

# 2015

## Metropolitan Municipality Water Balance Assessment



A WATER BALANCE ASSESSMENT OF SOUTH  
AFRICA'S METROPOLITAN MUNICIPALITIES



**water & sanitation**

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# Metropolitan Municipality Water Balance Assessment

## EXECUTIVE SUMMARY

### Key Findings

- Data quality is improving;
- In 2013/14 the metros supplied 2159 mill kl of water, exceeding their SIV target by 10%;
- Daily per capita consumption of 270 l is very high, especially for a water scarce country;
- The 2013/14 average NRW of 34.3% and WL of 28.8% are too high;
- Reducing the high ILI of 5.4 to an achievable 3, will save metros R1.6 bn/annum;
- The SIV is increasing in line with the population, (but slower than the household growth rate), indicating that WC/WDM is not being successfully implemented;
- Despite initial reductions, % NRW and % WL appear to be increasing and the ILI plateauing;
- Johannesburg, NM Bay and eThekweni Metros all exceeded their SIV targets by over 20%;
- NM Bay, Johannesburg, Buffalo and eThekweni Metros all have NRW values above 39%; Johannesburg's has risen by 6.4% in 2013/14;
- Mangaung Metro, despite performance improvements, has the fastest growing SIV in terms of their population growth and a disproportionately high per capita consumption;
- Johannesburg Metro has the highest ILI of 7.5 and is thus the least efficient metro; and
- Cape Town Metro is the top performer, whilst Tshwane, thanks to considerable improvement in recent years, is also performing well.

### Key Strategic Recommendations

- On-going monitoring and reporting of metros' water balances is crucial;
- Reconciliation strategy targets need to be reviewed and updated as necessary;
- WC/WDM must be implemented to secure water resources;
- Current water use per person must be reduced;
- Metros should increase their efforts to reduce NRW and the negative impact it has on their ability to generate own income and run a viable water business;
- Metros must increase efforts to achieve reconciliation targets; particularly so the Gauteng metros, (specifically Johannesburg Metro), where no additional water is available until 2022;
- Political support for payment and the prosecution of illegal water connections and theft is vital;
- Johannesburg Metro's sudden increase in NRW must be investigated;
- Ekurhuleni Metro must justify their excessive commercial losses;
- The failure of eThekweni Metro's WC/WDM initiative to improve performance to be investigated; and
- Mangaung Metro must take steps to reduce domestic consumption; they should consider revising their tariff structure.

## Introduction

40% of South Africa’s population lives within eight metropolitan municipalities and utilises approximately 48% of the total urban water supplied, or 11% of the total water consumed.

The Department of Water and Sanitation (DWS) regards water conservation and water demand management (WC/WDM), from a water resource perspective, as a key intervention in municipalities. Since WC/WDM is critical, and, in order to monitor municipal performance on an on-going basis, the DWS Water Services Directorate: Macro Planning, in consultation with the DWS Water Resource Planning Directorate: Water Use Efficiency, continually accesses municipal water balance information, a process that started in 2004/5 and more recently culminated in the No Drop process.

This metro specific report contains the most detailed water balance data from 2004/5 to 2013/14. All calculations are based on the International Water Association (IWA) standard water balance model as modified slightly for South African conditions.

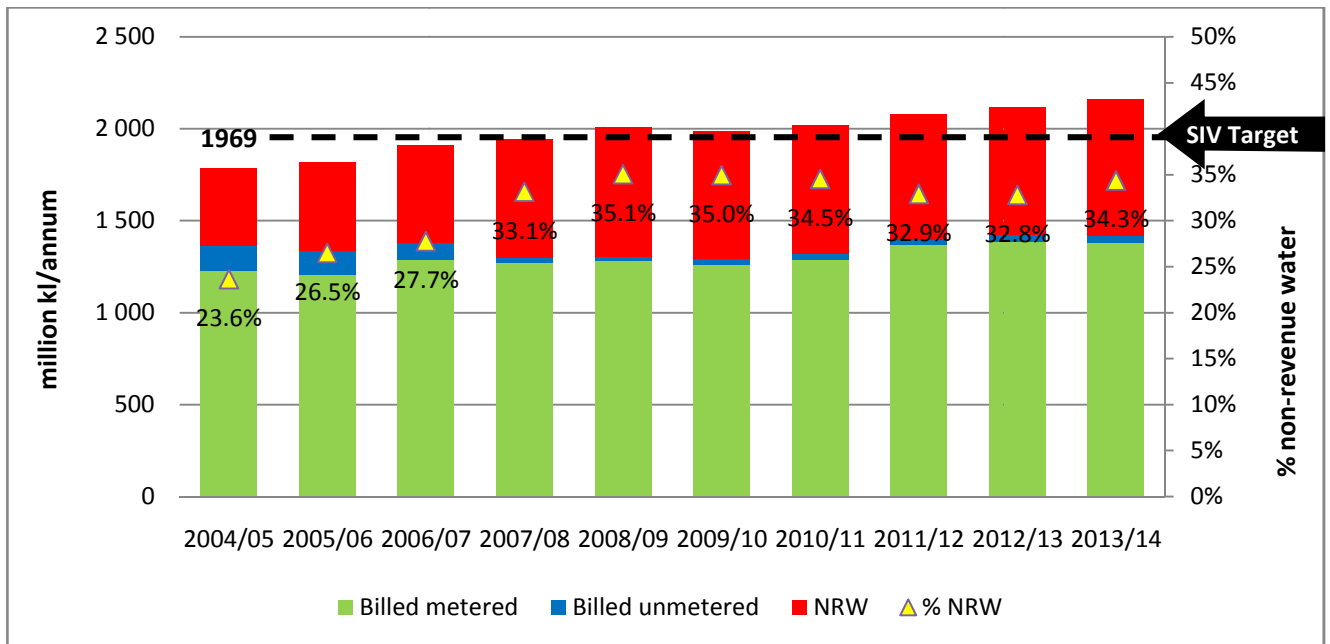
## Results

Metro water balance reporting standards are improving. In 2013/14 they supplied 2159 million kl of potable water, of which water losses amounted to 622 million kl and non-revenue water 741 million kl.

<b>System input volume 2159</b>	<b>Authorised consumption 1537</b>	<b>Billed authorised 1418</b>	<b>Billed metered 1378</b>	<b>Revenue water 1418</b>
			<b>Billed unmetered 40</b>	
		<b>Water losses 622</b>	<b>Unbilled author 120</b>	<b>Unbilled metered 15</b>
	<b>Unbill. unmetered 105</b>			
	<b>Commercial losses</b>		<b>175</b>	
		<b>Physical losses</b>	<b>447</b>	

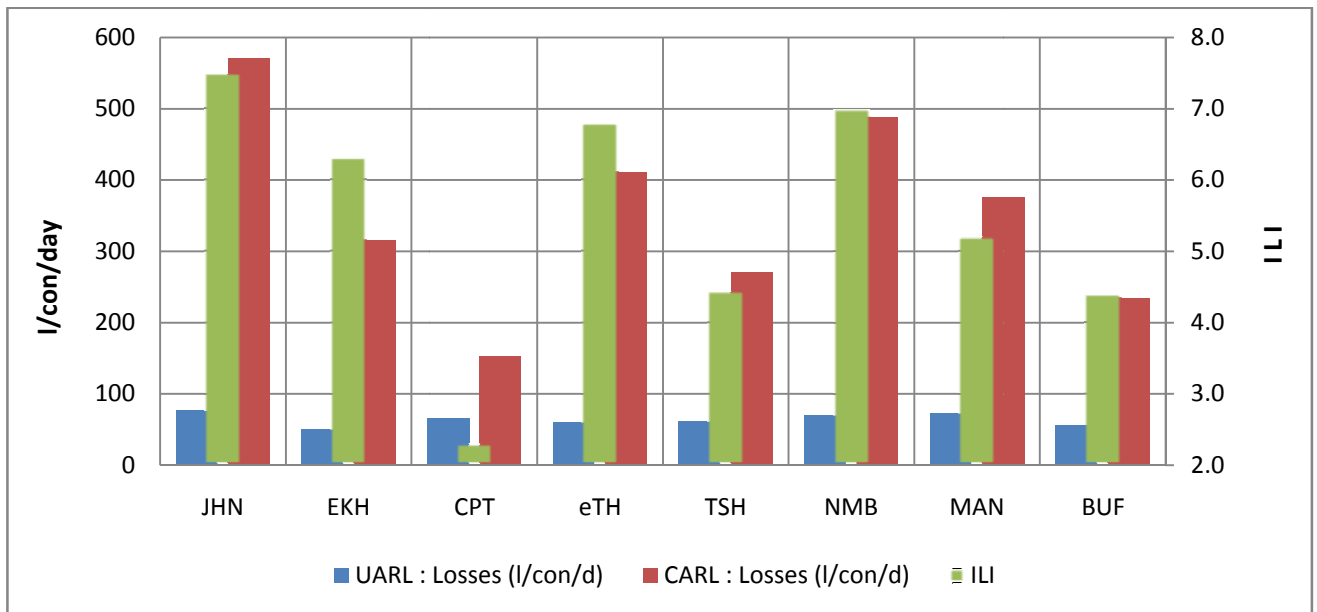
**Figure i: Combined Metro IWA Water Balance for 2013/14 (million kl/a) NTS**

From **figure ii** it is clear that the metros’ reconciliation strategy 2013/14 target has not been met and it appears unlikely to be achieved soon as there has been significant growth in the SIV. After decreasing in 2011/12, NRW has increased to pre 2011/12 values. Water losses (WL) decreased from 33.4% in 2010/11 to 26.4% in 2012/13, only to rise to 28.8% in 2013/14.



**Figure ii: Combined Metro NRW and SIV Trends and SIV 2013/14 Target**

Johannesburg Metro, (closely followed by NMB and eThekweni), has the highest Infrastructure Leakage Index (ILI) and current annual real losses. Cape Town Metro is the most efficient metro with an ILI of 2.3. The weighted average ILI of 5.4 is high for a relatively developed, water scarce, country.



**Figure iii: Metro 2013/14 ILI Comparison**

Reducing the ILI to 3, a not unrealistic target, will save about R1.6 bn per annum as shown in **figure iv** below. Johannesburg and eThekweni have the highest savings potential.

