Local Government and Decentralisation Unit of UN-Habitat that encourages the use of "smart" technologies by local governments.[Q] The Nicosia Guidelines, published by Uraía,[R] contain recommendations on using smart technologies to improve municipal finances.

Smart technologies can assist cities in the developed and developing worlds in a number of ways:

- To reduce the cost of government operations and contribute to increased municipal revenue.
- To improve transparency, accountability and citizen participation.
- To improve revenue collection.
- To create efficiencies in the management of public services and infrastructure.

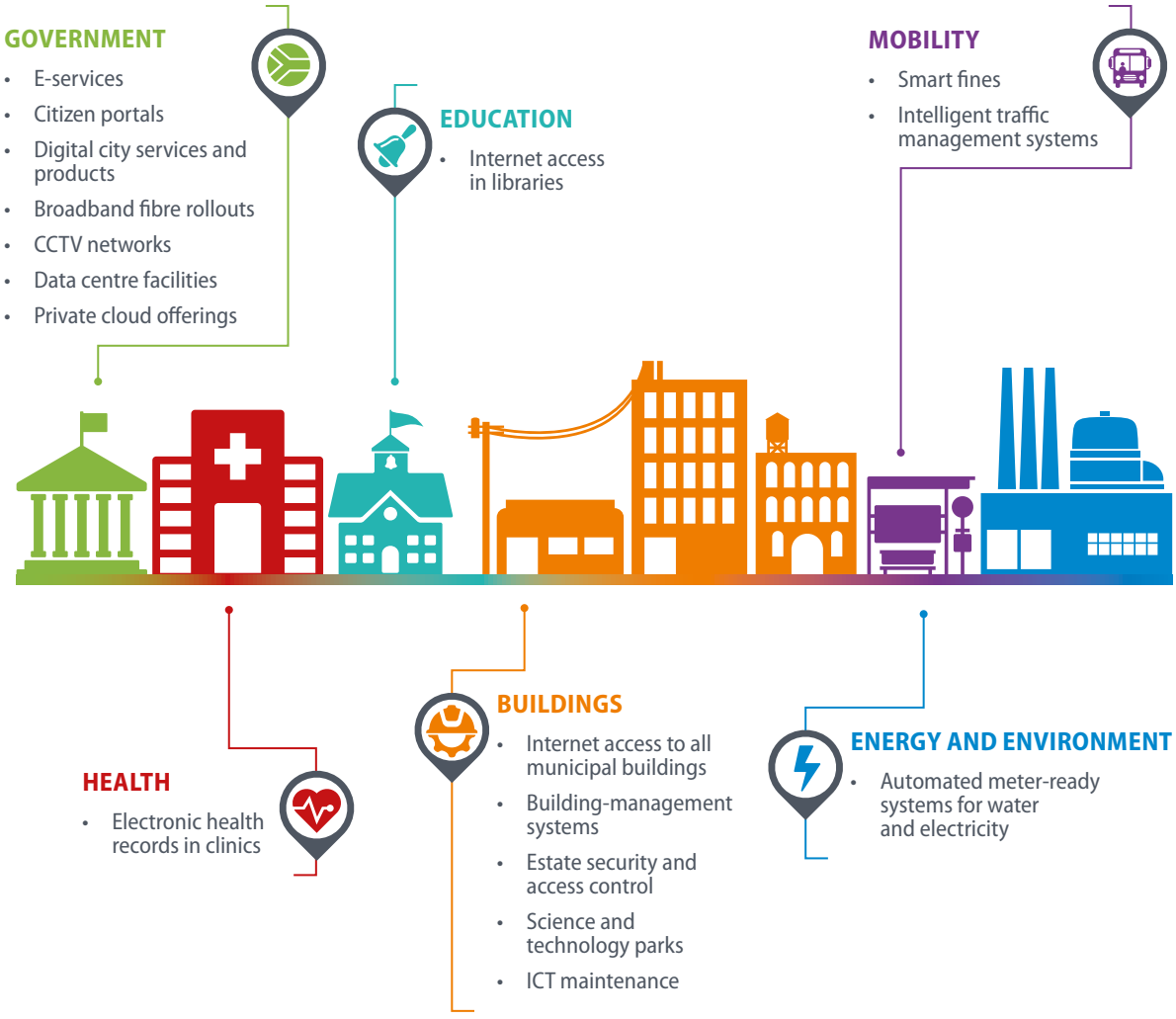


Source: Roland Berger

Furthermore, smart technologies can enable cities to move all transactions onto one centralised online platform and fully automate back offices, which improves efficiency and cuts costs, and helps local governments keep up with the rapidly evolving needs and expectations of residents. Other recommendations include that local governments should build digital platforms by providing one-stop city services, to enable transactional services with all city departments. This would require automating individual processes, digitisation, data sharing and integration and interoperability between services, which have typically been separated in silos.

The case study of Valencia in Spain illustrates some of the possibilities of the smart city initiatives that cities can learn from. In 2014, a seven-year, e-government action plan for digitalising all processes and records in the city of Valencia culminated with the launch of the Comprehensive Electronic Management Platform (PIAE – *Plataforma Integrada de Administración Electrónica*) and the Electronic Office. The benefits of this online system included increased transparency and efficiency for the municipality and simplified administrative processes for citizens. Most importantly, it resulted in huge savings for the municipality: after just one-year, operational costs had reduced by €170-million, and the expectation is to save up to €10-million per year.

South African cities have implemented smart city initiatives in several areas.



By implementing an e-government action plan, South African cities can improve services in the city, promote transparency between citizens and the government, enable citizens to do all their administrative procedures electronically, and save money by reducing operational costs.

The core elements of smart cities are government, buildings, health, education, energy and environment, and mobility.

Like other global cities, South African cities see implementing smart city initiatives as a way of becoming more resilient and liveable, through innovative solutions to urban problems and guidance on how best to govern in order to achieve sustainable urban development. South Africa is home to several smart city initiatives, but most of them are still in their infancy.[5] However, South African cities have made strides in certain areas, and their smart strategies show that more will be done by going forward.

Nevertheless, certain challenges prevent South African cities from fully implementing smart city initiatives. These include:

- Lack of integration of the smart city strategy (into the city's IDP) and of smart city programmes, which are not seen as an overarching framework but treated as isolated projects.
- Lack of integrated and coordinated thinking and operations across city departments. For example, the City of Tshwane's ICT systems and applications are segregated.
- A heavily regulated environment that does not have the agile mechanisms needed to engage and procure innovative and smart systems.
- Insufficient funding for conscious smart city development being available in an environment of competing needs.
- Limited broader stakeholder buy-in, including employees, communities, labour and the business community.
- Inadequate internal capacity to support and sustain initiatives. For instance, in Ekurhuleni, 40% of wi-fi nodes in the city are not working, and only 180 km of 645 km of fibre is validated.

To address these challenges, South African cities need to ensure that their smart city strategies are inclusive of all stakeholders and integrated into the city plans and budgets. They also need to invest in skills development and to build technological capacity among city administrators.

CHAPTER

8

FINANCING CLIMATE ADAPTATION AND RESILIENCE IN SOUTH AFRICAN CITIES

Key Messages

South Africa is one of the countries most affected by climate change, facing climate risks of floods, drought and heat stress, resulting in economic losses, which are amplified in cities.

Investing in adaptation and resilience can potentially reduce these losses by up to 80%, but cities find it hard to access finance for this purpose.

To access multilateral climate funds, cities need to partner with national and regional governments, and National Treasury should integrate climate change objectives into future infrastructure and development grants to cities.

Southern Africa is one of the world's regions that will be most affected by climate change[86] (IPCC, 2014). South Africa, a signatory to the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC), has set ambitious mitigation targets for curbing emissions by 34% by 2020 and 42% by 2025 (DEA, 2015). The country's climate change position is situated in the Constitution, the National Development Plan, the National Climate Change Response Strategy (NCCRS) and the Intended Nationally Determined Contribution (INDC). The INDC contains a strong adaptation component, including the development of a National Adaptation Strategy.[87] Climate adaptation and resilience objectives may also be integrated into agriculture, water and biodiversity sector plans and policies. At the local government level, municipalities outline climate change mitigation and adaptation strategies in their integrated development plans (IDPs), spatial development frameworks (SDFs) and climate adaptation and vulnerability assessments. Some South African cities are also signatories to local government climate change initiatives, such as the C40 and 100 Resilient Cities project.[88]

To transition to a low-carbon, climate resilient economy will require a combination of mitigation, adaptation and resilience measures.

- Mitigation refers to reducing greenhouse gas[89] (GHG) emissions and enhancing sinks that take up GHG (IPCC, 2014).
- Adaptation refers to the actions taken to prevent or minimise damages from the consequences of climate impacts (ibid).
- Resilience is a concept within adaptation and refers to the ability to withstand the impacts of climate hazards.[90] It allows for an asset to maintain its performance despite the potential impacts of climate change (Brugmann, 2011).

Adaptation is broader than resilience and is focused on mitigating specific risks that may not be related to the overall performance of a particular asset or system. An example of a mitigation project is a solar power plant that results in avoided emissions, whereas rehabilitating coastal dune systems to protect the shoreline from storm surges would be categorised as an adaptation initiative. The rehabilitation of wetland systems could be considered a cross-cutting project, as restoring these ecosystems increases carbon sequestration (adaptation), and reduces flood risk to communities living within the floodplains, which strengthens resilience.

Addressing climate change requires significant financial resources. Despite the Paris Agreement, accessing financing for adaptation and resilience is difficult. Adaptation finance is "finance – public or private, international or domestic – that specifically targets development that reduces climate risk thereby realising climate resilience objectives" (Pillay et al., 2017: 11). In 2017, adaptation finance accounted for $22-billion, while mitigation finance was estimated at $382-billion (Buchner et al., 2017). This chapter focuses on the financing of resilience and adaptation in South African cities.

