

CHAPTER 12

**Challenges, Constraints and Best Practices
in Maintaining and Rehabilitating Water
and Electricity Distribution Infrastructure**



12.1 Introduction

Investment in infrastructure is one of the key levers through which the State can contribute to accelerated and shared growth. Equally important is the maintenance and renewal of existing infrastructure. Inadequate care of infrastructure can drastically reduce service delivery potential, undermine service delivery, thereby contributing to increased backlogs. Well-maintained water and electricity distribution infrastructure is central to economic production, attracting business enterprises to particular localities resulting in positive spin-offs not only in terms of additional jobs and livelihoods, but also long term municipal revenue bases. Proper care of infrastructure investment is particularly important for municipalities, as this sphere of government is constitutionally mandated to deliver water, sanitation, electricity and refuse removal services. Adequate and effective spending on asset care represents an expenditure lever capable of protecting investment in infrastructure and contributing to sustainable service delivery.

At the local government level, municipalities are responsible for asset care (ongoing maintenance, which is an operational item) and asset renewal (which is categorised as capital spending). Within municipalities, evidence shows a significant mismatch between maintenance/renewal requirements and the resources being injected. Furthermore, when budgets are constrained, a soft target for cuts is spending on infrastructure maintenance and renewal, which are not immediately visible and hence politically less sensitive. This is particularly prevalent in non-metropolitan municipalities.

Generally, asset management practice is very poor across the South African local government sphere. Asset management incorporates the process of decision-making, planning and control over the acquisition, use, safeguarding, and disposal of assets, in order to maximise their service delivery potential and benefits, and to minimise their related risks and costs over their entire life. Most municipalities are uncertain of the extent, location, composition, physical attributes and asset-care needs of their infrastructure assets and hence are not in a position to plan and budget properly for asset maintenance and renewal (Boshoff, 2009). At the heart of these challenges lies the absence of any formal legislation governing asset care at local level.

12.2 Key Findings

The findings are divided into four sub-sections: the value of municipal infrastructure, the extent of the renewals backlog, maintenance requirements at local government level and causes of insufficient spending on asset care.

12.2.1 Value of Municipal Infrastructure

According to the International Infrastructure Management Manual⁴, public infrastructure should be valued based on a current replacement cost (CRC) measure (NAMS and IPWEA, 2011). The CRC means the value of replacing an existing asset with a modern asset of equivalent capacity. It is a commonly accepted "fair value" method allowed for in Generally Recognised Accounting Practice (GRAP) that applies to all three spheres of government in South Africa. At present, municipalities use the cost basis to value assets. At the end of June 2012 the CRC of municipal infrastructure was R1.156 trillion.

Electricity, water and sanitation-related infrastructure collectively accounted for 56 per cent of municipal infrastructure replacement value, as Table 38 shows.

(See Table 38 on page 136)

⁴The International Infrastructure Management Manual was, "developed with public and private sector industry input from Australia, New Zealand, United States, Canada, South Africa and the United Kingdom. It promotes best management practice for all infrastructure assets regardless of ownership or location" (NAMS and IPWEA, 2011: ii).

Table 38: Deemed Value of Municipal Infrastructure as at 30 June 2012

Asset class	CRC	Value as % CRC of total municipal portfolio
Roads and stormwater	385, 392, 106 000	33%
Water and sanitation	254 ,319 ,938, 000	22%
Electricity	398, 282, 940, 000	34%
Community facilities & operational buildings	118, 621, 919, 500	10%
Totals	1, 156, 616, 903, 500	100%

Source: Commission's calculations

12.2.2 Extent of Renewals Backlog

Defining Renewals and Renewals Backlog

Infrastructure renewal entails replacing or rehabilitating an asset and relates to capital budget activities that materially extend the useful life of assets. Renewal activities are required to maintain community wealth as captured in assets. International best practice, as advocated in the International Infrastructure Management Manual, holds that asset renewal needs be estimated against the CRC of an asset. As a standard rule, the accumulated depreciation provides an indication of the asset renewal needs. Thus, municipalities should annually spend as much on renewals as the depreciation charge for that financial period, in order to retain the community wealth vested in assets. A renewals backlog is considered to exist when the condition of infrastructure has deteriorated below the level considered acceptable. Renewals Backlog for Water and Sanitation and Electricity Distribution Infrastructure

Determining a renewals backlog requires a clear understanding of the point at which the condition or performance standards become unacceptable. This will vary by sector and for assets of differing importance. Relevant and reliable data on the current status of the asset portfolio is necessary. Table 39 gives the amount of resources that would be required to keep water and sanitation and electricity distribution infrastructure at optimum, sub-optimal and absolute standards of operation. These can be defined as follows:

- Optimum: desirable
- Sub-optimal: can be considered acceptable under duress
- Absolute baseline: where there could reasonably be cause for widespread concern and anxiety.