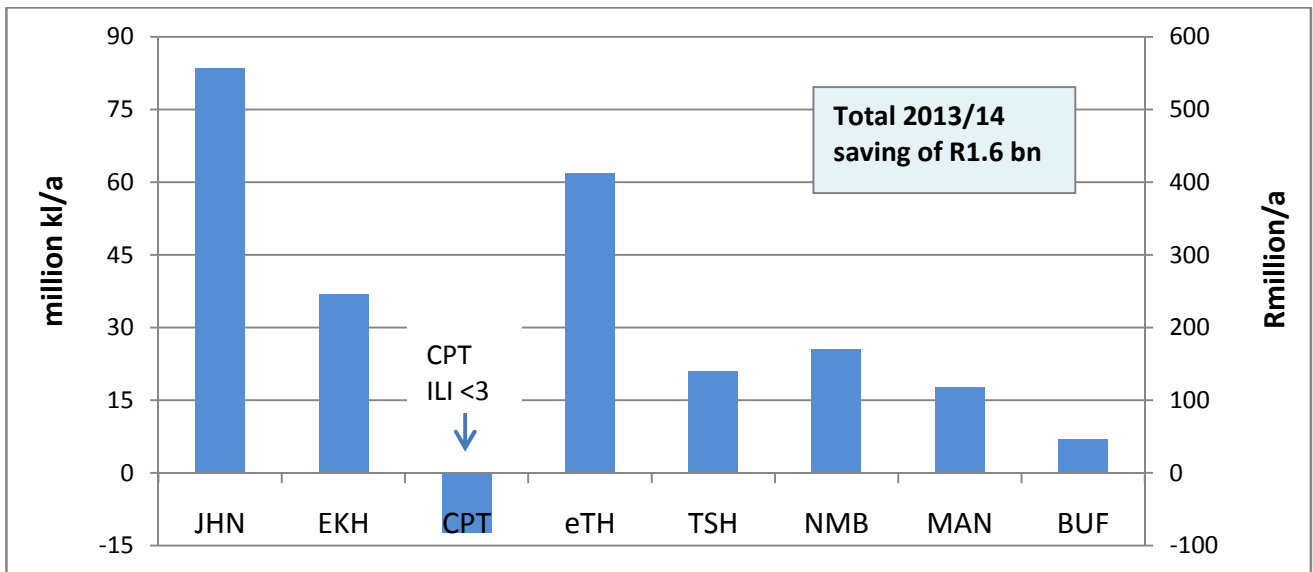


Figure iv: Metro 2013/14 Potential Saving Comparison at R7.60/kl

Figure v shows that unit consumption is particularly high in Johannesburg and Mangaung Metros. The latter is particularly bad as it does not have the high, non-domestic consumption that Johannesburg for example has. Overall, for a water scarce country, average per capita consumption (dotted lines), is much too high. It has however stabilised since 20010/11 at about 270 l/c/d, (relative to the SIV). In the same period unit authorised consumption has increased from 182 to 190 l/c/d. Unit domestic consumption has only recently started being recorded and the reliability of the 2013/14 value of 144 l/c/d is unsure.

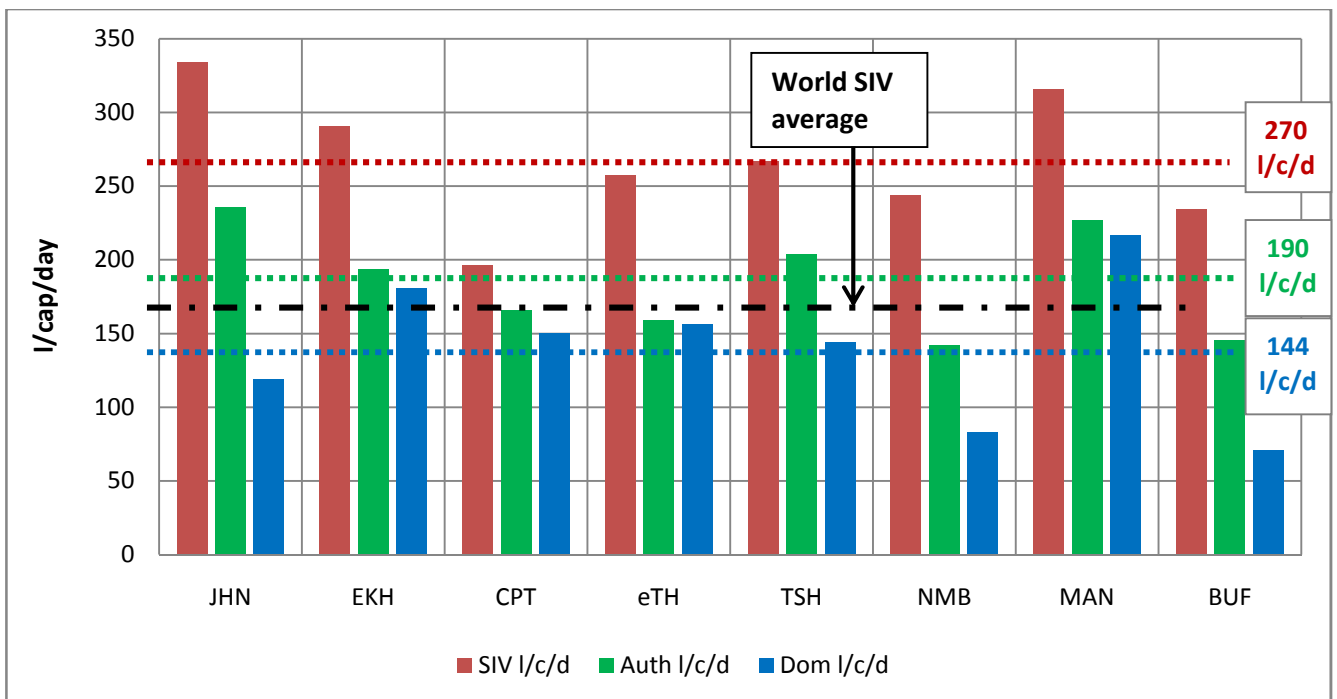


Figure v: Metro 2013/14 Per Capita Consumption Comparison

Over the longer term, total metro SIV has increased at the same rate as the population, which would seem to indicate that water conservation and demand management is either not being implemented

or is ineffective. However the SIV has increased at a slower rate than the number of households. Increased water scarcity (and climate change) will profoundly affect water supply systems and water resource security, and needs urgent attention. Only Cape Town and Tshwane met their 2013/14 reconciliation targets, with Johannesburg, Nelson Mandela Bay and eThekweni substantially exceeding their targets.

Unbilled authorised consumption has increased significantly from 23 million kl in 2010/11 to 120 million kl in 2013/14. The average number of households per connection has increased substantially since 2009, indicative of urban densification, albeit with a slight drop in 2013/14.

In terms of individual metros:

- 1) Given the lack of additional water sources in the Vaal catchment, these metros, and Johannesburg Metro in particular, as the largest Gauteng consumer, must take steps to reduce consumption and meet their targets.
- 2) Johannesburg Metro's big jump in % NRW in 2013/14 needs investigation.
- 3) Ekurhuleni Metro shows little sign of improvement and needs to start implementing WC/WDM.
- 4) eThekweni's failure to meet its SIV target and its recent increases in %WLand % NRW are disturbing.
- 5) The negative impact of adding problematic municipalities to a metro can be clearly seen in the Tshwane scenario.
- 6) Nelson Mandela Bay Metro's performance is deteriorating rapidly and is cause for concern.
- 7) Despite good efforts by Mangaung Metro, particularly as regards %NRW, their consumers are failing to play their part in conserving water and this needs to be addressed.

## Business Intelligence Support

# Metropolitan Municipality Water Balance Assessment

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## List of acronyms

Acronym	Definition
CARL	Current annual real (or physical) losses
DWS	Department of Water and Sanitation
ILI	Infrastructure Leakage Index
IWA	International Water Association
kl	Kilo litres (1 kl = 1000 litres = 1 m <sup>3</sup> )
KPI	Key Performance Indicator
NRW	Non-revenue water
NTS	Not to scale
SIV	System input volume
UARL	Unavoidable annual real (or physical) losses
UFW/UAW	Unaccounted for water
WC/WDM	Water conservation and water demand management
WL	Water loss
WRC	Water Research Commission
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider

## **1 INTRODUCTION**

South Africa's eight metropolitan municipalities, (metros), support 40% of its population, (21.3 million people), and utilise approximately 48% of the urban water use. Their water resources have been investigated in detail in the past few years by the Department of Water and Sanitation (DWS) and water conservation and water demand management (WC/WDM) have been identified as key interventions required to balance the available supply against projected future requirements.

The aim of this assessment is to:

- Review the water balance data of each metro and in particular the status of their non-revenue water (NRW), water losses, (WL), water consumption and water use efficiency;
- Evaluate water balance trends;
- Assess progress made toward achieving the DWS Reconciliation Strategy targets; and
- Make strategic recommendations.

This report adds business intelligence to the data received and presents a strategic perspective that can be used for planning purposes. It does not provide reasons for the results, unless known. This would require a comprehensive interaction with each metro and is beyond the scope of this report.

Calculations are based on the International Water Association water balance model, as modified slightly for South African conditions in order to accommodate "free basic water". Previous studies undertaken by the Water Research Commission (WRC) and DWS have provided significant detail on the methodology and terminology, which are not repeated here. This review includes information from all metros and is considered the most comprehensive dataset to date. It should be noted that the work undertaken in this assessment is effectively an update on the previous work undertaken by the WRC and DWS, together with more recent data captured during the No Drop Programme and to a lesser extent the SALGA Municipal Benchmarking Initiative.

## **2 METHODOLOGY**

### **2.1 Data sources**

The following data sources were utilised in the preparation of this report:

- WRC NRW assessments in 2005 and 2007;
- The State of NRW in S. Africa (2012), (WRC);
- DWS 2011/12 NRW assessment;
- 2012/13 and 2013/14 No Drop Programme data, (DWS 2015);
- 2013/14 SALGA Municipal Benchmarking Initiative data, (2013/14);
- Metropolitan Municipality NRW Assessment, (DWS 2013);
- Population and households figures Stats SA;
- Water Services Tariffs 2012/13, DWA (PULA) 2013;
- DWS Reconciliation Strategy Studies for the major economic areas, namely
  - The Western Cape Water Supply System, (DWS June 2007);
  - Vaal River System Large Bulk Water Supply, (DWS, 2007);
  - Water Reconciliation Strategy Study for the KZN Coastal Metropolitan Areas, (DWS, 2009);
  - Algoa Water Supply System, (DWS, Nov 2010);
  - Reconciliation Strategy for Amatole Bulk Water Supply System, (DWS, March 2008); and
  - Large Bulk Water Supply Systems: Greater Bloemfontein Area, (DWS, June 2012).

## **2.2 Data validation and confidence levels**

The metros have high confidence levels in their water supply figures, which are mostly metered by bulk water service providers such as Rand Water, Umgeni Water and Amatola Water. This confidence is certainly improving.

Consumer metering and billing is generally acceptable, with high levels of confidence. The figures are often verified, where the water supplied to specific areas is compared to the water billed to the consumers. Various software packages are used for this analysis.

Concerted efforts have been made to standardise the manner in which data is interpreted, so as to prevent discrepancies and allow meaningful comparisons to be made between metros.