After looking at the climate risks facing South African cities, the chapter describes the financial landscape of adaptation. The current and potential financial instruments for stimulating resilience and adaptation finance are assessed, and an attempt is made to quantify the adaptation and resilience expenditure by cities. The investment case for greater adaptation and resilience is made using the Cape Town drought as a case study, and recommendations are suggested that could result in greater financial flows for city adaptation and resilience measures.

Physical Climate Risks in South African Cities

Most South African metros have undertaken vulnerability assessments and developed adaptation strategies. The key climate risks faced by South African cities are droughts, floods and heat stress (Table 53).

TABLE 53: Summary of physical climate risks facing South African cities

CITY	DROUGHT	FLOODS	HEAT STRESS	STORM SURGES	WIND	RISING SEA LEVELS
Johannesburg	✓	✓	✓			
Cape Town	✓	✓	✓	✓	✓	✓
eThekwini	✓	✓	✓	✓		✓
Tshwane	✓	✓	✓			
Ekurhuleni	✓	✓	✓			
Nelson Mandela Bay	✓	✓	✓			✓
Buffalo City	✓	✓	✓			✓
Mangaung	✓	✓	✓			
Msunduzi	✓	✓	✓			

Sources: CES (2011), Constable & Cartwright (2009), SACN (n.d.), SACN (2014), Tadross & Johnston (2012).

All cities will experience more extreme weather events, with longer droughts and more frequent flash floods and heatwaves. For instance, Tshwane is likely to see an increase in very hot days (when maximum temperature exceeds 35°C), from less than 40–60 days by mid-century and 100–180 days by the end of the century. For Gauteng cities, average annual temperatures are expected to increase by between 2.3°C (Johannesburg) and 3°C (Ekurhuleni) by 2040, while annual average precipitation will increase (by 840mm for Johannesburg). In Mangaung, temperatures will rise by 2.5°C, but rainfall will decrease by 5–10%. Coastal cities will have to manage additional risks, such as rising sea levels and storm surges. In eThekwini, the sea level is currently rising by 2.7mm per decade and is expected to accelerate over the next two to three decades, while in Nelson Mandela Bay sea levels are expected to rise by 58–75 cm.

Economic losses due to climate hazards

With the projected increase in extreme weather events,[91] South Africa's economic losses as a result of climate hazards will increase. In 2016, the overall losses from natural hazards in South Africa were estimated to be $1.2-billion,[92] but by 2030, the expected urban damage from floods in South Africa could be between $2.0 and $2.3-billion.[93]

Losses from climate hazards inhibit the ability of societies to maintain long-term development gains. In Madagascar, the average economic losses from climate hazards were equivalent to approximately 75% of public investment during the same period (World Bank, 2015). To maintain the development gains made by South African metros, current public budgets must prioritise adaptation and resilience. Investing in resilience and adaptation prior to a natural disaster can yield a 5:1 benefit

ratio (Szoenyi & Freiner, 2016). Globally, investing $6-billion annually in disaster risk management strategies can deliver R360-billion in risk reduction benefits (UNISDR, 2015). This is equivalent to reducing expected losses by more than 80%. The benefits of reducing risks are magnified in cities, as cities are centres for economic growth and where high-value assets are concentrated. Therefore, despite the higher initial capital costs of climate resilient and low-carbon initiatives, the benefits can be substantial, including avoiding financial losses, maintaining development gains and growing the economy (Pillay & Clapp, 2017).

Economic losses and damages incurred to sectors managed by South African metros are mainly financed off their own budgets, with possible access to disaster relief funding from national and provincial government.[94] However, the current strain on the public fiscus means that metros cannot count on the public sector to support increasing losses under future climate scenarios. Although metros can use insurance to cover incurred losses, premiums are also financed from the public budget.[95] The insurance will also not be able to cover all economic losses from more frequent and severe climate hazards, given the significant global protection gap (the difference between the amount insured and the economic losses from a natural hazard).[96]

Ultimately the availability of finances and political will determine whether or not South African cities can transition to a low-carbon and climate resilient future. Therefore, metros need to mobilise financial flows from all sources, including public (government) and private (commercial).

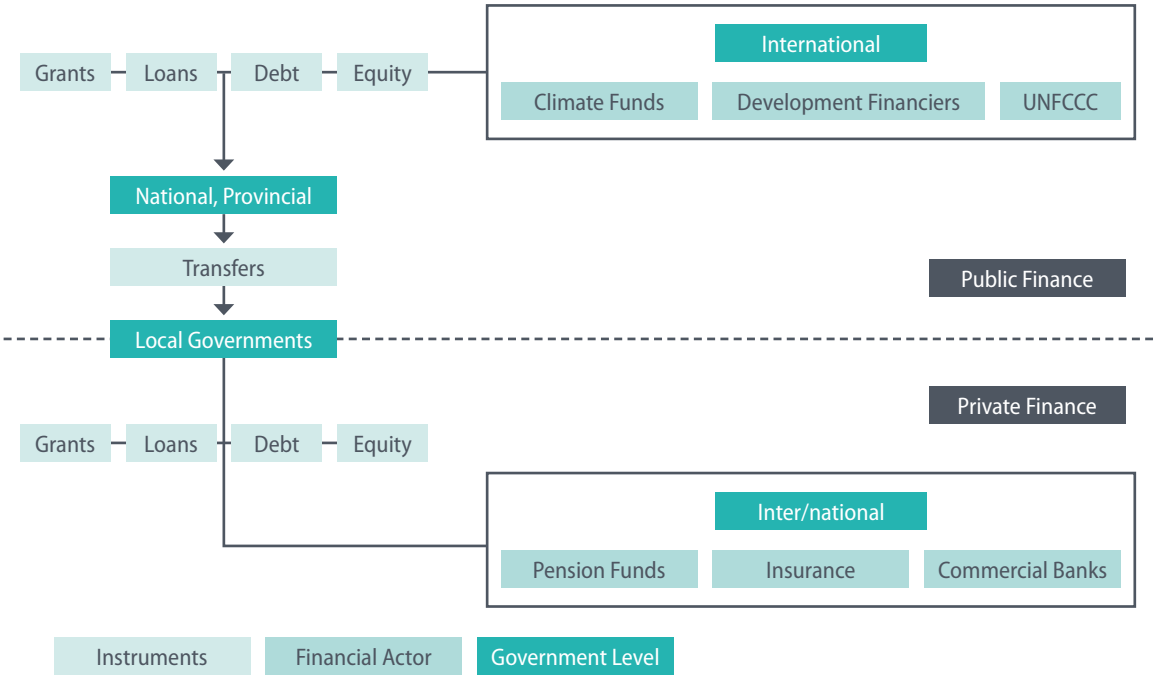
Understanding the Adaptation Finance Landscape

Local governments can use public or private sources of finance to fund climate resilience and adaptation initiatives. Public sources include intergovernmental transfers, own revenues, international climate fund applications and donor financing.[97] Local governments can also access capital directly from development finance institutions (DFIs) and commercial banks. Pension funds and insurance companies may act as institutional investors for the uptake of bonds issued by local governments, while insurance companies may offer climate insurance products. The overall adaptation funding landscape is presented in Figure 75.

The financing of large-scale climate resilient infrastructure faces the same barriers as financing standard large-scale infrastructure: high initial capital costs, high initial risks (politics, policy changes, demand uncertainty) and unexpected construction timelines (Barnard, 2015; CCFLA, 2015; Smith et al., 2014; World Bank, 2015). As climate resilient infrastructure requires higher initial capital requirements (and the benefits produced are long term, i.e. 30+ years), it may be cut in favour of short-term needs (DEFRA, 2011).

Typically, infrastructure projects have been financed by long-term bond issuances, including green bonds for financing large-scale climate resilience infrastructure. Financially prudent local governments have predictable cash flows and an investment grade credit rating, and so can benefit from bond financing (OECD, 2015), whereas local governments with sub-investment grade credit ratings can use guarantees and insurance (Torvanger et al., 2017).

FIGURE 75: Funding flows for adaptation: A local government perspective



Source: Author's own representation

Green bonds usually package some revenue-generation projects, so that sufficient costs can be recovered to make bond repayments. However, smaller ad-hoc resilience and adaptation projects tend to realise intangible or longer-term benefits, not generate revenue. This insufficient revenue generation exacerbates liabilities in the case of loans and bonds, while equity financing is not viable, as these projects cannot guarantee returns to investors.

Accessing Resilience and Adaptation Finance

Accessing public or private funds for adaptation and resilience at the metro level is not easy for several reasons, including the following:

- **Adaptation funds flow top down,** making it difficult for funds to reach cities and municipalities (Terpstra, 2013). Adaptation finance is typically funnelled through national governments, international climate funds and donor financing. Therefore, South African cities have to rely on intergovernmental transfers and their own revenue sources to finance adaptation and resilience projects.

- **The financial status of cities limits access to debt financing.** The solvency and credit worthiness of certain local governments may make obtaining debt financing difficult for large-scale climate resilient infrastructure projects (Whiley, 2017). Cities need to maintain current programmes and find additional finance to fund the resilience premium[98] on climate resilient infrastructure (World Bank, 2015). This may be especially difficult for cities with limited tax bases, competing (short-term) demands and unfavourable financial statuses.

- **Adaptation and resilience initiatives are seen as public goods.** This makes them more aligned to public rather than private financing (Aakre & Rübbelke, 2010; Abadie et al., 2013; Persson, 2011). Certain sectors that are not managed by the public sector (e.g. agriculture) may see greater private capital flows for adaptation and resilience.