Table 39: Summary of Estimated Capital Renewal Backlogs

Target Condition Standard	Water and Sanitation			Electricity		
	Amount	% CRC	Years ⁵	Amount	% CRC	Years
1 Optimum	R 39 billion	19%	10	R 41 billion	22%	11
2 Sub-optimal	R 19 billion	10%	5	R 25 billion	11%	7
3 Absolute Baseline	R 4 billion	3%	1	R 8 billion	5%	2

Source: Commission's calculations.

The amounts exclude portions of the networks provided by external service providers (Water Boards and Eskom).

Table 39 indicates a backlog of about R20–R40 billion in each of the water and sanitation and electricity sectors in municipalities (depending on the target standards). This may be compared to depreciation (of fair value) of around R4–R5 billion per year per sector. Based on the data at hand, current levels of investment in capital renewals are between R600 and R800 million per year (about 10 per cent of the total capital expenditure). Therefore, to turn the tide towards a position of tolerable infrastructure standards, a capital renewals programme – specifically to address the backlog – of a magnitude higher than current budget allocations (at least R4 billion per year), is required over a period of five to 10

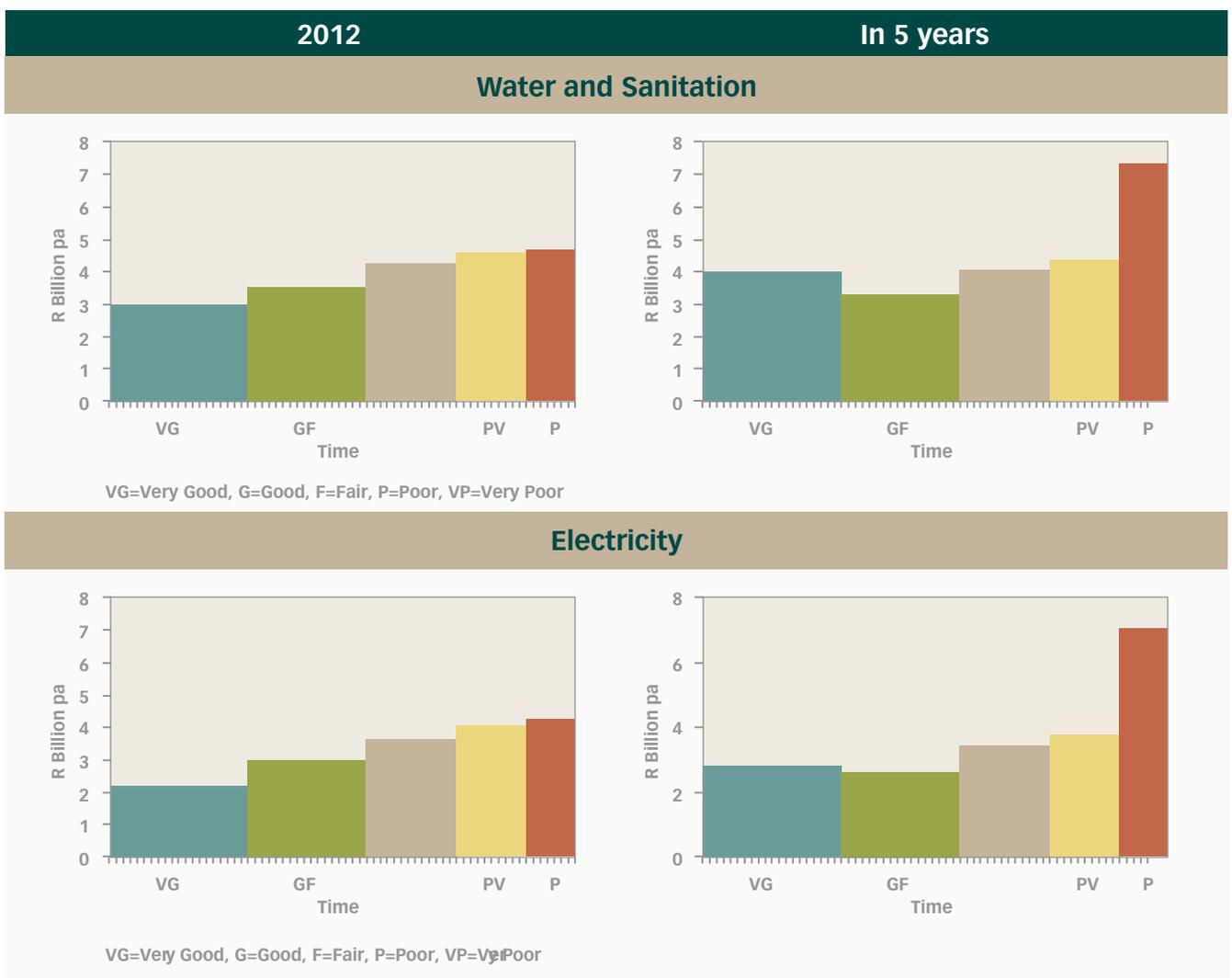
⁵ The years' backlogs indicated in the table are based on the average annual depreciation (assuming that the infrastructure has been fair-valued).