## **2.3 Reconciliation strategy targets**

Water resource management requires long-term planning, and strategies to source and supply water. The DWS has undertaken strategic water resource assessments at Water Management Area level, followed by supply and demand reconciliation studies for major river systems, metros, growth centres, and smaller towns across the country. The water balance reconciliation strategies seek to reconcile future water requirements with available resources over the next 20-30 years.

WC/WDM has been identified as a key intervention to reduce municipal water demand and reduce the need for additional new sources to be developed. Very often municipalities try to solve the problem of water “shortage” by developing additional resources, often at a very high cost and when their shortage is almost entirely induced by water losses.

The 2013/14 water demand targets set in the various reconciliation strategies are aimed at reducing the system input volume of the IWA water balance and do not specify water loss or NRW targets. The input volume can only be reduced by increasing efficiency, (reducing authorised consumption), and reducing water losses, (commercial (or apparent) and physical (or real) losses). NRW will only be reduced by increasing billed consumption and reducing unbilled consumption and water losses.

## **3 RESULTS**

Previous investigations have found that the most important factors influencing water use efficiency in the various metros revolve around financial constraints and supply chain problems, so that the funding and resources required for WC/WDM interventions are simply not available. Water is not considered a priority in many metros and is not properly funded. Funding is only prioritised in metros where water security has become an issue and restrictions have been imposed. This problem is further compounded by the fact that such interventions require significant technical expertise.

An important consideration when assessing annual trends in the various metros, concerns the changing boundaries. In some cases, such as Tshwane Metro, highly problematic areas with very high levels of water losses have been consolidated into the nearest metro, often because of a general breakdown in management and operation of the water service authority in question. This negatively affects metro performance and often masks positive developments.

In the results below, dates shown are for a municipal financial year, 1 July to 30 June. Unless otherwise stated, average metro values are weighted averages.

### 3.1 Metro specific results and trends

#### 3.1.1 Johannesburg Metro (2013/14 KPIs: NRW = 40.9%; WL = 29.2%; ILI = 7.5)

System input volume 577	Authorised consumption 409	Billed authorised 341	Billed metered 320	Revenue water 341
			Billed unmetered 21	
	Water losses 168	Unbilled author 67	Unbill. unmetered 67	Non-revenue water 236
		Commercial losses 47		
		Physical losses 121		

Figure 1: Johannesburg Metro 2013/14 Water Balance(million kl/a) NTS

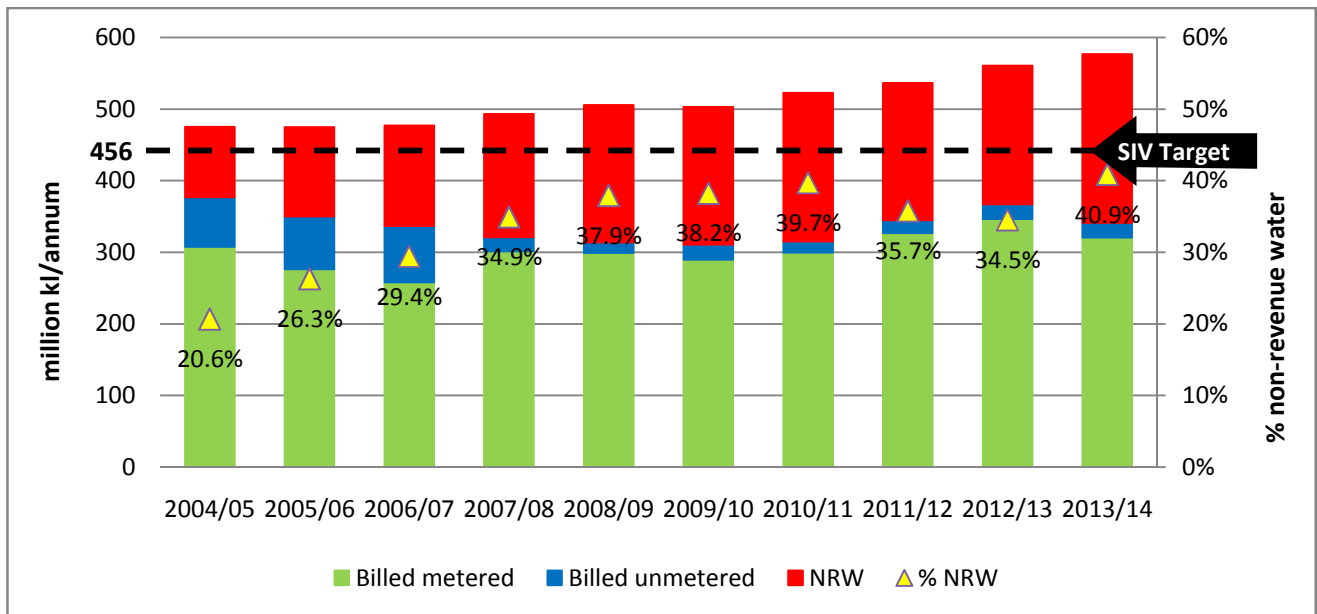


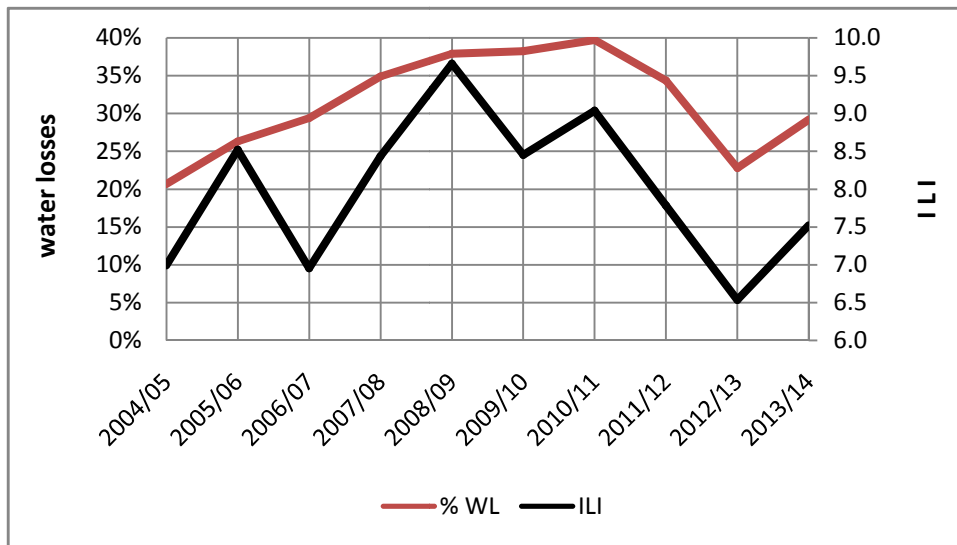
Figure 2: Johannesburg Metro NRW and SIV Trends and 2013/14 SIV Target

Clearly the metro has vastly exceeded its 2013/14 reconciliation strategy SIV target and is unlikely to do so in the near future. <sup>1</sup>The rate of increase in SIV is however slightly less than that of their population.

NRW in the metro fluctuated in recent years, but in 2013/14 increased enormously to almost 41%. **Figure 3** shows that its water losses reduced substantially from 2010/11 to 2012/13, only to increase in 2013/14 to 29.2%. This %WL is very close to the metro average of 29%.

<sup>1</sup> Appendix A figure 46

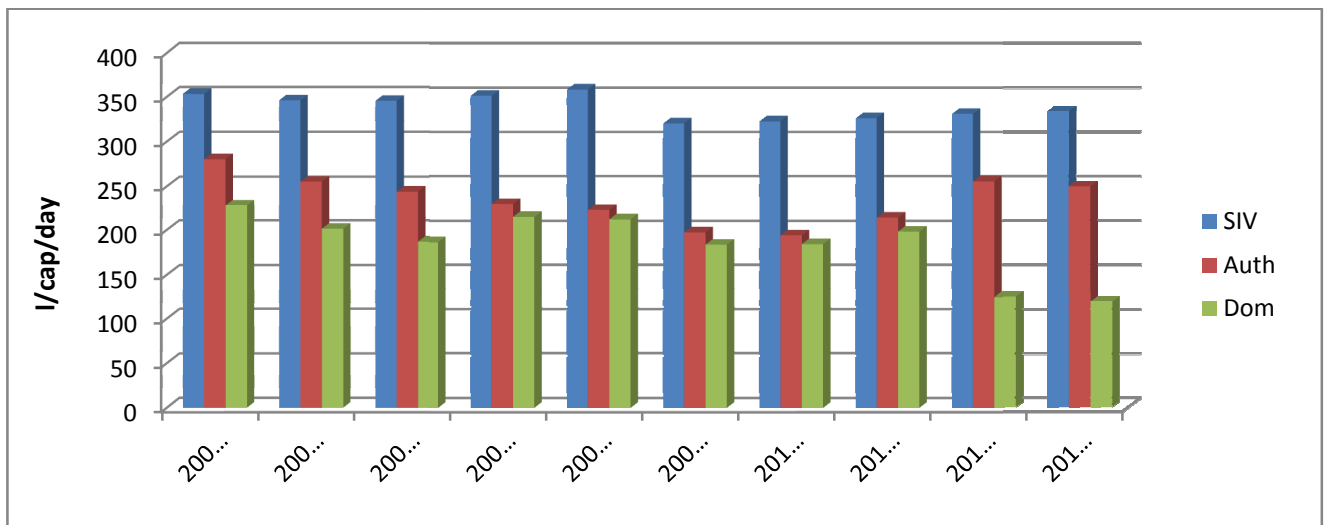
Since 2010/11 total WL, <sup>2</sup>physical losses and the ILI have all decreased, most likely due to WC/WDM initiatives such as pressure management and a pre-paid metering initiative. In 2013/14 however these values increased slightly.



The current ILI of 7.5 is the highest of any metro. The high ILI, but relatively low %WL appear contradictory, however the WL are reduced by the big increase in unbilled authorised consumption.

**Figure 3: Johannesburg Metro ILI and WL Trends**

<sup>3</sup>Authorised consumption has increased in recent years. <sup>4</sup>Unbilled authorised consumption has only recently been included as part of non-revenue water and has shown a huge increase; with this increase there is a concomitant decrease in both commercial and physical losses.



**Figure 4: Johannesburg Metro Per Capita Consumption Trends**

Figure 4 indicates a sudden drop in SIV unit consumption in 2009/10, an increase in unit authorised consumption in 2012/13 and a sharp decrease in unit domestic consumption in 2012/13. The confidence level of the latter is however low.

The recent increase in %NRW is concerning, as is the increase in unbilled authorised consumption. The SIV target was hugely exceeded and is unlikely to be met any time soon under current trends. This is particularly concerning given the unavailability of any additional water before 2022.