- **Tracking adaptation and resilience expenditure is difficult.** South African local governments do not track funds earmarked for climate resilience and adaptation, as resilience premiums tend to be integrated within the budgets of different local government departments; for example, the widening of pipe diameters to manage greater volumes of water in the City of Cape Town would be captured under the Water and Sanitation Department's budget line.[99]

- **Data about risks is not available.** Certain cities lack data and the knowledge for integrating risks into planning and investment mobilisation plans. A lack of standards also inhibits the benchmarking of climate proofed assets. Consequently, investors are unable to assess the risk-return ratios of investments (CCFLA, 2015; World Bank, 2015).

- **Different spheres of government manage different public goods.** This institutional arrangement can result in inefficient implementation of climate resilience initiatives. For example, the coastal zone may fall within the City of Cape Town's jurisdiction but its management falls under the national Department of Environmental Affairs (DEA) Oceans and Coasts division.[100]

- **Local government lacks the capacity to implement resilience and adaptation projects.** The lack of capacity leads to problems in the planning, implementing and monitoring of resilience investments (Naidoo et al., 2013), limiting the pipeline of financeable resilience projects (Barnard, 2015; CCFLA, 2015; Smith et al., 2014; World Bank, 2015).

- **Financial legislation limits the ability of municipalities to raise funds.** The Public Finance Management Act (PFMA) and the Municipal Finance Management Act (MFMA) do not favour untested technologies (Naidoo et al., 2013), while local governments are by nature risk averse. Municipalities could overcome the restrictions of the MFMA and PFMA by developing and investing in independent state-owned enterprises (SOEs) similar to municipal water utilities, such as Johannesburg Water SOC Ltd, which is an independent company with the City of Johannesburg as its sole shareholder.[101] However, forming SOCs is time-consuming and may add further red tape, slowing down the implementation of adaptation and resilience investments on the ground.

Adaptation and Resilience Financing Instruments

This section analyses the adaptation and resilience financing instruments used by cities in South Africa, as well as other strategies and economic instruments.

Financing used by South African cities

South African cities currently finance adaptation and resilience projects through public funds, climate change funds and green bonds.

Public funds

Funding for cities mostly comes from intergovernmental transfers (local government equitable share, fuel levy and conditional grants) and city own revenues generated through service charges and property rates (National Treasury, 2001). Conditional grants are intended to support compliance with national priorities and standards (ibid), and yet the current conditional grants do not mention climate resilience, and there is no conditional grant dedicated to climate adaptation and resilience.

Certain conditional grants have delivered climate resilience benefits, such as disaster risk reduction,[102] enhanced water security and improved livelihoods through managing ecosystems (DEA, 2017). For example, the Department of Public Works' Expanded Public Works Programme Integrated Grant has funded many of the DEA's programmes for managing natural resources, including Working for Water, Working for Wetlands, Working for Ecosystems, Working for the Coast, Working for Land and Working for Fire (ibid). Integrating climate change objectives into conditional grants used for infrastructure[103] and development[104] could reduce the amount of resilience financing needed, as the following examples illustrate:

- The water services infrastructure grant could fund catchment management if National Treasury recognised ecological infrastructure as a form of infrastructure, instead of an environmental rehabilitation project (which is currently the case, even though catchment management enhances dams' long-term functionality).
- The regional bulk infrastructure grant funds the expansion of the bulk water network through the installation of new, wider pipes but is classified as an infrastructure project, and yet it meets both climate resilience *and* water management objectives.
- The Urban Settlements Development Grant (USDG) inherently promotes greater climate resilience when used to deliver housing developments positioned away from flood plains (even if the land acquisition costs are higher).
- The Integrated City Development Grant (ICDG) focuses on creating a more compact urban form, although climate change is explicitly mentioned as an objective (National Treasury, 2013). Resilience benefits could be integrated into elements of projects funded by the ICDG.

Climate change funds

Only a tenth ($1 in every $10) of multilateral climate funds is allocated to urban projects (Barnard, 2015). Although different climate funds possess different requirements, they generally need accredited entities to be national, regional and multilateral stakeholders.[105] This means that cities are not able to directly access international climate funds but have to collaborate with national governments and multilateral development banks who manage the funds (Junghans & Dorsch, 2015). For instance, regional, national and sub-national entities can access the Green Climate Fund[106] (GCF) directly if nominated by countries (Müller, 2014).

The mandates of most international climate funds support climate resilience projects that occur in cities. As of 2015, a total of $842-million was mobilised for urban projects, financing mostly low-carbon transport systems (Barnard, 2015). All the Global Environment Facility (GEF) funds (GEF Trust Fund, the Least Developed Countries Fund and the Special Climate Change Fund) support projects in an urban setting, with $195 million specifically for resilience projects in cities (Junghans & Dorsch, 2015). The Strategic Climate Fund under the Climate Investment Fund has also supported innovative climate resilience programmes that may focus on urban issues (ibid).

Some local governments have received indirect financial support from international climate funds. In October 2014, South Africa was awarded its first adaptation fund project, equivalent to $8-million over a period of five years. It was for the "Building Resilience in the Greater uMngeni Catchment" proposal (Adaptation Fund, 2014), with the South African National Botanical Institute (SANBI) as the implementing entity, and the uMgungundlovu District Municipality (which includes Msunduzi) as the executing entity. The aim of the project is to reduce the vulnerability of rural settlements and small-scale farmers to the impacts of climate change, with the specific goals of: developing early warning systems and ecological infrastructure, integrating climate-resilient crops and climate-smart techniques, and disseminating adaptation lessons.

Domestic climate funds are also an avenue for cities. The mandate of the South African Green Fund, which had an allocation of $1.1-billion, is to support projects focused on developing green cities and towns.[107] In the future, city-focused climate funds are likely to increase, with the C40 Cities Financing Facility initiative.[108]

Philanthropic grants could be accessed to fund climate resilience and adaptation projects. For example, the Rockefeller Foundation's 100 Resilient Cities programme seeks to build capacity by offering grants that fund Chief Resilience Officers (Junghans & Dorsch, 2015). eThekwini Municipality and the City of Cape Town are already members of the 100 Resilient Cities programme.

Green bonds

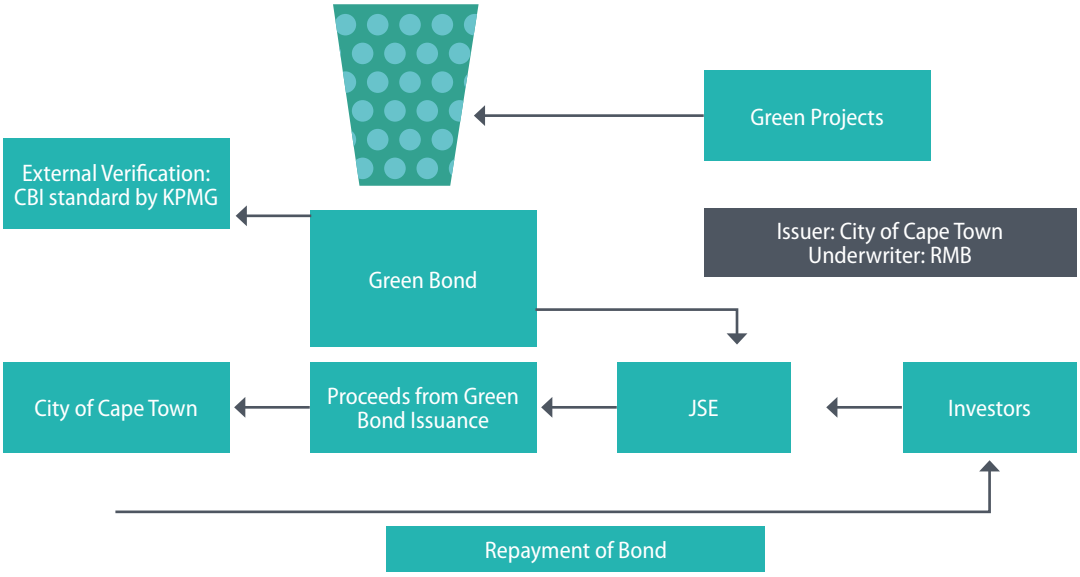
Green bonds are traditional bonds whose proceeds are used for green initiatives (CICERO & CPI, 2015). The green bond market has grown significantly in recent years, almost doubling between 2015 and 2016, but still represents only 0.1% of total bonds issued. Development banks, government entities, municipalities, commercial banks and corporations can all issue green bonds (OECD, 2015). Green bonds are useful for metros because of their large issuance sizes, which can finance costly climate resilient infrastructure.[109] They are able to attract institutional investors (insurance companies, pension funds and sovereign wealth funds) that hold large pools of capital – institutional investors possess an asset value of $83-trillion, with bonds being the most common securities in the portfolios of pension funds (Kaminker et al., 2013).

The City of Johannesburg and City of Cape Town have managed to access private capital to finance green initiatives through the issuances of green bonds.[110] The City of Johannesburg issuance in 2014 primarily focused on mitigation, earmarked for renewable energy, energy efficiency and clean transportation, whereas the City of Cape Town's issuance in 2017 focused on adaptation and resilience: 7.2% for low carbon transport and 92.8% for water.

The City of Cape Town Green Bond Issue

In July 2017, the City of Cape Town issued a 10-year green bond worth R1-billion, with proceeds earmarked for the transport and water sectors, that was underwritten by Rand Merchant Bank (RMB) and had a 10.7% yield. The bond received overwhelming interest from the market, with 29 investors offering the equivalent of R4.3-billion. Most stock exchanges require external verification of green bonds issued, and the Climate Bonds Initiative certified the City of Cape Town's green bond. The green bond had excellent green credentials and was awarded a "GB1" rating from Moody's.

FIGURE 76: The City of Cape Town's Green Bond Issuance.



Source: CBI (Climate Bonds Initiative). 2017. Bonds and Climate Change: The State of the Market. London: CBI. CBI (2017); Mokone A. "Investing in green bonds: Cape Town raises R1bn to boost eco-friendliness", Biz News, 29 August 2018.