years. This is in addition to the need to ramp up ongoing provisions for capital renewal to a level that depends on the portfolio health in each municipality. However, the level should not be less than half the depreciation of fair value, otherwise another backlog can be expected to recur (estimated to be another R2 – R3 billion per year nationally per sector).

Implications of Infrastructure Deterioration

Whereas the pace of infrastructure deterioration can be modelled according to the expected useful life of infrastructure so as to inform planning, in practice the assets are often pushed to the limit – with severely constrained capital budgets, and maintenance stretched. Figure 21 illustrates the condition of water and sanitation and electricity infrastructure in both 2012 and what can be expected in five years’ time, based on current investment levels. In five years, the asset portfolios deteriorate from poor to very poor, and the capital renewals backlog deepens, with a consequent need for an even more considerable and longer capital renewals programme to restore acceptable standards.

Figure 21: Condition of Infrastructure Portfolios Now and in Five Years’ Time (at Current Investment Levels)



12.2.3 Maintenance Needs

Defining Maintenance

Maintenance embraces all the activities required to keep an asset operational after commissioning. It is important for municipalities to define the expected useful life of an asset and the expected life-cycle interventions throughout the life of the asset. Accepted good practice is to document these in the form of life-cycle strategies per asset type. A life-cycle strategy for an asset states:

- The type of maintenance to be applied during its life.
- The triggers for renewal, which may be expressed in terms of condition, performance, capacity, or cost of operation consistent with the levels and standards of service adopted by the municipality, and which may vary depending on the importance of the asset.
- The typical renewal treatment (optimised solutions may also be assessed for high value assets).
- The expected useful life from new (a median – noting that each individual component’s useful life will be regularly reviewed based on its specific operational environment).
- The assumed deterioration pattern.
- Any safe-guarding, operational and/or de-commissioning requirements.

All the actions required for a defined component to reach its expected useful life must be considered operational expenditure.

Current Practice versus International Practice

In South Africa, finance officers benchmark maintenance provisions as a percentage of operating budget. The percentage used differs depending on whether it is applied by the Institute of Municipal Finance Officers (IMFO), National Treasury or a particular municipality, but typically ranges between five and 10 per cent of the operating budget. While this practice focuses some budgetary attention on maintenance, it is fundamentally flawed. Maintenance needs are a function of the nature, extent, service commitments (e.g. committed response times to asset failures, such as attending to a burst water pipe of a diameter of greater than 80mm within two hours) and compliance requirements. In contrast, the current methodology assumes that a municipality will generate sufficient revenue and has balanced cost and revenue streams. This is not true in the local government space, where the system of intergovernmental transfers means that assets are created without corresponding increases in municipal revenue, partly because much of infrastructure created is of a non-revenue generating nature (e.g. community halls, libraries and recreation facilities), while much of infrastructure with revenue potential (e.g. electricity and water) is subsidised and characterised by limited cost recovery. The International Infrastructure Management Manual advocates estimating maintenance budget needs (and also renewal budget needs) as a percentage of CRC, to be further refined based on network-level life-cycle strategies, the cost structure of the municipality, statutory requirements (e.g. annual hydraulic testing requirements, which is a form of predictive maintenance), importance of the asset, risk appetite and asset failure information (cost of operations, use, capacity and condition). In the event that the real asset maintenance needs exceed the available budget, the deficit should, in terms of accounting practice, be recorded as deferred maintenance. The international norm for provision of maintenance is about 2 per cent of CRC per year, although this ranges from sector to sector: from as low as 1.1 per cent for community facilities and operational buildings to as high as 2.6 per cent per year for electricity. Table 40 outlines benchmark provisions against which actual performance of municipalities can be measured.