<sup>2</sup> Appendix A figures 47, 48

<sup>3</sup> Appendix A figure 47

<sup>4</sup> Appendix A figure 48

3.1.2 Ekurhuleni Metro (2013/14 KPIs: NRW = 37.8%; WL = 33.2%; ILI = 6.3)

System input volume 357	Authorised consumption 239	Billed authorised 222	Billed metered 222	Revenue water 222
		Unbilled author 17	Unbill. unmetered 17	Non-revenue water 135
	Water losses 118	Commercial losses 57		
		Physical losses 61		

Figure 5: Ekurhuleni Metro 2013/14 Water Balance(million kl/a) NTS

Some Ekurhuleni data prior to 2007/8 is suspect, (e.g. NRW). It should be interpreted with caution.

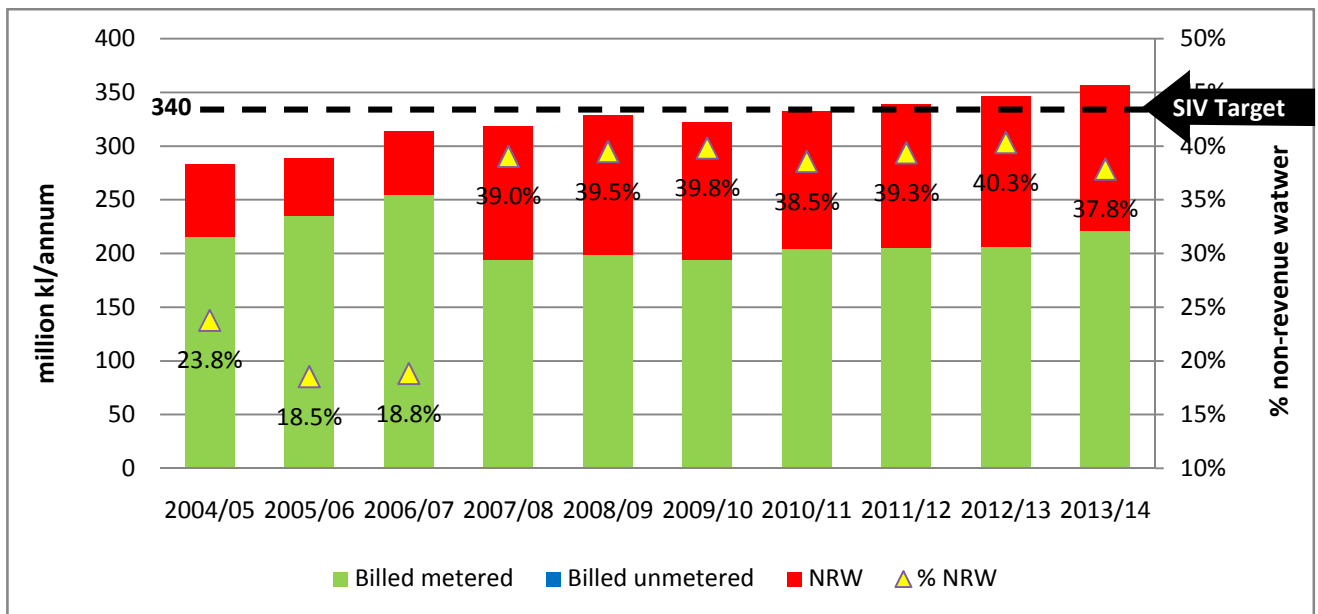


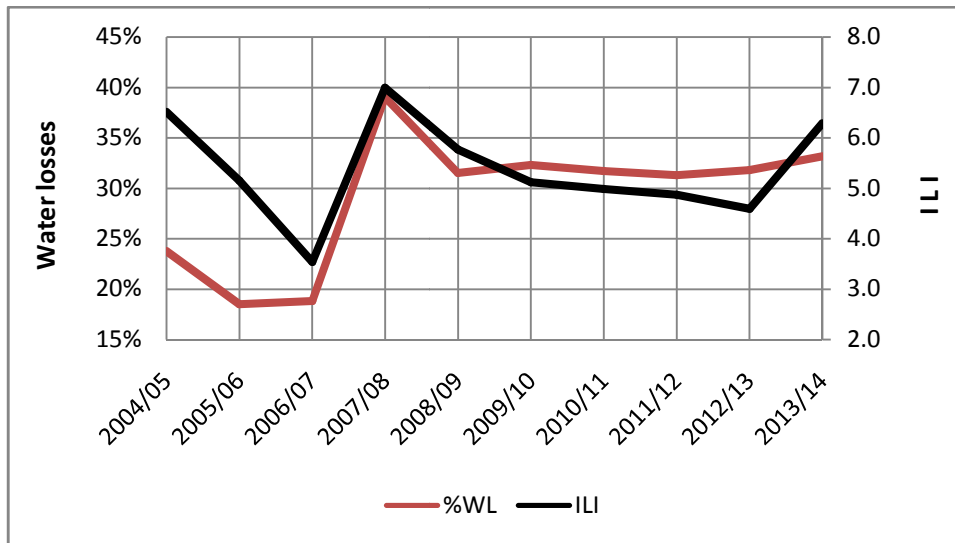
Figure 6: Ekurhuleni Metro NRW and SIV Trends and 2013/14 SIV Target

To date the metro has been unable to reduce its SIV and has not met its 2013/14 reconciliation strategy target. The target is however within range. <sup>5</sup>The SIV has increased slightly faster than the population.

NRW has been relatively constant at about 39%, since 2007/8 with a slight drop in 2013/14 to 37.8%. This is however still above the metro average.

<sup>5</sup> Appendix A figure 49

<sup>6</sup>Water losses have been relatively stable since 2008/9, at about 32%, but unlike NRW, show a slight increase in 2013/14, to 33.2%, well above metro average. Given the uncertainty of data in the

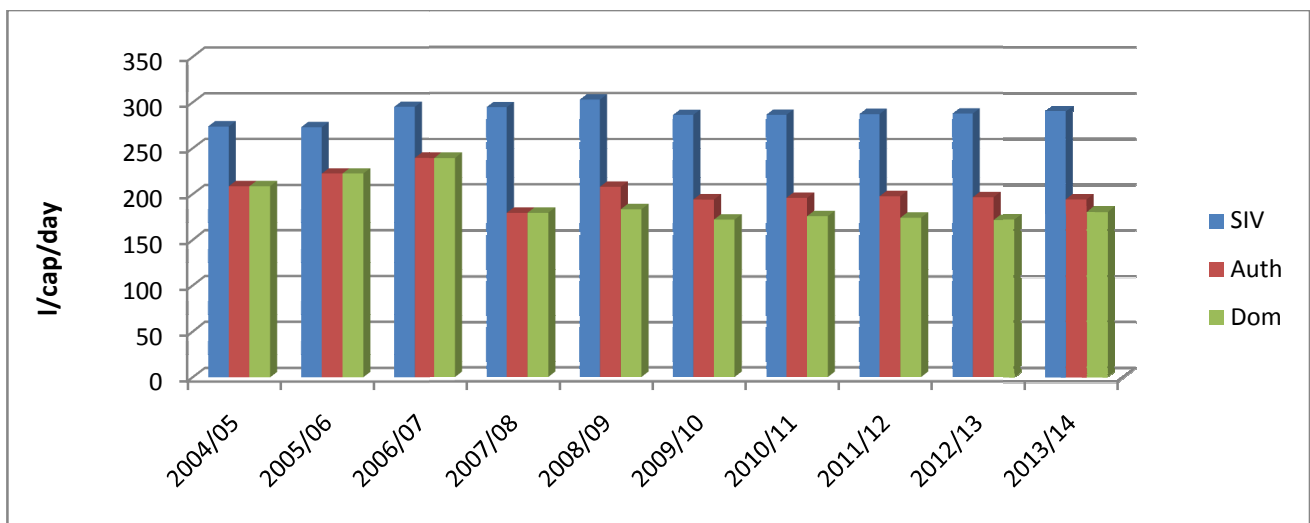


first 3 years, it would appear that the ILI was plateauing at about 5, only to jump in 2013/14 to 6.3. Ekurhuleni Metro has extremely high commercial losses. This needs to be validated as it could artificially lower physical losses.

**Figure 7: Ekurhuleni Metro ILI and WL Trends**

<sup>7</sup>Ekurhuleni’s relatively high unbilled authorised consumption, previously said to be due to the large number of unmetered properties in Tsakane and Kathlehong, showed a substantial drop in 2013/14.

Per capita consumption has been relatively constant since 2007/8 for all 3 categories shown in figure 8.



**Figure 8: Ekurhuleni Metro Per Capita Consumption Trends**

In summary the overall situation in Ekurhuleni has shown little improvement in recent years. Its SIV target is quite achievable, but will require the implementation of WC/WDM. Business as usual will not be good enough.

<sup>6</sup> Appendix A figures 50,51

<sup>7</sup> Appendix A figure 51

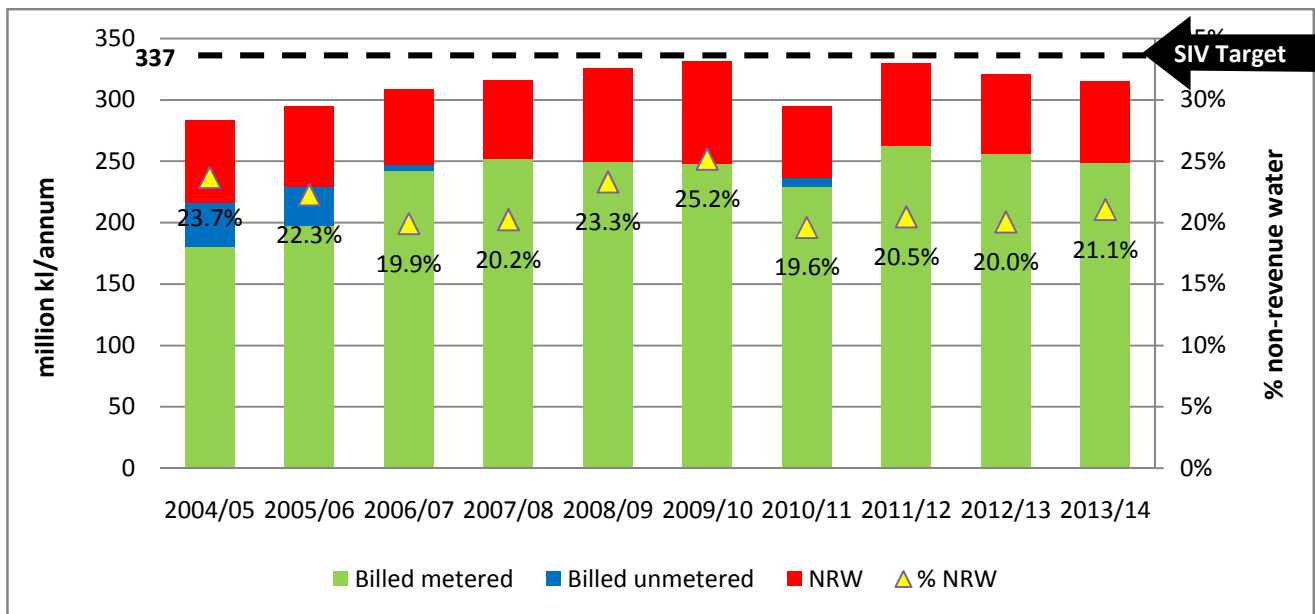


**3.1.3 Cape Town Metro(2013/14 KPIs: NRW = 21.1%; WL =13.9%; ILI = 2.3)**

System input volume 315	Authorised consumption 271	Billed authorised 248		Billed metered 248		Revenue water 248		
		Unbilled author 22		Unbill metered 14		Non-revenue water 66		
	Water losses 44		Commercial losses 7		Unbill unmeter 9			
			Physical losses 36					

**Figure 9: Cape Town Metro 2013/14 Water Balance(million kl/a) NTS**

Cape Town Metro is the best performing metro.