Other resilience and adaptation strategies

Other ways of mobilising resilience and adaptation finance include developing public-private partnerships and coupling disaster risk management approaches with climate adaptation goals.

Public-private partnerships

This type of partnership reduces the implementation costs of initiatives and increases the buy-in from interested and affected stakeholders. If well-managed, such partnerships are effective avenues for increasing adaptation finance flows.

- The City of Cape Town and The Nature Conservancy (TNC) are exploring the establishment of a water fund for Cape Town, which "aims to safeguard water supplies and biodiversity while supporting local livelihoods". It would take the form of a public-private partnership (PPP), similar to the Global Water Model and would be in partnership with the National Government, the Western Cape Government and the Dassenberg Coastal Catchment Partnership (DCCP), aimed at securing water quality and quantity for Atlantis through improving the ecological infrastructure.[111]

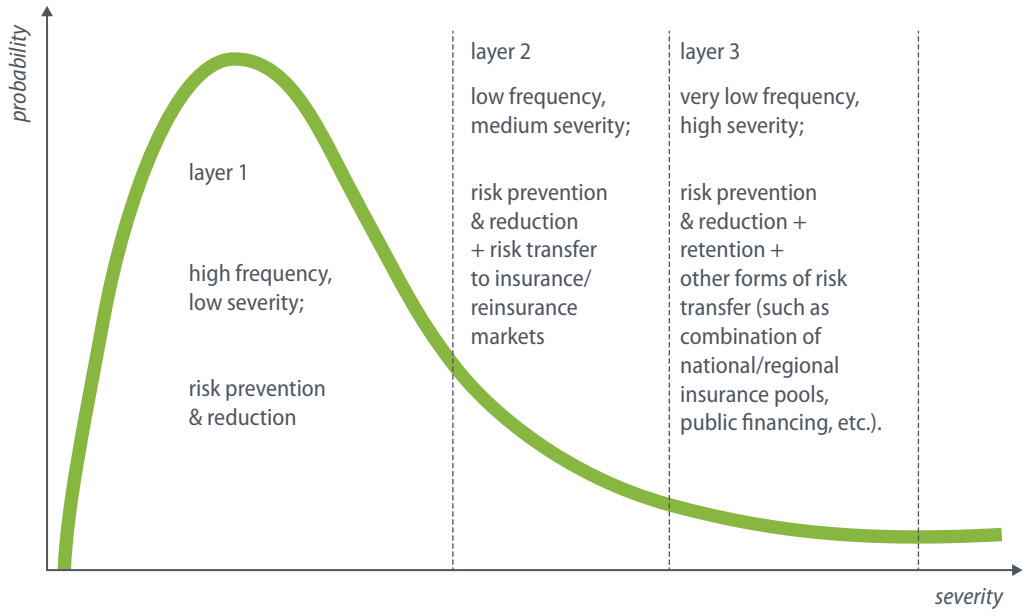
- Landowners of Zorrotzaurre in Bilbao, Spain and the municipality developed a PPP to finance a new flood-proof district in Bilbao. The Municipality paid €5.1-million for a flood protection barrier, structural rehabilitation of the river bank and the stormwater tanks, while residents (through financial contributions to the PPP, based on the share of land they owned) financed the elevation of the ground level of buildings and public green spaces. The PPP ensured that the municipality was able to leverage additional funding that ensured the redevelopment was completed (EEA, 2017).

Coupling disaster risk management and climate adaptation

A risk-based approach to managing extreme weather – the coupling of disaster risk management and climate adaptation – may be a useful avenue to manage climate risks of different magnitudes and frequencies. The linkage between disaster risk management and climate adaptation is well established (Warner et al., 2013). Financial support aimed at preventing disasters can be considered as adaptation and resilience financing. And yet, although the Disaster Management Act (No. 57 of 2002) states that its focus is on risk reduction, prevention, mitigation and emergency preparedness, the only conditional grants provided are for disaster relief and recovery (COGTA, 2017). The amendment of the MFMA also allows cities to access insurance products, but South African cities continue to focus on risk-retention instruments such as municipal disaster grants and own revenues to manage economic loss – for example, the City of Tshwane's internal disaster reserve funds currently hold R50-million.[112] Cities that focus only on risk retention (i.e. handling risk by bearing the results of risk, rather than transferring or avoiding risks) may not be sufficiently resilient to manage a future with hazards of greater frequency and magnitude.

If risk-retention instruments are balanced with risk-transfer[113] tools, all types of hazards can be covered, allowing for comprehensive climate risk management strategies to be developed (Figure 77). Layering requires an understanding of the severity and frequency of different hazards, as certain financial instruments are able to manage higher economic losses (Warner et al., 2013).

FIGURE 77: Risk-layering approach to support decision-making process in climate risk management



Source: Warner et al. (2013)

Risk-transfer instruments are financial instruments that allow for risk to be ceded to a third party (Pillay, 2016). Examples that may be appropriate at the city level include traditional insurance, risk pooling and cat-bonds (Arnold 2008):

- **Traditional insurance** is the most well-understood risk transfer instrument.[114] It protects an entity against financial losses in exchange for a premium cost. When an event occurs, the third party pays out an initially agreed upon amount (coverage) according to the contractual obligations. Traditional insurance may result in high transaction costs to contract holders but is useful in managing "high frequency, low severity events" (Pillay, 2016).
- **Risk pooling** allow entities that are exposed to a common peril to pool their risk. The benefit is that risk pooling allows reduced premiums and faster payouts, as the policies are based on environmental thresholds rather than traditional loss assessments. At a sovereign level, the African Risk Capacity is a risk pool focused on managing the drought risk of 26 African countries (ARC, 2013).
- **Cat-bonds** or catastrophe bonds are insurance-linked securities that deliver above-market returns. They are useful for "high severity and low frequency events" (Warner et al., 2013). Unlike traditional bonds, the issuer of the cat-bond is not required to pay part of the outstanding funds if a loss should occur (Durand et al. 2016). A cat-bond would be an issuance to manage an extreme weather event such as the ongoing drought in the City of Cape Town.

Economic instruments

Environmental taxes, development charges and user fees are some of the economic instruments that can be useful in generating adaptation finance. For example, revised property taxes for any developments in flood risk zones under different climate scenarios; road surface taxes for roads that may melt in extreme heat (e.g. in Australia); and development charges that generate revenue for adaptation and resilience measures (Junghans & Dorsch, 2015).

Incentives can shift the financing of adaptation to individuals by driving the demand for certain initiatives. Cities have used rebates on installations such as solar home systems to stimulate the uptake of renewable energy, thereby providing climate mitigation benefits. For example, the Hamburg Ministry for Environment and Energy gives owners subsidies that cover up to 60% of the cost of installing green roofs on their buildings. Building owners can receive these subsidies up until 2020 (EEA, 2017), after which the City of Hamburg may require green roofs to be compulsory. The City of Hamburg decided that installing green roofs was economically more feasible than expanding the sewerage network to cope with excess storm water (ibid). Green roofs have lower maintenance costs (because of their longer lifespan), lower energy costs (because of improved building insulation) and 50% reductions in water fees (because of their rainwater retention).

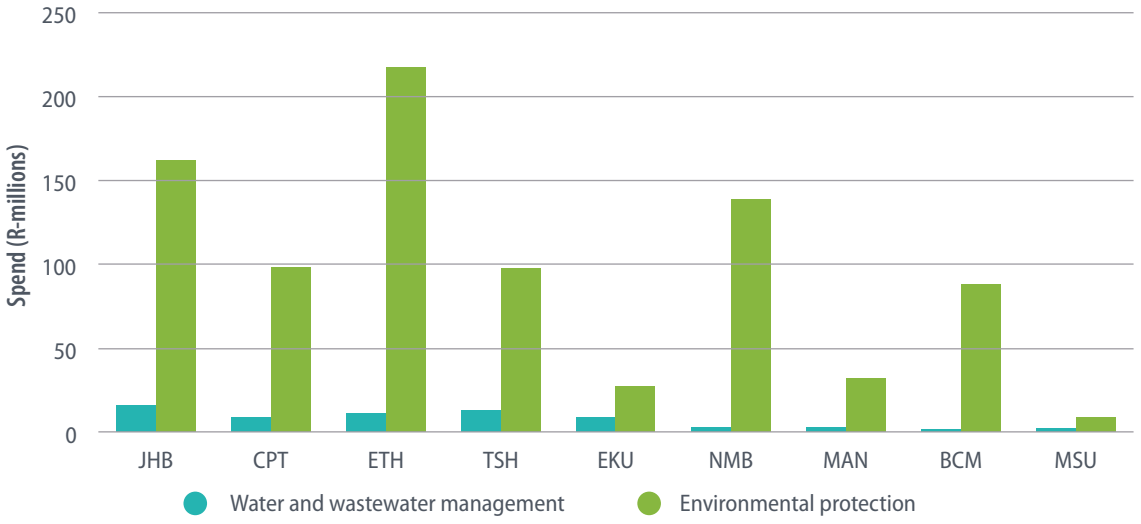
Quantifying Adaptation and Resilient Expenditure by Cities

South African cities do not track climate-related expenditure,[115] in part because of a lack of capacity to use (or the unavailability of) methodologies such as climate budget tagging. And, regardless of whether or not the methodologies are available, climate resilience counts for only a small portion of infrastructure expenditure, which makes extracting this expenditure from public budgets difficult. The marginal cost of ensuring that new buildings are climate resilient is equivalent to one percent of the baseline cost of infrastructure (Hughes et al., 2010). This additional cost is the result of making small changes to the project design, so the cost is not made explicit and cannot be identified in project budgets. Furthermore, tracking expenditure is not easy because costs will vary depending on the type of project. The metric of one percent of the baseline cost of infrastructure was used to generate the expenditures presented in Figures 78 and 79.