Table 40: Benchmark Municipal Infrastructure Maintenance Needs

Asset class	Current replacement cost	Depreciated replacement cost	Annual maintenance
Roads and stormwater	385,392,106,000	186,938,883,250	4,239,313,166
Water and sanitation	254,319,938,000	126,736,833,330	4,577,758,884
Electricity	398,282,940,000	194,006,152,800	10,355,356,440
Community facilities and operational buildings	118,621,919,500	58,165,679,475	2,491,060,310
Totals	1,156,616,903,500	565,847,548,855	21,663,488, 800

Source: Commission's calculations.

Adequacy of Maintenance Spending

Table 41 compares final budgets and actual spending to benchmark spending. As is evident, budgeted maintenance provisions increased substantially, from R6.44 billion in 2005/06 to R16.99 billion in 2011/12, an increase of 255 per cent.⁶ Maintenance spending weakened from above 80 per cent in the period 2003–2008, to as low as 75 per cent in 2008/09, subsequently improving to 78 per cent in 2011/12. Average maintenance spending performance from 2005 to 2012 was 79 per cent of budgeted expenditure. Over the corresponding period, the total amount not spent on maintenance – what

Table 41: Municipal Maintenance History 2005/06–2011/12 (Current Prices at the Intervals Recorded, Measured in R '000)

Repairs and Maintenance per Province		Jun-05	Jul-06	Aug-07	Sep-08	Oct-09	Nov-10	Dec-11
EC	Final Budget	621.313	692.622	895.83	907.459	1,061,327	1,241,284	1,451,755
	Actual	562.425	665.918	652.909	822.062	889.56	1,025,268	1,181,679
	Benchmark							2,089,960
FS	Final Budget	234.946	290.018	211.86	371.231	425.522	487.752	559.084
	Actual	185.065	207.98	244.669	298.528	289.929	317.691	348.112
	Benchmark							2,500,042
GAU	Final Budget	2,147,414	2,463,834	2,773,475	3,679,083	4,181,321	4,752,121	5,400,841
	Actual	1,486,222	1,729,375	2,268,495	2,837,889	2,827,947	3,224,750	3,677,231
	Benchmark							6,407,358
KZN	Final Budget	1,473,815	1,661,526	2,069,306	2,524,814	2,945,287	3,435,784	4,007,967
	Actual	1,180,030	1,314,667	1,789,413	2,231,214	2,753,341	3,217,932	3,760,917
	Benchmark							3,653,090
LIM	Final Budget	218.527	271.486	314.623	307.84	341.681	379.242	420.932
	Actual	202.136	244.619	274.775	346.39	379.861	438.76	506.791
	Benchmark							1,488,155
MPU	Final Budget	218.159	279.959	325.441	423.664	526.617	654.588	813.656
	Actual	220.448	231.699	304.761	397.597	425.108	513.781	620.951
	Benchmark							1,264,230
NC	Final Budget	114.816	120.33	105.344	109.937	111.518	113.122	114.749
	Actual	73.195	83.653	94.067	130.577	136.088	150.408	166.235
	Benchmark							384.358
NW	Final Budget	126.98	173.311	193.757	256.515	301.131	353.508	414.994
	Actual	123.991	137.951	193.664	209.485	201.325	233.972	271.914
	Benchmark							1,201,038
WC	Final Budget	1,280,644	1,251,409	1,676,497	1,877,803	2,246,282	2,687,068	3,214,349
	Actual	1,185,341	1,310,069	1,217,137	529.64	1,381,721	1,737,476	2,184,827
	Benchmark							2,675,252
Budgeted all		6,436,615	7,204,494	8,566,133	10,458,346	12,140,686	14,104,469	16,398,327
Spent all		5,218,853	5,925,931	7,039,890	7,803,382	9,284,880	10,860,039	12,718,657
% budget spent		81%	82%	82%	75%	76%	77%	78%