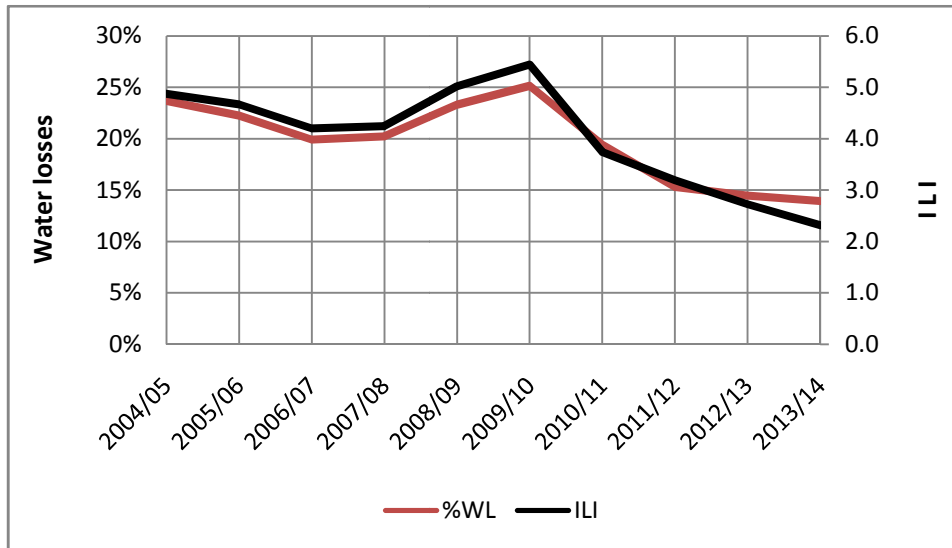


**Figure 10: Cape Town Metro 2013/14 Water Balance and 2013/14 SIV Target**

It comes as no surprise that Cape Town Metro has comfortably exceeded its reconciliation strategy 2013/14 target. Their current SIV is in fact less than that of 1999! The SIV shows a gradual decrease since 2009/10, (ignoring the unexplained anomaly in 2010/11).<sup>8</sup> The SIV has increased substantially less than population, due mainly to reduced consumption in the last four years.

<sup>8</sup> Appendix A figure 52

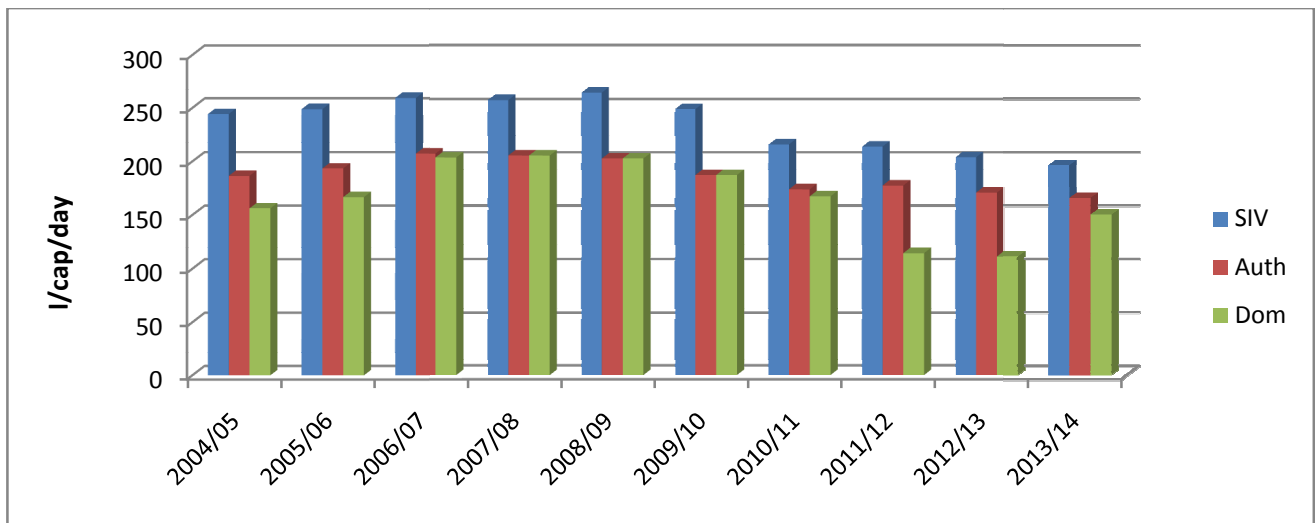
NRW is relatively constant at a low 20%, whilst WL have declined from 24% to an extremely low 13.9%.<sup>9</sup> Both total and physical losses and ILI show a consistent reduction. At these low levels, it will become increasingly difficult to further reduce them.



**Figure 11: Cape Town Metro ILI and WL Trends**

<sup>10</sup>It is encouraging to see that as a % of SIV, authorised consumption has increased in the long term.<sup>11</sup>Unbilled authorised consumption has only been recorded since 2011/12 and has increased slightly since then. <sup>12</sup>Commercial losses consistently decreased to 11% in 2012/13, only to increase in 2013/14 to 17%.

The metro has very low unit consumption figures for all three categories shown in **figure 12**. These have reduced consistently since 2008/9, although domestic consumption increased inexplicably in 2013/14. Continued reduction may however prove difficult, given the already low figures.



**Figure 12: Cape Town Metro Per Capita Consumption Trends**

In summary Cape Town Metro sets a good example of what can be achieved, but further improvement will become ever more difficult and expensive.

<sup>9</sup> Appendix A figure 54

<sup>10</sup> Appendix A figure 53

<sup>11</sup> Appendix A figure 54

<sup>12</sup> Appendix A figure 54

3.1.4 EtheKwini Metro(2013/14 KPIs: NRW = 39.4%; WL = 38.2%; ILI =6.8)

System input volume 333	Authorised consumption 206	Billed authorised 202	Billed metered 202	Revenue water 202
		Unbilled author 4	Unbill. unmetered 4	Non-revenue water 131
	Water losses 127	Commercial losses 31		
		Real losses 97		

Figure 13: EtheKwini Metro 2013/14 Water Balance(million kl/a) NTS

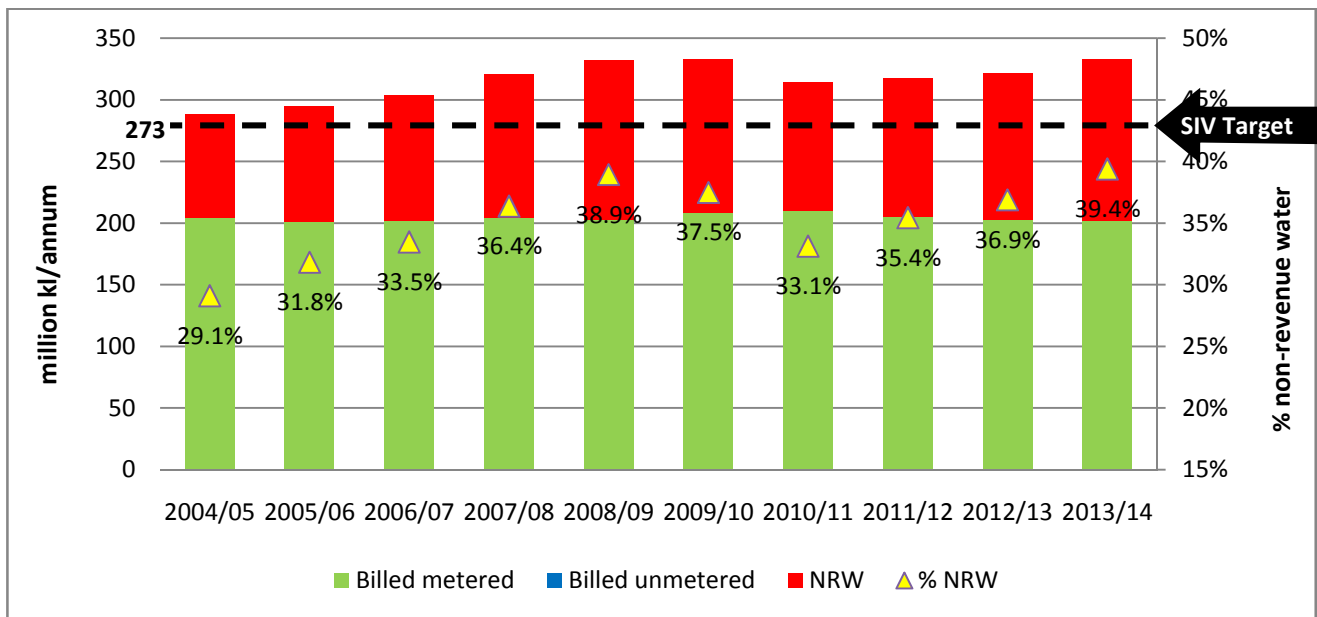


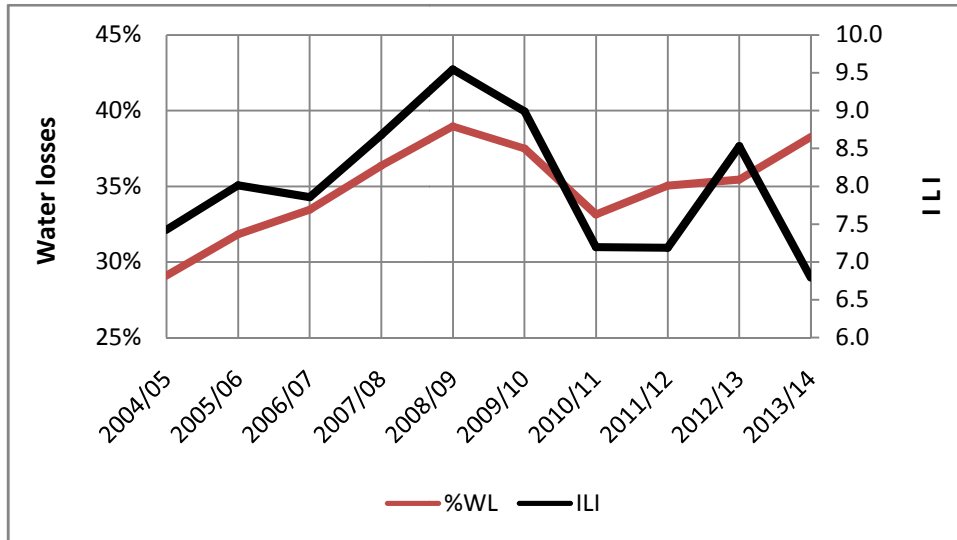
Figure 14: EtheKwini Metro 2013/14 Water Balance and 2013/14 SIV Target

EtheKwini Metro has not come close to meeting their reconciliation strategy 2012/14 target and appears unlikely to do so in the near future. Apart from a once-off improvement in 2010/11, the Metro’s recent performance has consistently deteriorated in terms of NRW and SIV. <sup>13</sup>It is of concern that the increase in SIV since 2004/5 far exceeds the population growth. Data indicates that this is probably due to decreased efficiencies.