Figure 78 illustrates an attempt to estimate current spend by the cities on climate resilience and adaptation through expenditure on environmental protection and on water/wastewater management.

According to the Municipal Standard Chart of Accounts, the environmental protection budget line item includes expenditure on biodiversity and landscape, coastal protection, pollution control, indigenous forests, nature conservation, pollution control and soil conservation. Apart from pollution control, categories that bring climate resilience and adaptation benefits include disaster risk reduction, water security and food security through enhanced ecosystem services. While it is not possible to determine what funds are allocated to these categories from the cities' annual financial statements, based on the assumption that each environmental protection category[116] receives an equal share of expenditure, 83% of these expenditures could be considered as resilience and adaptation-related financial flows (Figure 78).

FIGURE 78: Estimated current spend for climate resilience and adaptation in South African metros



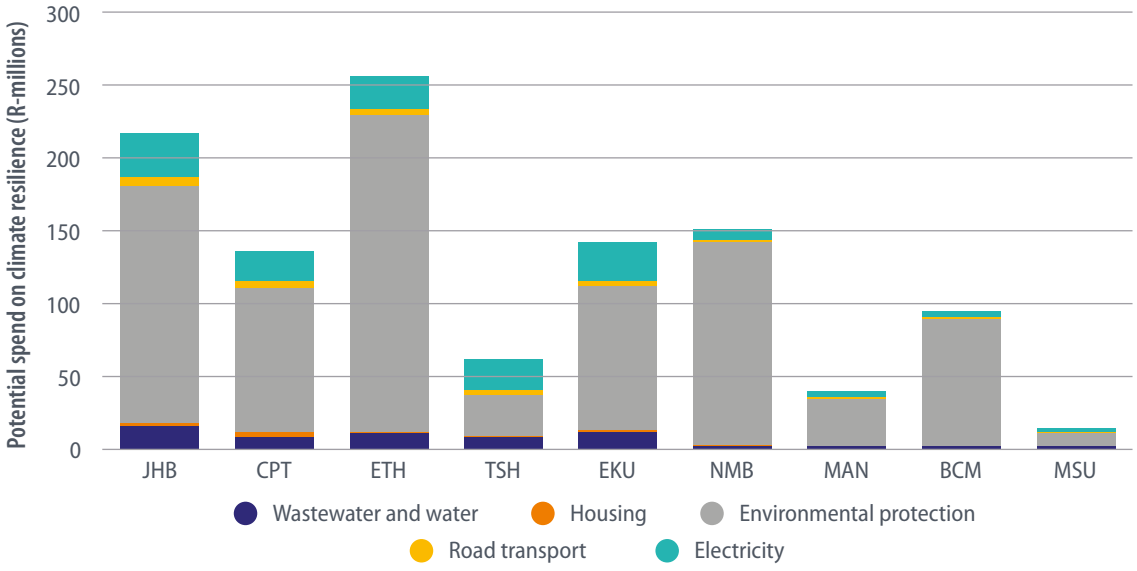
Source: National Treasury: MFMA – Annual Financial Statements

Certain municipal sectors are already undertaking climate-proofing initiatives. For example, in the City of Cape Town, pipe diameters of bulk water infrastructure were increased in anticipation of extreme precipitation events. The City of Cape Town allocates approximately 20% of the total water and wastewater budget to new water and waste water infrastructure build.[117] To calculate

the climate resilience component of new infrastructure costs, the metric of one percent of baseline cost of infrastructure (to ensure the new build is resilient) was applied to 20% of the water and wastewater spend for the 2016/2017 financial (Figure 78).

To estimate the resilience and adaptation finance needs, the one-percent increase in baseline cost of new infrastructure was applied to other sectors (Figure 79). It is important to note that these costs are meant to be indicative only, particularly given the differing costs which depend on resilience and adaptation project types. Climate resilience and adaptation spend was calculated to be between 0.04 and 0.1% of total spend from all South African metros. If climate resilience and adaptation initiatives were applied in all sectors under local government control, it would equate to between 0.2% and 0.3% of the total spend per municipality.[118]

FIGURE 79: Projected spend on climate resilience and adaptation if initiatives are implemented in all sectors



Source: National Treasury: MFMA – Annual Financial Statements.

Investing in Resilience and Adaptation to Avoid Future Costs

According to the DEA's Long-Term Adaptation Scenarios (LTAS), climate change will lead to increased intensity and frequency of extreme weather events, which is likely to lead to increased economic losses (DEA, 2013). The past five years have seen a noticeable increase in extreme weather in South Africa, including flash floods in Johannesburg and Ekurhuleni in November 2016, flash floods in eThekwini in October 2017 and the ongoing drought in the City of Cape Town in 2018.

Proactive, consistent adaptation and resilience investment can reduce the financial losses in the long term and be cost effective in the short term (Shreve & Kelman, 2014). Under a moderate climate change scenario, floods are expected to result in national losses of approximately $2.3-billion per annum by 2030. Therefore, an early warning system can reduce the risk and costs arising from these events. South Africa currently possesses several early warning systems for different sectors and a flash flood guidance system to detect flood risk (DEA, 2016b). National government has identified funding for maintaining early warning systems and has noted integrating improved data

from future climate models as a barrier (ibid). Maintaining and enhancing national early warning systems addressing flood risk management would yield significant benefits: the cost benefit ratio is estimated to be 3:30. In other words, for every one rand invested, the implementing entity would gain benefits worth R3.30 (Pillay, 2017).

Delayed climate adaptation action can result in rushed decision-making in response to climate threats, resulting in investments which may not be the most cost-effective option, as the case study of Cape Town shows.

Cape Town and the drought

This case study illustrates the complexity of making urgent decisions about adaptation investments under uncertain conditions and pressures from the public. It reinforces the importance of internalising adaptation practices and investments into public budgets as a matter of urgency.

Since 2015, Cape Town had been experiencing drought-like conditions, but the drought was only declared a disaster in May 2017. Severe multi-year droughts are infrequent, with the May 2017 drought being described as a "1 in 628 years" event. By February 2018, dam levels were dangerously low, at 24.9%, and the City introduced level 6B water restrictions that restricted individuals to 50 litres of water per day. The water restrictions are estimated to result in water sales decreasing by half. Water sales make up 10% of the City of Cape Town's revenue, and as of January 2018, the losses incurred during the 2017/2018 financial year were estimated to be R1.6-billion rand.[119]

In addition to the reduced water revenues, indirect financial impacts could include:

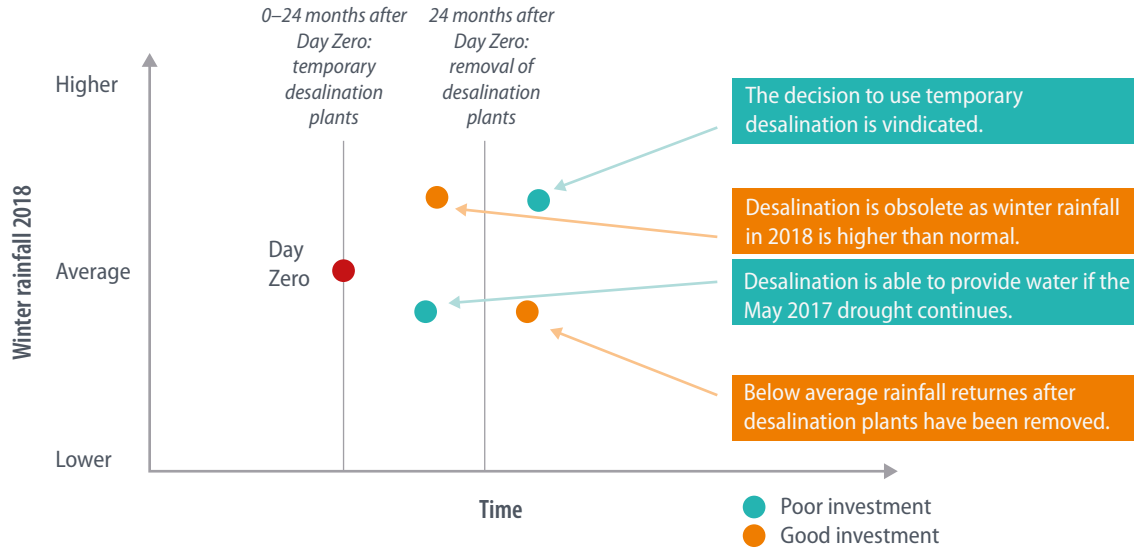
- Reduced revenue from tourists who have decided against visiting the Western Cape owing to the drought. Approximately, 1.6 million people visit the province annually, spending approximately 40 billion rand.[120]
- Reduced credit rating, which is currently Baa3 (the lowest of the investment-grade bond ratings). Rating agencies such as Moody's have indicated that the drought poses a threat to this credit rating.[121]
- Losses in the agricultural sector, which are close to R14-billion following water restrictions that cut the supply of water by between 60 and 87% – the agriculture sector contributes 23% of the Western Cape GDP.[122]
- Increased disaster risk management costs, e.g. the severe flash floods in February 2018 may have been influenced by the drought.
- Greater health care costs, should reduced water supply result in less hygienic practices, leading to increases in diseases that cause diarrhoea, vomiting or dysentery (enteroviruses, salmonella, shigella, or E. Coli).

The City of Cape Town initially received transfers from the National Disaster Management Centre (NDMC) of R20.8-million for boreholes, pipeline installations and pumps and redirected R2.6-billion from its own budget to finance seven water projects, including desalination plants, water recycling and aquifer initiatives.[123]

The City of Cape Town's decision to invest in desalination demonstrates that cities could be forced into "last-resort" investments – where an investment case is difficult to determine but the short-term needs require that the investment be made. Desalination plants are energy intensive and have extremely high standby costs. For example, in Victoria, Australia, the desalination plant costs per day on standby mode are estimated to be AUS$1.8-million. The City of Cape Town opted for temporary desalination plants for a period of 24 months, after which the infrastructure will be removed.[124] Temporary desalination plants are useful because they avoid high standby costs in the future when there is enough water supply again.