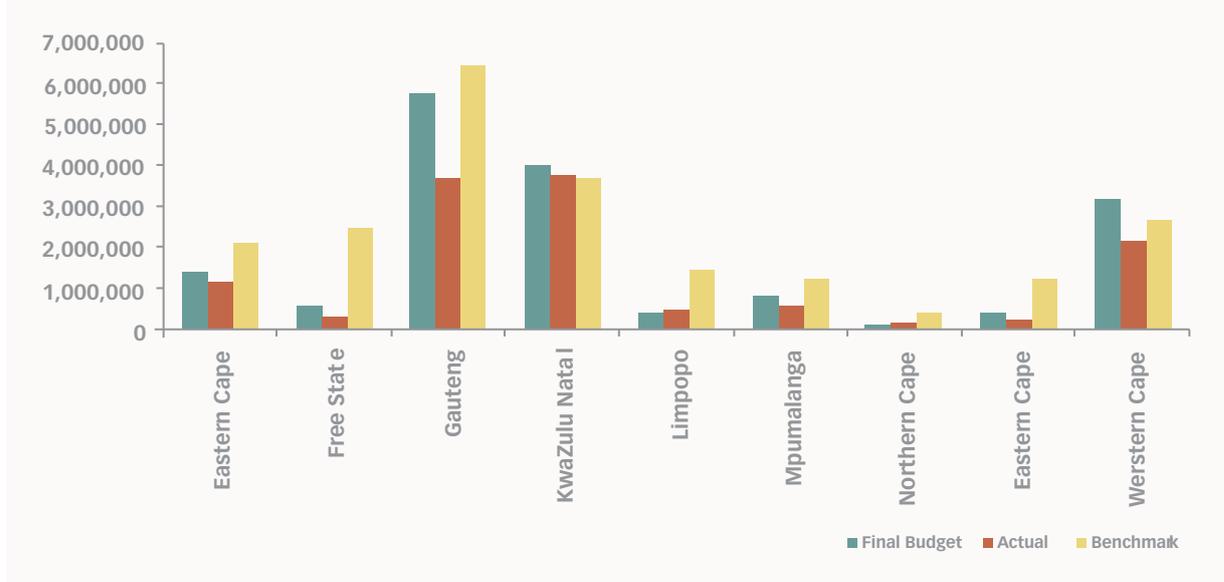
Source: Commission's calculations.

⁶ Figures have not been adjusted for inflation.

should be referred to in annual financial statements as deferred maintenance – is R16.46 billion. This is equivalent to the 2011/12 maintenance budget, which means that one year's maintenance is foregone every six years. However, if measured against the accepted international benchmark, then municipalities should have spent R21.66 billion on maintenance in 2011/12. This translates into an annual budget gap of R5.27 billion and a spending gap of R8.94 billion.

No category of municipality managed to spend on maintenance according to budget. District municipalities budgeted above but spent close to benchmark requirements. Metropolitan municipalities budgeted more or less on a par with benchmark requirements but underspent on maintenance. Local

Figure 22: Maintenance Provisions and Spending Per Province 2011



Source: Commission's calculations

12.2.4 Cause of Insufficient Spending on Asset Care Activities

The results presented in the preceding sections indicate significant under-spending on both asset renewals and maintenance. Given that municipalities tend to spend less than 80 per cent of their maintenance budget, it is questionable whether providing additional funding will have any meaningful impact at this point. Based on this research, the Commission's view is that the following may significantly contribute to the underfunding of maintenance and renewal activities: the quality of the existing regulatory regime, poor asset management practice, and the current system of intergovernmental funding for capital versus maintenance expenditure.

Regulatory Regime

Preliminary results indicate that between 2006 and 2008, infrastructure asset management received much attention locally. The Department of Cooperative Governance and Traditional Affairs (CoGTA) published the Local Government Infrastructure Asset Management Guidelines 2007–2009. This manual advocated, among others, that municipalities adopt a holistic, enterprise-wide approach to asset management and also prepare asset management plans that quantify asset lifecycle needs in response to service needs, informed by supporting implementation plans that address funding and organisational capacity issues. Since publication, CoGTA has not updated or actively promoted this manual. It also appears that CoGTA has since shifted its focus away from promoting the adoption of sound infrastructure asset management practice to obtaining clean audit results by 2014, an element of which includes robust asset registers.

In 2007 the Construction Industry Development Board published the National Infrastructure Maintenance Strategy (CIDB, 2007), but no documentary evidence exists of its implementation. In 2008 the Government Immovable Asset Management Act (GIAMA) came into being, but its scope excludes local

government (RSA, 2007). In the same year National Treasury released its Local Government Capital Asset Management Guidelines (National Treasury, 2008). These guidelines have not been updated, although new accounting standards for assets and best practices have been introduced.