<sup>13</sup> Appendix A figure 55

Recent NRW and WL increases are despite large WC/WDM efforts in recent years. <sup>14</sup>The NRW and WL percentages are very similar, because of a very small, unbilled, consumption component, which has been reported since 2011/12, indicative of improved reporting. Billed consumption has been remarkably constant.

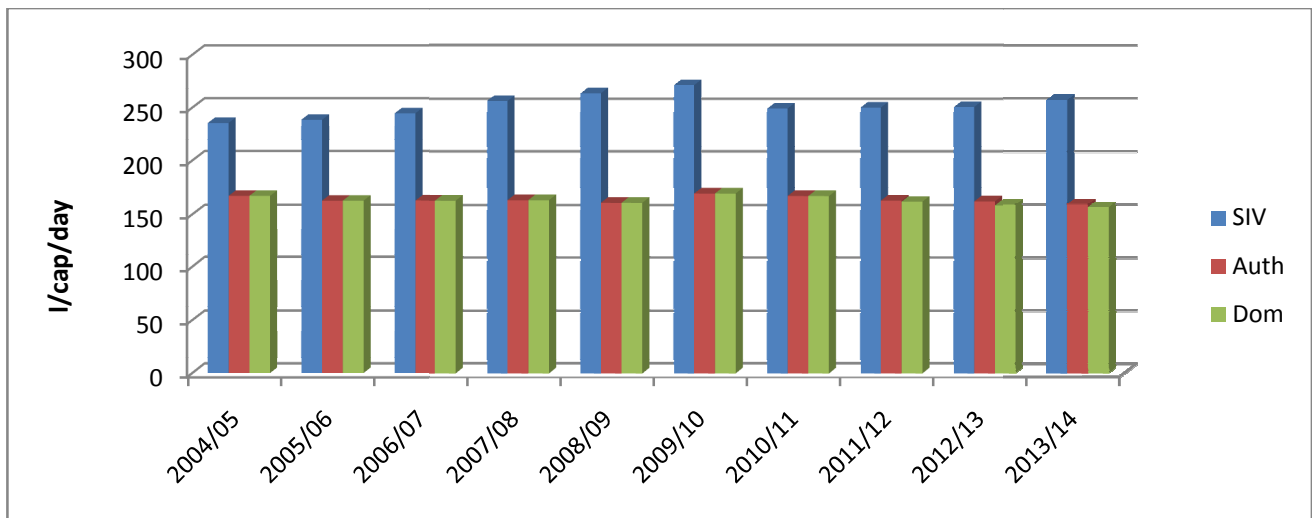
<sup>15</sup>Total and physical losses decreased from 2008/9 to 2010/11, whereafter they have increased.



Apart from an anomaly in 2012/13, the ILI has gradually declined to its 2013/14 value of 6.8, which is still above the average of 5.5. Why the % WL is increasing while the ILI is decreasing is perplexing and needs investigation.

**Figure 15: Ethekwini Metro ILI and WL Trend**

Although per capita SIV consumption decreased in 2010/11, it has since remained constant. Authorised and domestic consumption have remained fairly constant over the entire period.



**Figure 16: Ethekwini Metro Per Capita Consumption Trends**

In summary, eThekwini’s failure to meet its SIV target by a large margin and its increasing WL, despite huge expenditure on WC/WDM, are concerning. Why the ILI is reducing when the %WL is increasing needs investigation.

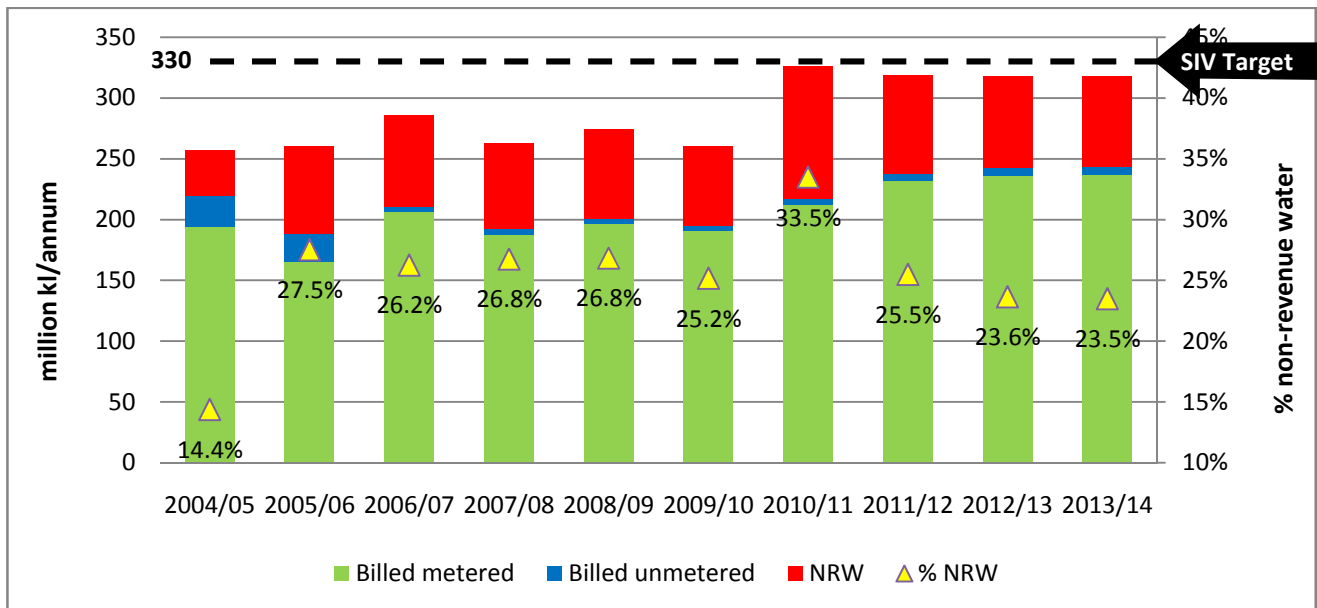
<sup>14</sup> Appendix A figure 57

<sup>15</sup> Appendix A figures 56, 57

**3.1.5 Tshwane Metro(2013/14 KPIs: NRW = 23.5%; WL = 22.4%; ILI = 4.4)**

System input volume 318	Authorised consumption 247	Billed authorised 243	Billed metered 237	Revenue water 243	
			Billed		
	Water losses 71	Unbilled author 3	Commercial losses 14	Unbill. unmetered 3	Non-revenue water 75
				Real losses 57	

**Figure 17: Tshwane Metro 2013/14 Water Balance(million kl/a) NTS**



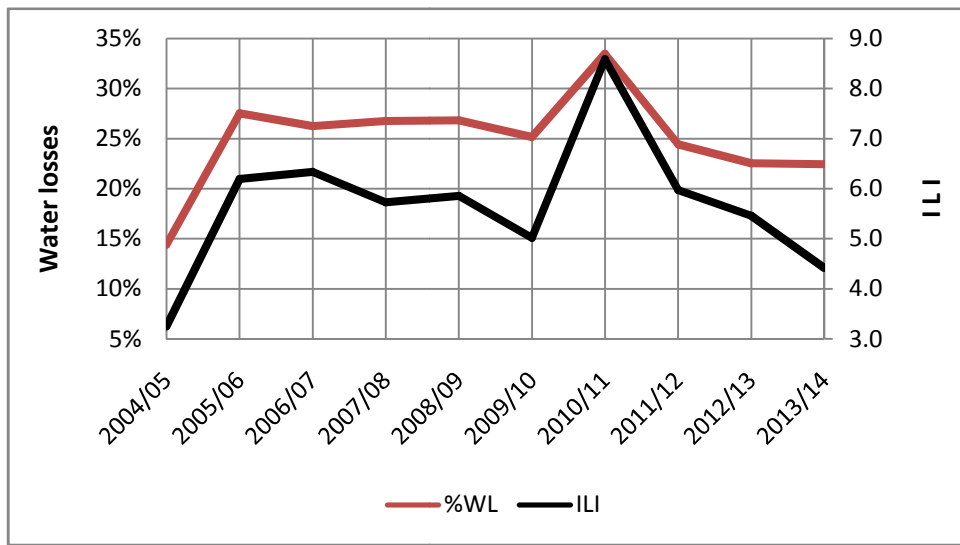
**Figure 18: Tshwane Metro 2013/14 Water Balance and 2013/14 SIV Target**

Tshwane Metro was one of only two metros to achieve their SIV target, this despite the fact that their SIV increased in 2011 because of the incorporation of Kungwini and Nokeng Tsa Taemane Municipalities into the metro. Since then there has been a small decrease in SIV.<sup>16</sup>SIV has increased over the long term less than the population. The SIV has been constant for the last 3 years, indicating reduced per capita consumption.