It is possible that droughts as severe as the May 2017 drought will be more common in the future, but it is not possible to predict *when* a drought of a similar magnitude will occur and thus when desalination will be needed again. The difficulty of making a "last-resort" investment decision, such as temporary desalination plants as a response to the drought, is illustrated in Figure 80.

FIGURE 80: Decision-making under uncertainty in response to the May 2017 drought



Source: Author's own

As Figure 80 shows, the investment decision is good if the May 2017 drought continues, as the desalination plants will contribute to maintaining water security. However, if winter rainfall is normal or above average after June 2018, then the decision to construct temporary desalination plants would be questionable, as the initial capital investment to construct the plant would be wasted expenditure. Temporary desalination plants would also become a bad investment decision if a high severity drought occurs (such as the May 2017 event) after the temporary desalinations plants have been removed, especially as most of the Western Cape province is expected to experience warmer and drier climatic conditions in coming years.

The lessons for other cities is that they can avoid last-resort adaptation investments by being proactive and implementing more cost-effective solutions, such as rainwater harvesting, increased bulk water storage capacity and early demand-side management. Cities need to focus on proactive continuous climate change adaptation, not risk reduction in response to a particular extreme weather event.

Recommendations

Six recommendations were identified as the primary factors that could result in greater financial flows for adaptation and resilience:

1. **Enhanced public infrastructure management and planning**. Enhancing adaptation and resilience in local governments starts with strong public infrastructure management, including maintaining storm water drainage systems and roads, and incorporating climate change scenarios into city planning. These activities will *reduce* the risk and impacts of climate hazards, but residual risks will still need to be managed through climate risk financing approaches.
2. **Climate mainstreaming**. Local governments must mainstream climate adaptation and resilience, which is "the informed inclusion of relevant environmental concerns into the decisions of institutions that drive national, local and sectoral development policy, rules, plans, investment and action" (Dalal-Clayton & Bass, 2009: 16). Climate change mainstreaming can reduce the amount of resilience and adaptation finance needed and increase the efficacy of existing financial mechanisms such as conditional grant transfers.
3. **Consistent, continuous and proactive climate adaptation and resilience**. As illustrated by the May 2017 drought in the Western Cape, local governments must prioritise risk reduction and prevention initiatives to ensure climate adaptation and resilience building prior to extreme weather events. In this way, "last-resort" decision-making can be avoided, thereby reducing investments costs for local governments.
4. **Private sector financial instruments**. By 2050, the cost of adaptation is expected to be $280–$500-billion per year, and possibly higher under higher emission scenarios (UNEP, 2016). The private sector will have to be more involved in order to meet these vast financing needs for resilience and adaptation. The use of more innovative financial solutions such as green bonds and insurance products can stimulate greater flows and entice different markets to be involved in adaptation investments.
5. **Demand-side policies for adaptation and resilience investments**. Municipalities must lobby the other spheres of government to capitalise on existing demand-side policies. For example, the Carbon Offsets bill could include project types that focus primarily on adaptation and vulnerability, so that under the Carbon Tax (when implemented) entities would be able to offset their carbon tax by 5%–10% through carbon offsets (National Treasury, 2017). Credit mechanisms, such as the Vulnerability Reduction Credits (Schultz, 2012) or the Adaptation Benefits Mechanism, may be able to stimulate the demand for these project types, but these methodologies are still largely untested.[125]
6. **Tracking adaptation and resilience finance and capacity issues**. This could be achieved through:
    - engaging with sector departments to create an awareness of the resilience premium within certain project undertakings;
    - identifying and cataloguing elements within project types that can be considered as resilience building;
    - engaging with service providers and internal sectoral units to track the costs of individual resilience elements (where possible); and
    - collaborating with academic institutions, NGOs, think-tanks and international organisations that specialise in adaptation economics and finance. For example, the United Nations Development Programme (UNDP) in partnership with the Asian Institute of Technology (AIT) and USAID delivered the "Economics of Climate Change Adaptation" training courses, which were available to Asian country applicants.[126]

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List of Acronyms and Abbreviations

AE	Accredited Entities
AGSA	Auditor-General of South Africa
AMFM	Alternative Municipal Finance Model
BCM	Buffalo City Municipality
BEPP	Built Environment Performance Plan
BRT	Bus Rapid Transit
CIT	Corporate Income Tax
COCT	City of Cape Town
COGTA	Ministry of Cooperative Governance and Traditional Affairs
COJ	City of Johannesburg
COT	City of Tshwane
CSIR	Council for Scientific and Industrial Research
DA	Democratic Alliance
DBSA	Development Bank of Southern Africa
DCOG	Department of Cooperative Governance
DEA	Department of Environmental Affairs
DFI	Development Finance Institutions
DME	Department of Minerals and Energy
DOE	Department of Energy
DOT	Department of Transport
EE	Executing Entities
FFC	Financial and Fiscal Commission
EMM	Ekurhuleni Metropolitan Municipality
EV	Electric Vehicle
FBS	Free Basic Services
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFL	General Fuel Levy
GHG	Greenhouse Gas
ICDG	Integrated City Development Grant
IDP	Integrated Development Plan
INDC	Intended Nationally Determined Contribution
INEP	Integrated National Electrification Programme
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IPTN	Integrated Public Transport Network
IRP	Integrated Resource Plan
IUDF	Integrated Urban Development Framework
JSB	Joint Services Board
LGES	Local Government Equitable Share
MBRR	Municipal Budget Reporting and Reform
MFMA	Municipal Finance Management Act
MFPFA	Municipal Fiscal Powers and Functions Act
MIIF	Municipal Infrastructure Investment Framework
MMM	Mangaung Metropolitan Municipality
MPRA	Municipal Property Rates Act
MSCOA	Municipal Standard Chart of Accounts
MSFM	Municipal Services Financial Model
MTEF	Medium Term Expenditure Framework
MTREF	Medium Term Revenue and Expenditure Framework
NCRS	National Climate Change Response Strategy
NDA	National Designated Authorities
NDMC	National Disaster Management Centre
NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
NMB	Nelson Mandela Bay
NRW	Non-Revenue Water
OECD	Organisation of Economic Co-operation and Development
PFMA	Public Finance Management Act
PIT	Personal Income Tax
PPA	Power Producer Agreement
PPP	Public-Private Partnership
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMB	Rand Merchant Bank
RSA	Republic of South Africa
RSC	Regional Services Council
SACN	South African Cities Network
SALGA	South African Local Government Association
SANBI	South African National Botanical Institute
SAPVIA	South African Photovoltaic Industry Association
SARPA	Southern Africa Revenue Protection Association
SARS	South African Revenue Services
SCM	Supply Chain Management
SDF	Spatial Development Framework
SEA	Sustainable Energy Africa
SOCF	State of City Finances
SOE	State-Owned Enterprise
SSEG	Small-Scale Embedded Generation
STATS SA	Statistics South Africa
SWH	Solar Water Heater
TNC	The Nature Conservancy
TOU	Time of Use
UNFCCC	United Nations Framework Convention on Climate Change
USDG	Urban Settlements Development Grant
UNDP	United Nations Development Programme
WCPG	Western Cape Provincial Government
WEF	World Economic Forum