The GIAMA regulates the management of immovable assets of national and provincial governments, but no corresponding legislation applies in local government – despite the sector boasting infrastructure assets with a replacement value exceeding R1 trillion. The Municipal Finance Management Act (RSA, 2003) limits itself to the requirement that the accounting officer must develop, implement and maintain a system of internal control and safeguarding over assets. This appears to normally be taken to mean that a municipality must implement, maintain and update an asset register, and take basic measures for the safeguarding of assets. The Municipal Systems Act (RSA, 2000) provides for aspects such as undertaking infrastructure feasibility studies, investment planning and affordability assessment. Assets are central to economic production and growth, as well as social upliftment and wellbeing of the nation. Yet no piece of local government legislation adequately encompasses the scope of asset management required in terms of accepted international best practice or when measured by International Standards Organisation standards for asset management.

Asset Management Practice

Various sectoral reports confirm the existence of inadequate planning practice. For example, according to the National Energy Regulator of South Africa (NERSA), 86.7 per cent of municipalities with electricity distribution licences have maintenance budgets, although only 53.3 per cent have a National Rationalised Specification (NRS) 082 maintenance strategy in place (NERSA, 2011:9). NRS 082 specifies maintenance planning as a component of a recommended maintenance policy for distribution networks. With respect to water, the most recent Blue Drop (water) assessments indicate that 35 per cent of municipalities scored 50 per cent or less for asset management practice. The corresponding figure for sanitation asset management is 48 per cent. Of great concern is that, in many cases, municipalities are uncertain of the extent, location, composition, physical attributes and asset-care needs of their infrastructure assets, and hence are not in a position to plan and budget properly for asset maintenance and renewal.

Impact of Current Intergovernmental Transfer System

The system of intergovernmental transfers has made it possible for municipalities to accelerate the roll-out of services, in particular to the poor, through the creation of vast stocks of infrastructure and community facilities. Several capital grants require the submission of business cases that must, among others, prove that a municipality has the administrative and financial capacity to operate and care for the asset to be constructed. However, in practice this does not work. Applicant municipalities and the departments that consider grant business plans pay little attention to life-cycle considerations in the planning stages and less so to the accumulated effect of additional assets on the financial and administrative capacity of a municipality. This is because the accumulated effect can only be assessed through a network-level asset management plan and a comprehensive municipal infrastructure plan. Most municipalities do not have these plans in place, although most recognise the need for such plans. As a result, municipalities create some assets that they are unable to care for, or create assets that mean available maintenance resources must be spread more thinly, to the detriment of revenue-generating infrastructure.

12.3 Conclusion

The overarching finding that must be emphasised is that, at present, no legislation adequately encompasses the full scope of asset management in municipalities, as required in terms of accepted international best practice. As a result of this, asset management practice is poor across the majority of municipalities because municipalities have no road-map for planning, budgeting and spending on infrastructure maintenance and renewal. In particular, the following findings are highlighted:

- Municipalities under-budget and under-spend on both asset maintenance and renewals.
- The current methodology for valuing municipal assets is not in line with international best practice.
- Given current regulatory, planning and institutional arrangements, there is limited value in increasing asset care funding provisions, despite the need to do so.

- The lack of priority attached to asset care needs to be urgently addressed, so that public investment in infrastructure is protected, thus contributing to increased sustainability and continuity of delivery of basic services.

12.4 Recommendations

With respect to **maintaining and rehabilitating water and electricity distribution infrastructure**, the Commission recommends that:

- National Treasury, in collaboration with relevant stakeholders such as CoGTA and the South African Local Government Association (SALGA) develops local government-specific infrastructure asset management legislation, similar to the Government Immoveable Asset Management Act at national and provincial level. The proposed legislation should:
 - o Cover decision-making, planning and control over the acquisition, use, safeguarding, and disposal of local government assets, to maximise their service delivery potential and benefits and to minimise their related risks and costs over their entire life.
 - o Define asset management practices appropriate to the different categories of municipality, given the nature, extent and complexity of infrastructure, the financial and administrative capacity of the municipality, and other relevant factors.
- National Treasury devises local government infrastructure asset management guidelines. These guidelines should be positioned within the broader system of capacity development and performance oversight. Technical assistance should be provided to municipalities to prepare and implement credible infrastructure asset management plans.
- Provincial and national authorities must increase scrutiny of the operating implications of capital funding so as to ensure that municipalities are able to adequately maintain and renew infrastructure.