Both NRW and WL spiked in 2010/11, most likely due to the incorporation of the above areas. Fortunately, the metro has managed to reduce these values to below pre 2009/10 values. The

<sup>16</sup> Appendix A figure 58

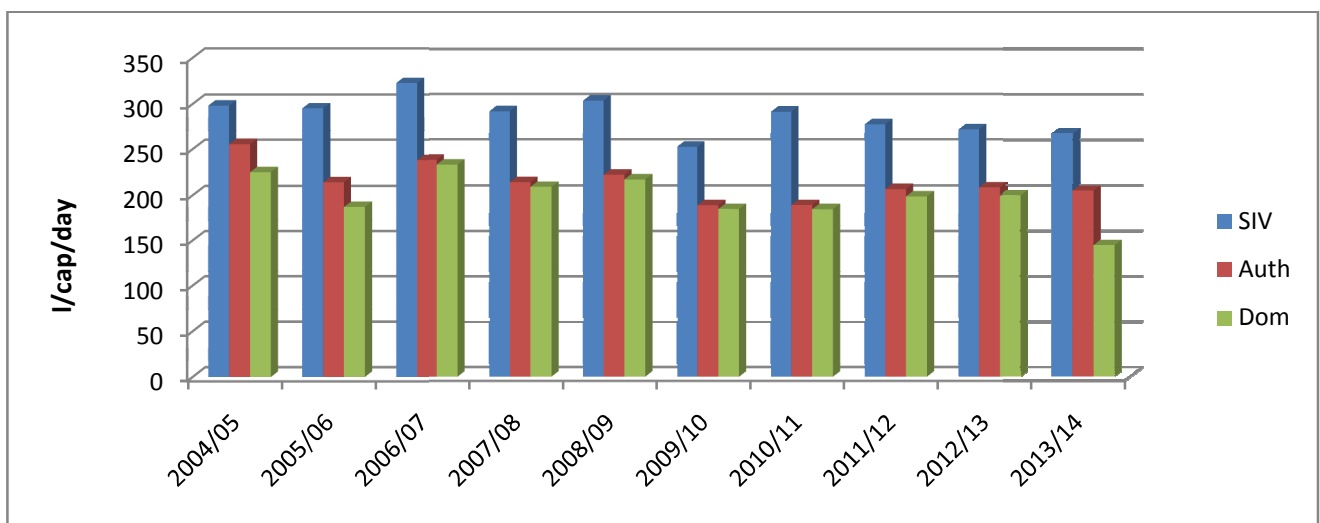
2013/14 NRW and WL values of 23.5% and 22.4% respectively are second only to those of Cape Town and well below the metro average. However reported recent drastic O&M and WC/WDM budget cuts could negate this good work and need to be closely monitored.



The impact of the incorporation of the two municipalities into Tshwane, on physical losses and the ILI is also apparent. Despite these setbacks, the metro has improved efficiency and their 2013/14 ILI of 4.4 is well below average.

**Figure 19: Tshwane Metro ILI and WL Trends**

<sup>17</sup>Unbilled authorised consumption, reported since 2011/12, is relatively low. <sup>18</sup>Over the last 3 years authorised consumption has been relatively unchanged.



**Figure 20: Tshwane Metro Per Capita Consumption Trends**

Figure 20 indicates that per capita consumption has gradually declined since 2010/11, with the exception of domestic consumption. The latter shows a sudden drop in 2013/14, which needs explanation.

In conclusion the negative impact of adding problematic municipalities to a metro can be clearly seen in the Tshwane scenario and the metro has done well to bring this under control, to meet their SIV target and to have relatively low NRW and WL. Reported recent O&M and WC/WDM budget cuts could negate this good work and needs monitoring.

<sup>17</sup> Appendix A figure 60

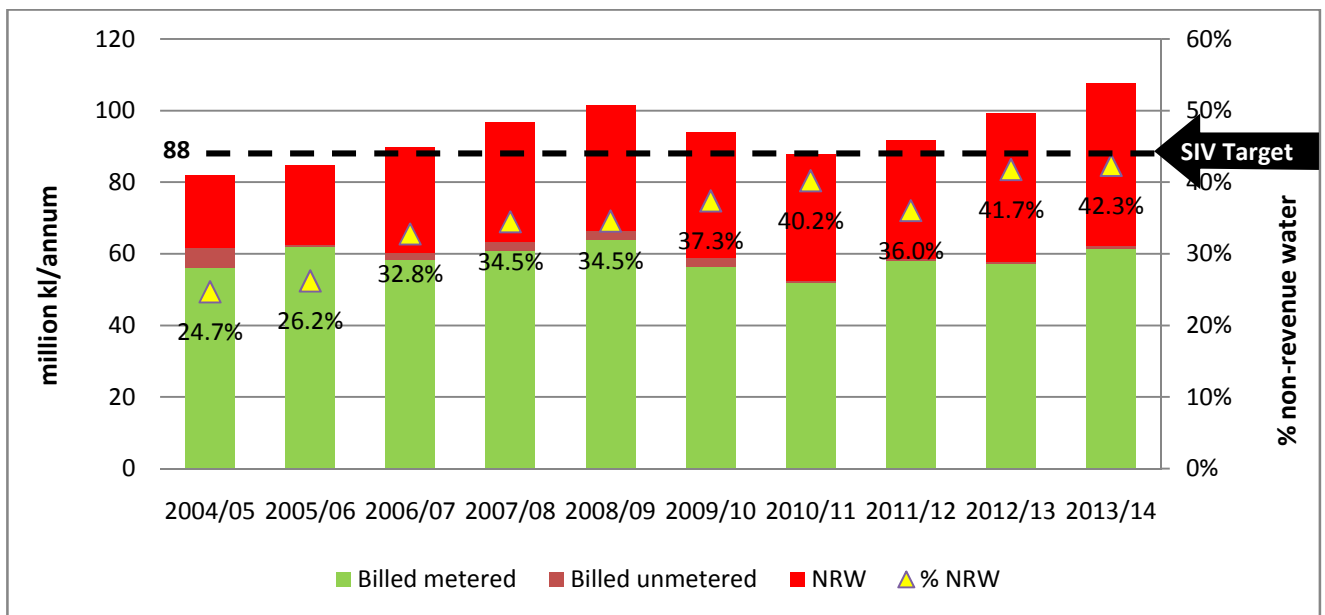
<sup>18</sup> Appendix A figure 59

**3.1.6 Nelson Mandela Bay Metro (2013/14 KPIs:NRW= 42.3%;WL= 40.3%;ILI= 6.2)**

System input volume 108	Authorised consumption 64	Billed authorised 62	Billed metered 61	Revenue water 62
			Billed	
	Water losses 44	Unbilled author 2	Unbill. unmetered 2	Non-revenue water 46
		Commercial losses	4	
Real losses	39			

**Figure 21: Nelson Mandela Bay Metro 2013/14 Water Balance(million kl/a) NTS**

The lifting of restrictions after the drought-forced consumption reduction of 2009/10 to 2010/11 has resulted in a worryingly sharp increase in SIV.

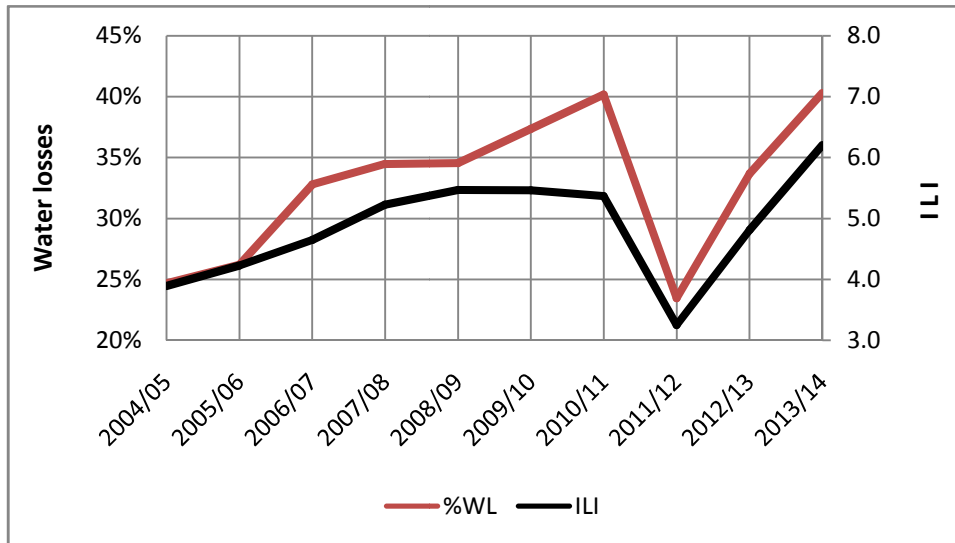


**Figure 22: Nelson Mandela Bay Metro 2013/14 Water Balance and 2013/14 SIV Target**

<sup>19</sup>Despite the drop in 2010/11, the SIV in the long term has increased much faster than population growth. This is cause for huge concern, particularly as the metro have fallen short of their 2013/14 reconciliation strategy target, and appear unlikely to meet it any time soon.

<sup>19</sup> Appendix A figure 61

NRW has increased almost relentlessly from 2004/5 to date, apart from a 2011/12 drop. The 2013/14 value of 42.3% is the highest of any metro. Similarly, WL, apart from a once-of, drop in 2011/12, have increased to 40.3%, the highest metro value.

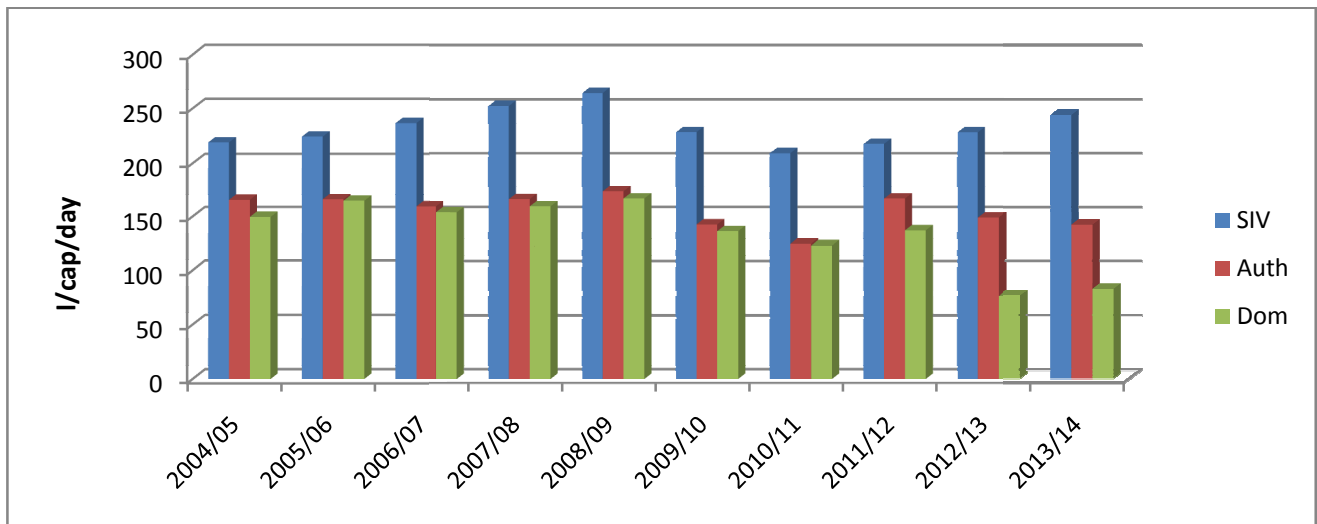


Apart from an unexplained drop in 2011/12, the ILI and %WL have increased over the 10 year period. The 2013/14 ILI of 6.2 is well above the metro average.<sup>20</sup> Physical losses too are rising.