Endnotes for Chapters

1 Note that at the time of writing the chapter, cities were considering their 2018/19 budgets, so in some instances information from these budgets is referenced.
2 This is calculated using data from the cities' budget tables A2 and A4 in National Treasury's Local Government Database (2018)
3 Table W1.3 shows how funds are shifted towards higher education away from local and provincial governments
4 Email correspondence with Johan Steyl, Director: Budgets in the City of Cape Town (10 January 2018).
5 Section 15 read together with Section 1 of the MFMA, No. 56 of 2003.
6 www.municipalmoney.com
7 At time of writing, a new agreement for the period 1 July 2018 to 30 June 2020 was still being negotiated.
8 Calculated using data from National Treasury, 2017 Budget Review - Annexure D public sector infrastructure update.
9 Compare Mangaung's reporting of capital expenditure on Table A5 and Table A9 in National Treasury's Local Government Database (2018).
10 Moody's Investor Service. Moody's downgrades 13 South African sub-sovereigns, press release dated 12 June 2017.
11 See sections 171 and 172 of the MFMA, No. 56 of 2003
12 It extends the analysis on the affordability of domestic rates and service charges of the cities presented in Chapter 2 of the 2013 State of City Finances Report (SACN, 2013) and Chapter 5 of the State of City Finances 2015 Report (SACN 2015) to cover the period up to 2017, so the results are fully complementary.
13 The idea is extended to tariffs based on the principles set out in section 74(2) of the Municipal Systems Act (No. 32 of 2000), and specifically the first principle that "users of municipal services should be treated equitably in the application of tariffs".
14 In addition, many of these households are likely to be in settlement types that do not receive formal municipal services.
15 Although some households with incomes at the upper end of band 4 may be liable for municipal taxes and service charges, to avoid analytical complications, the group starts with band 5
16 Some reasons why this is the case are given in the SOCF 2015 chapter on affordability of tariffs.
17 An appendix to the Survey provides a breakdown of this category: water and electricity (0.8%), water supply (0.9%), refuse collection (0.2%), other services relative to the dwelling (1.2%) and electricity (3.4%) , totalling 6.5% of household consumption.
18 The SACN Expert Panel commissioned to explore alternative finance models in 2015 found that a city's ability to borrow would be compromised without own revenue and intergovernmental transfers. These two sources of revenue enable cities to access additional finances.
19 Peripheral refers to land on the periphery of urban areas. It is important because the sprawl concept is primarily about outward expansion of the urban footprint, and peripheral in the context of South African cities is not always straight forward.
20 The Waterfall Estate is a very good example of how sprawl might be contained in a South African city, but such a development consumes vast amounts of open space adjoining urban land and creates the need for new infrastructure. Although often developers' contributions pay for infrastructure, the municipality bears the long-term maintenance. There has been limited investigation into this long-term cost impact for municipalities.
21 This means that local governments are able to capture some of the increased property values that result from municipal expenditure in the area.
22 Non-exchange revenues are those revenues that arise where metros receive value from another entity without giving approximately equal value in exchange.
23 Most forms of value-based taxation are growth elastic, i.e. as the value of the taxed good or service grows, the associated tax revenue grows because of the transparent and frequent valuation of the good or service.
24 Property rates are calculated by multiplying the property/land value by a cent amount in the rand determined by the municipal council for each type of zoning (e.g. residential, commercial, agricultural).
25 These criteria are explained in Chapter 6.
26 This is largely a demand-driven process reliant on developers submitting requisite rezoning applications
27 The financial liabilities for municipal property rates are calculated by multiplying the market value of immovable property (for example, land and buildings) by a cent amount in the rand that a municipal council has determined.
28 Monaco, Malta, Fiji, Dominica, Seychelles, Sri Lanka, UAE, Bahrain, Kuwait, Oman, Saudi Arabia. These countries essentially fall into three broad groups: i) wealthy micro-states, which have neither a local government level, nor the need for property rates revenues; ii) gulf states, which are increasingly moving towards being tax-free, due to their ability to supplement their entire expenditure requirement with oil revenues alone; and iii) island nations seeking to incentivise investment and expatriation through reduced property rates. Across the majority of these countries large capital gains taxes, stamp duties and property sales taxes are used to capture revenues from the sale of property, so that their governments receive revenues from new property ownership without burdening existing property owners.
29 In the absence of any directly comparable spatial and rates revenue data, case studies/experiments are used to test this hypothesis.
30 The models used the following assumptions: (1) Greenfield development of 20 000m^2 of agricultural land valued at R4-million (paying a cent in the rand of 0.00611, resulting in R23,218 property rates revenue every year, or R1.16/m^2) into mixed use comprising 20 residential properties valued at R2-million each plus 2400m^2 commercial property valued at R10-million (paying a cent in the rand of 0.007345 for residential and 0.019097 for commercial, resulting in R308,489.20 property rates revenue every year, or R15.42/m^2, representing additional revenue for the city of R285,271 or 1228% increase). (2) Brownfield development of 1000m^2 of industrial site valued at R6-million (paying a cent in the rand of 0.019097, resulting in R114,582 property rates revenue every year, or R114.58/m^2) into mixed use comprising 20 residential units valued at R400,000 each plus 400m^2 of commercial property valued at R4-million (paying a cent in the rand of 0.019097 for residential and commercial because rezoning not required, resulting in R229,164 property rates revenue

every year, or R229.16/m², representing additional revenue for the city of R114,582, or 100% increase).

31 It should be noted that there are many different models that would likely generate potentially different results.

32 The MSFM projects revenues based on affordability assumptions, not tariffs. It assumes that low-income households (with "low income" defined as a household income of up to R3500 a month) will pay the lesser of an affordable bill and the unit operating cost of the service, while high-income households and non-residential customers will pay cost plus a surcharge. The level of the surcharge approximates a tariff by calibrating the model against actual operating revenues in the base year.

33 This was due to the timing of the project: the 2016/17 MTREF data was not available at the start of the project.

34 Whereas "bottom-up" estimates of infrastructure investment needs are typically generated through municipal Master Planning processes and based on detailed assessments of the condition and capacity of existing infrastructure.

35 Default unit costs are provided in the MSFM that are representative of the country. These unit costs can and should be tailored to the individual municipality being modelled, based on data provided by the municipality. This was done in the modelling presented here, although the data was relatively limited. Operating unit costs were determined from the capital budget; capital unit costs were estimated based on the value of assets on the asset register.

36 The Stats SA data (from Census 2001, Census 2011 and Community Survey 2016) shows population growth declining in the metros when the growth rate for 2011–2016 is compared to that of 2001–2011; and it seems unlikely that household sizes can continue to decline indefinitely.

37 This is essentially a "trickle down" effect. The model assumes that if economic growth exceeds household growth, household incomes will rise across the income groups.

38 Property prices in South Africa are very responsive to economic growth: according to Lightstone Properties (2012), a 1% rise in economic growth results in a 3.5% rise in house prices on average. The extent to which property price rises are captured in property rates depends on the frequency with which valuation rolls are updated, and the willingness of municipalities to maintain cent-in-the-rand property rates at levels that capture the growth in the value of properties. There is a lag between economic growth and rising property rates revenue, and this lag is not well accommodated in the model.

39 Projections from Investec, the Bureau of Economic Research and the International Monetary Fund websites in 2015. Links no longer available.

40 Research by IHS Global Insight Regional eXplorer 674 (2.5n). There is variability among the metros, with Nelson Mandela Bay and Mangaung growing more slowly than South Africa as a whole.

41 The Baxter Contract Price Adjustment Formula is widely recognised as an accepted set of indices to adjust contracts for payment escalation. It is a composite index based on Stats SA indices that is published regularly by the South African Federation of Civil Engineering Contractors in their quarterly "State of the South African Civil Industry" reports, which may be downloaded from www.safcec.site-ym.com.

42 While there is widely accepted anecdotal evidence of a significant backlog in infrastructure renewal in South African municipalities, the data on the current condition of municipal infrastructure is so limited that there are no reliable estimates of the size of this backlog. For this reason, the modelling focused on ongoing renewal and set aside the renewal backlog.

43 Internally generated surpluses and borrowing together are referred to as "own source" finance because they are both funded out of internal cash surpluses.

44 In working group meetings at National Treasury where this analysis was first presented, Tshwane indicated that their cash collection efficiencies had been overstated in the data provided. Their ability to raise new loans is in reality likely to be significantly less than indicated and their funding gap higher than indicated in Figure 31 and Table 32.

45 The modelling assumes that metros will use their operating surpluses to leverage borrowing where possible rather than to finance capital expenditure directly.

46 Household growth will probably be higher than suggested in the lower growth scenario presented here, but lower than the very high growth used in the base model run. Economic growth prospects are uncertain but are not expected to be strong.

47 The deficits account for agency fees received from provincial governments.

48 The South African Local Government Association (SALGA) has conducted two separate cost benchmarking exercises: one that tried to establish benchmarks by comparing what municipalities currently spend in order to identify best practices (SALGA, 2013a); and one that sought to develop bottom-up costing norms (SALGA, 2013b). Both found that the reliability of any benchmark costs was constrained by data concerns (variability in financial reporting by municipalities) and the complex nature of service delivery. The second study concluded that "[i]t has also been demonstrated that the complex nature of the service delivery challenge and the numerous possible combinations of 'cost drivers' result in a situation where a single 'cost curve' for all WSAs may prove to be difficult to develop." (SALGA, 2013b: 20).

49 The roll out of the municipal Standard Chart of Accounts (mSCOA) should create more consistency in this regard.

50 The data includes all households that receive free basic services. In some municipalities, these include households that are not classified as indigent.

51 The revenue cost is the revenue that the metro would have generated had they sold the FBS to customers instead of providing them free. The graph shows this figure for property rates exemptions and rebates, water, sanitation, electricity, refuse and other services. Other services include rental subsidies for municipal housing and top structure rebates.

52 According to data reported in MBRR Table A10 for 2014/15, Cape Town provided 1 134 925 households with free water and sanitation, but National Treasury calculated Cape Town's LGES on the basis of 484 997 poor households. This discrepancy was a result of Cape Town providing 6kl of free water and associated sanitation to all households through its tariff structure in 2014/15. This has been discontinued subsequently with free water and sanitation now provided only to households living on properties valued below a threshold amount.

53 The free basic water policy stipulates 6kl of water which is based on 25 litres per person per day for a household of eight. While more than the World Health Organisation's recommended 20 litres per person per day for short-term survival, it has been criticised as being too low to meet

the poorest households' basic needs (Smith, 2010; Goldin, 2005). It is certainly insufficient to allow for toilet flushing.

54 Collection rates are calculated by comparing billed revenue to cash receipts, which means that the data includes only property rates and service charges. Therefore the collection rates are different to those in Table 1, which uses total revenue (i.e. including investment revenue, transfers recognised and other own revenue) compared to audit outcome.

55 This feedback was given in the working group meeting where this analysis was presented.

56 Recall that the "real" component of NRW is the portion that is related to physical water losses (leaks).

57 Chapter 5 explores the alternative financing options for cities, taking the SACN and City of Tshwane (2017) research as its starting point.

58 The Financial and Fiscal Commission's (FFC) Public Hearings on the Review of the Local Government Fiscal Framework (2011 to 2012) and National Treasury's Review of Metropolitan Own Revenue Sources (2013 to present) are also some of the initiatives that demonstrated the existence of a funding gap.

59 For instance, some municipalities do not apply a surcharge rate over and above a service tariff. Instead, the excessive profit generated is used for general expenditure, which makes it difficult to ascertain the size of the surcharge for regulation purposes. Municipalities are currently not applying surcharges on services rendered by third parties, particularly electricity services in Eskom distribution areas.

60 While the overall share that accrues to the metropolitan municipalities is fixed, the subsequent distribution of this overall share to each metro is determined by fuel sales within each metro as a share of overall fuel sales in all metros. Therefore, the allocation among metros can change, depending on the change in fuel sales shares, but the overall envelope of funds remains a fixed share.

61 A private good is a good that is excludable, in that people can be excluded from using it once it is purchased by someone else, and there is rivalry in consumption, in that the use of the good by one person decreases the availability of that same good to another person (Black & Siebrits, 2015).

62 As per the economic definition: A good that is both non-excludable and non-rivalrous and in consumption

63 Estimates based on 2015/16 financial information.

64 The detailed analysis of the AMFM proposal on the tourism levies will be undertaken in the subsequent SACN analysis

65 The Revenue Assessment Matrix is an Excel-based model.

66 Chapter 8 of the 2015 State of City Finances report provides an excellent overview of this emerging public transport funding crisis in South African cities and is recommended as prior reading to provide context to this Chapter.

67 The income per capita quintiles have the following values: 1 = up to R6485; 2 = R6486–R13,818; 3 = R13,819–R28,091; 4 = R28,092–R71,478; 5 = R71,479 and above.

68 https://www.iol.co.za/news/south-africa/western-cape/poor-hardest-hit-by-public-transport-costs-1867506

69 See the 2016 State of South African Cities Report (SACN, 2016) for a discussion of the relationship between transport investment and sprawl.

70 In 2015, the cost of road traffic crashes in South Africa amounted to 3.4% of GDP, far higher than the comparable global average of 2.2% (Road Traffic Management Corporation, 2016).

71 National fuel levy; provincial fuel levy; CO_2 tax; vehicle sales tax; vehicle import duties; road tolls; vehicle registration and licensing; parking charges; congestion charges; per km charges; pollution charges; employer charges.

72 The simulation incorporates data from case studies of private vehicle charges to identify potential charge levels in the implementation of the modelled charges – including a low, medium and high charge level for each mechanism. The simulation then stress-tests private and public transport elasticities, private vehicle charge compliance and transport demand management analyses using meta analyses to simulate the potential impact of these proposed charge levels on revenue generation and modal shift.

73 Article: *https://mashable.com/2017/09/11/china-to-ban-gasoline-cars/#L8fOjo7BOqqL*

74 This is an outdated version of South Africa's electricity power plant build plan published in 2011.

75 BCM (2008), CPT (2011), EKU (2007), ETH (2008), NMB (2015), TSH (2009).

76 It must be noted that electricity supply is a complex balancing process between supply and demand. Hence, supply options need to consider more than just production costs and should be based on a thorough optimisation study, which looks at availability and flexibility, among other factors.

77 Available online: *http://www.nersa.org.za/Admin/Document/Editor/file/Consultation%20Paper%20on%20Small%20Scale%20Embedded%20Generation.pdf* (accessed 10 November 2017).

78 Section 4(ii) of the Electricity Regulation Act of 2006 states that Nersa must regulate city tariffs, but the Constitution gives local government exclusive authority over electricity reticulation, and Section 74 of the Municipal Systems Act states that municipalities should set their own tariffs. The regulatory authority for tariff-setting has not been tested in court, and cities are complying with Nersa's regulation voluntarily.

79 This unconditional grant currently covers 80% of service delivery costs to the poor.

80 Communication with Leshan Moodliar, eThekwini electricity department.

81 Electricity unit costs are subsidised by national government, through the equitable share grant.

82 Communication with Paul Vermeulen, City Power Johannesburg.

83 This is changing rapidly, because rooftop PV costs are still dropping, making the case for grid defection in the face of high fixed charges and low feed-in tariffs even more compelling.

84 Where the meter reverses and pays customers the full retail price for the electricity exported.

85 Available here: *http://www.savingelectricity.org.za/pdf/cct_safe_and_legal_pv_requirements_march_2016.pdf* (accessed 10 November 2017).

86 Climate change refers to the changes in global and regional weather patterns owing to the increase in greenhouse gas emissions.

87 The National Adaptation Strategy (DEA, 2016a) is being circulated for comment. Available Online: https://www.environment.gov.za/sites/default/files/docs/nas2016.pdf

88 100 Resilient Cities project is funded by the Rockefeller Foundation and supports the adoption and incorporation of social, economic and environmental resilience into the planning of cities. Currently, the City of Cape Town and eThekwini Municipality are signatories.

89 Gases that contribute to the greenhouse gas effect by absorbing infrared radiation. Common greenhouse gases are carbon dioxide, methane and nitrous oxide.
90 A hazard is a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation.
91 Sied S & Govender, 'More extreme weather coming in the next few years', Herald Live, 12 October 2017.
92 Munich Re. 2017. NatCatService: Natural Catastrophe Statistics Online. Available Online: *http://natcatservice.munichre.com/*
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95 Interview with Amy Davidson, Head of Environmental Strategy, City of Cape Town (16 October 2017).
96 Swiss Re, 'The USD 1.3 trillion disaster protection gap: innovative insurance tools exist to support governments to be better prepared', 7 October 2015.
97 Interview with Amy Davidson, Head of Environmental Strategy, City of Cape Town (16 October 2017).
98 Resilience premiums refer to the marginal cost increase that allows for climate proofing initiatives to be implemented on infrastructure. The CCFLA (2015) estimates this premium to be between 9% and 27%.
99 Interviews with David Sullivan, former Head of Resilience and Adaptation at the City of Cape Town; Amy Davidson, Head of Environmental Strategy, City of Cape Town; and Msukisi Gwata, former Head of Resilience and Adaptation at the City of Johannesburg (16 October 2017).
100 Interview with Amy Davidson, Head of Environmental Strategy, City of Cape Town (16 October 2017).
101 Interview with Msukisi Gwata, former Head of Resilience and Adaptation at the City of Johannesburg (16 October 2017).
102 A series of interconnected actions to minimise disaster vulnerability by preventing or limiting (mitigating/preparing for) the adverse effects of hazards within the broad context of sustainable development.
103 These include the regional bulk infrastructure, municipal infrastructure and water services infrastructure grants.
104 The Urban Settlements Development Grant (USDG) and the Integrated City Development Grant (ICDG).
105 International climate funds usually require three types of stakeholders: National Designated Authorities (NDA), Accredited Entities (AE) and Executing Entities (EE). NDAs act as a focal point overseeing the work programme and proposal development of a particular country. AEs are responsible for financial monitoring and reporting as well as the overall management of the projects and EEs are in charge of executing eligible activities under the oversight of the AE (Fayolle & Odianose, 2017).
106 The Green Climate Fund (GCF) is a global fund aimed at helping developing countries limit or reduce their greenhouse gas (GHG) emissions and adapt to climate change.
107 http://www.sagreenfund.org.za/wordpress/ (date accessed: 13 February 2018).
108 https://www.c40cff.org/knowledge-library/c40-cities-good-practice-guide-city-climate-funds (date accessed: 13 February 2018)
109 In comparison to other debt instruments such as loans, bonds are able to have larger issuance sizes as the entity is borrowing money from the public which can include a wider variety of actors as opposed to borrowing money from a single lending source.
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111 Cape Business News, 'City and The Nature Conservancy to establish South Africa's first Water Fund', 18 August 2016.
112 Interview with Dewald van Niekerk. Professor: North West University (16 October 2017).
113 Risk transfer is a contractual process whereby the burden of financial loss is shifted to another party, through insurance or other financing instruments, in return for a payment or premium.
114 Interview with Richard Wilcox, CEO African Risk Capacity (9 June 2016).
115 Interview with Amy Davidson, Head of Environmental Strategy, City of Cape Town (16 October 2017).
116 Six categories constitute the Environmental Protection Budget item in the Municipal Standard Chart of Accounts. Of these six, five relate to adaptation and resilience, or 83% of expenditure, assuming that the total expenditure is split equally among the six categories.
117 Interview with Amy Davidson, Head of Environmental Strategy, City of Cape Town (16 October 2017).
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126 ECCA (Economics of Climate Change Adaptation). Training Courses. https://www.ecca.rrcap.ait.asia/ (date accessed: 11 February 2018).

Endnotes for Inserts

A. The Minister of Finance promulgated the Municipal Regulations on a Standard Chart of Accounts in Government Gazette Notice No. 37557 on 22 April 2014.

B. The National Treasury Local Government Database (LG Database) provides an institutionalised platform on which all municipalities report budget, in-year performance and related municipal information as per the legislated reporting framework.

C. Local Government Revenue and Expenditure: First Quarter Local Government Section 71 Report for the period: 1 July 2017 to 30 September 2017.

D. The LG Database applies validation criteria to submissions received to ensure the reliability and relevance of the submitted information.

E. National Treasury Local Government Database – mSCOA status of scheduled submissions.

F. The International Budget Partnership (The Open Budget Survey): www.international budget.org

G. http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/using-blockchain-to-improve-data-management-in-the-public-sector. https://blockgeeks.com/guides/what-is-blockchain-technology/. http://tech.newstatesman.com/public-sector/blockchain-going-important-public-sector-next-year. https://www.coindesk.com/local-government-china-trials-blockchain-public-services/. https://www.forbes.com/sites/rogeraitken/2016/04/05/bitlands-african-blockchain-initiative-putting-land-on-the-ledger/#36ec760b7537. https://www.ibm.com/blogs/blockchain/2017/05/the-difference-between-public-and-private-blockchain/. https://www.linkedin.com/pulse/blockchain-public-procurement-reducing-corruption-colman-mcmahon. https://www.theguardian.com/commentisfree/2018/feb/06/blockchain-explained-by-crypto-expert-f-onthemoon. https://longreads.com/2018/02/15/blockchain-just-isnt-as-radical-as-you-want-it-to-be/. Government Office for Science. 2016. Distributed Ledger Technology: beyond blockchain. A report by the UK Government Chief Scientific Adviser. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf. Tapscott D and Tapscott A. 2016. The Blockchain Revolution. How the technology behind bitcoin is changing money, business and the world. London, UK: Penguin Random House.

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Tel: + 27 11 407 6471 • Fax: + 27 11 403 5230
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