**Figure 23: Nelson Mandela Bay Metro ILI and WL Trends**

<sup>21</sup>Unbilled authorised consumption monitoring commenced in 2011/12, with extremely high values. In 2013/14 there was however a sudden reduction to what would appear to be more realistic values. This calls the reliability of the earlier data into question. <sup>22</sup>Authorised consumption has been relatively constant over the 10 year period, i.e. it has dropped as a % of SIV, which is concerning.

**Figure 24** indicates that since the 2009/10/11 SIV per capita consumption drop, there has been a substantial increase. This is however not the case for authorised unit consumption, which rose in 2011/12 and has since dropped. The sudden drop in domestic consumption in 2012/13, together with its unrealistically low 2013/14 value of 83 l/c/d, need clarification.



**Figure 24: Nelson Mandela Bay Metro Per Capita Consumption Trends**

This metro's performance is deteriorating and is cause for concern.

<sup>20</sup> Appendix A figure 63

<sup>21</sup> Appendix A figure 63

<sup>22</sup> Appendix A figure 62



3.1.7 Manguang Metro(2013/14 KPIs: NRW = 31.4%; WL = 28.1%; ILI = 5.2)

System input volume 87	Authorised consumption 62	Billed authorised 59	Billed metered 59	Revenue water 59
		Unbilled author 3	Unbilled metered 3	Non-revenue water 27
	Water losses 25	Commercial losses 5		
		Real losses 20		

Figure 25: Manguang Metro 2013/14 Water Balance(million kl/a) NTS

Manguang Metro has data that appears suspect, as it does not fit in with overall trends. 2010/11 and the first two years are relevant in this regard.

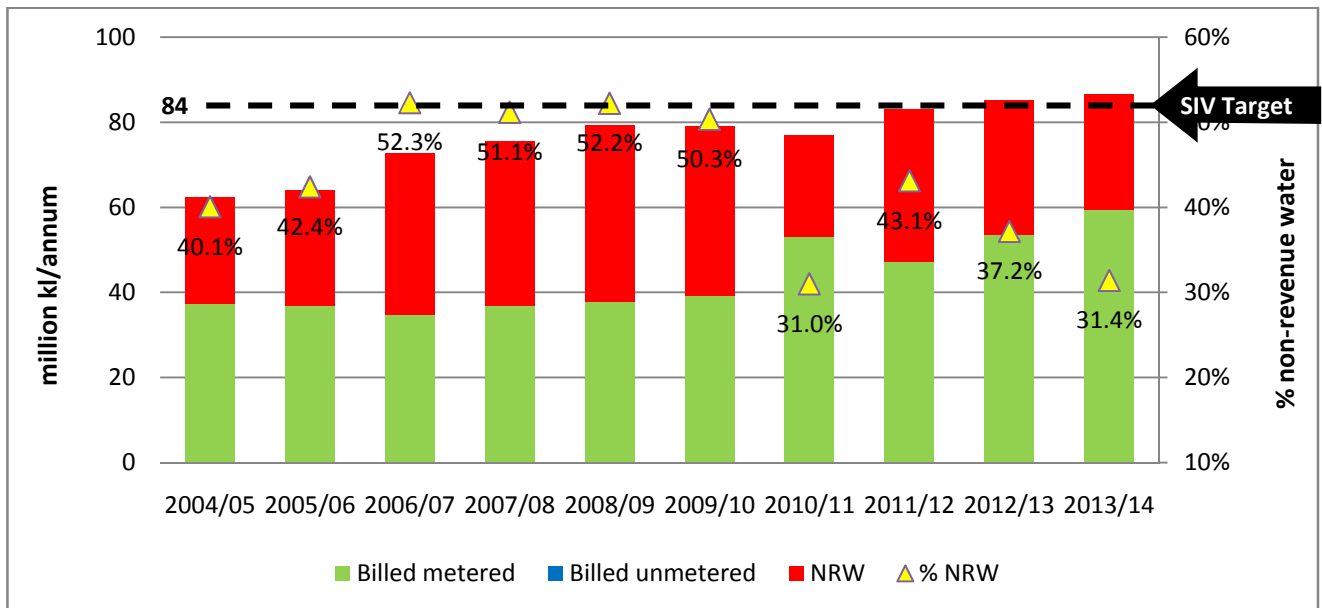
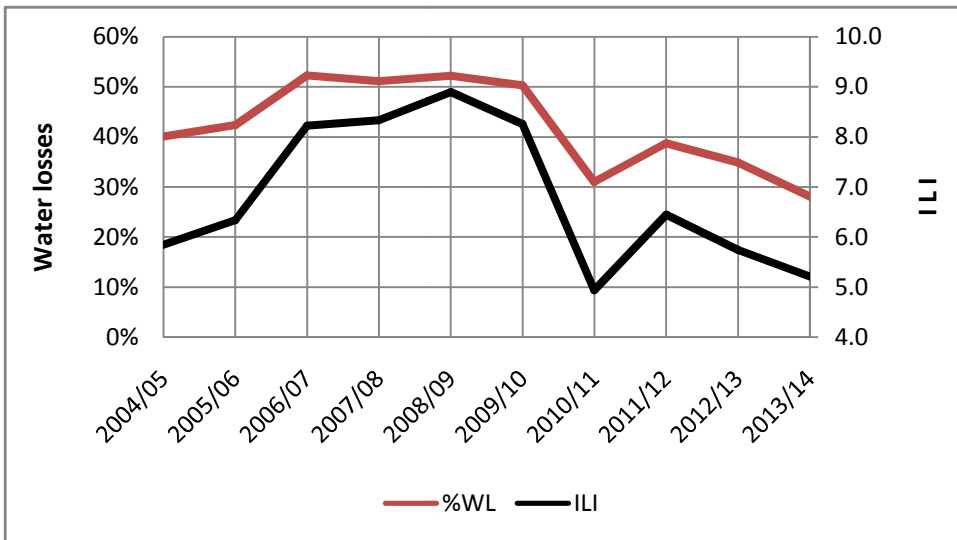


Figure 26: Manguang Metro 2013/14 Water Balance and 2013/14 SIV Target

<sup>23</sup>Although the metro’s SIV has increased substantially faster than its population, (due largely to increased per capita consumption, as will be discussed below), they narrowly missed achieving their SIV target, but this is well within range. Ignoring the outliers, both NRW and WL have decreased from very high values in the period 2006/7 to 2009/10, to the much lower 2013/14 values of 31.4% and 28.1% respectively. This indicates a substantial improvement in performance.

<sup>23</sup> Appendix A figure 64

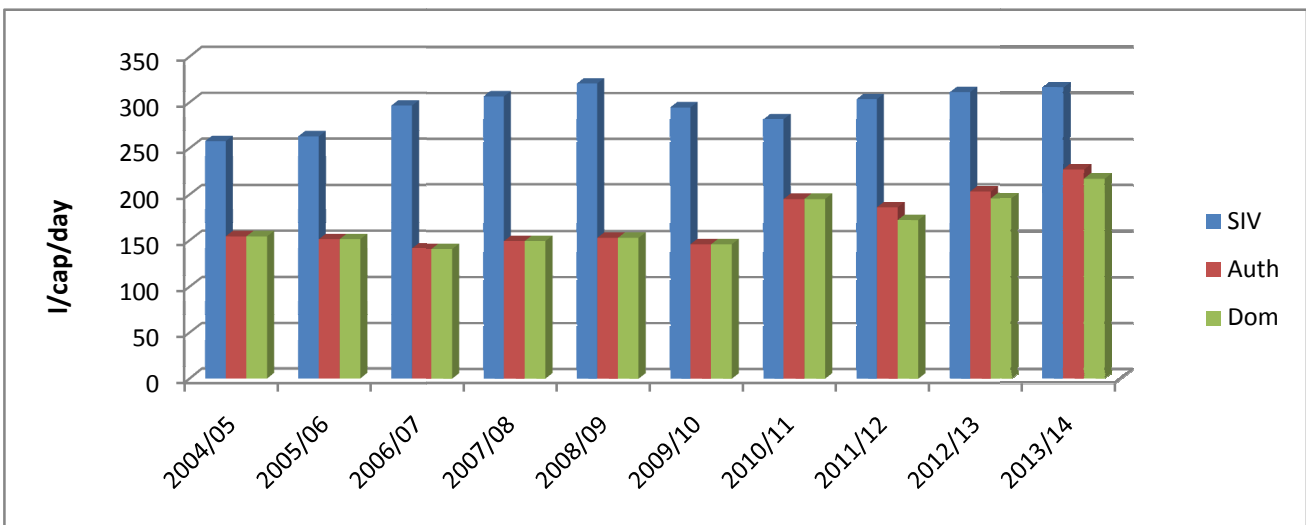


<sup>24</sup>Despite the increase in SIV, physical losses have decreased, indicating a disturbing increase in per capita consumption. The metro's ILI dropped from 8.9 in 2008/9 to 5.2 in 2013/14, a huge improvement.

**Figure 27: Mangaung Metro ILI and WL Trends**

<sup>25</sup>A big increase in authorised and billed consumptions since 2010/11 is encouraging.

This metro has some of the highest per capita consumption figures. This is particularly so for authorised and domestic unit consumption. When one considers that this metro does not have as much industrial consumption as some of the other larger metros, it is particularly unacceptable. **Figure 28** also shows a worrying upward trend in all three categories in recent years. Indications are that consumer targeted initiatives are needed to reduce per capita consumption. Looking at their tariff structure it becomes apparent that Mangaung's tariff blocks 2 to 5 are very flat and their water is cheap, compared to the other metros; thus not conducive to water conservation.



**Figure 28: Mangaung Metro Per Capita Consumption Trends**

It would appear that despite good efforts by the metro, the public is failing to conserve water. A steeper rising block tariff and community education are suggested.

<sup>24</sup> Appendix A figure 66

<sup>25</sup> Appendix A figure 65

3.1.8 Buffalo City Metro(2013/14 KPIs: NRW = 39.5%; WL = 38.0%; ILI = 4.1)

System input volume 65	Authorised consumption 40	Billed authorised 40	Billed metered 28	Revenue water 39
			Billed unmetered 12	
	Water losses 25	Unbilled author 1	Unbilled metered 1	Non-revenue water 26
		Commercial losses	5	
Real losses	20			

Figure 29: BuffaloCity Metro 2013/14 Water Balance(million kl/a) NTS

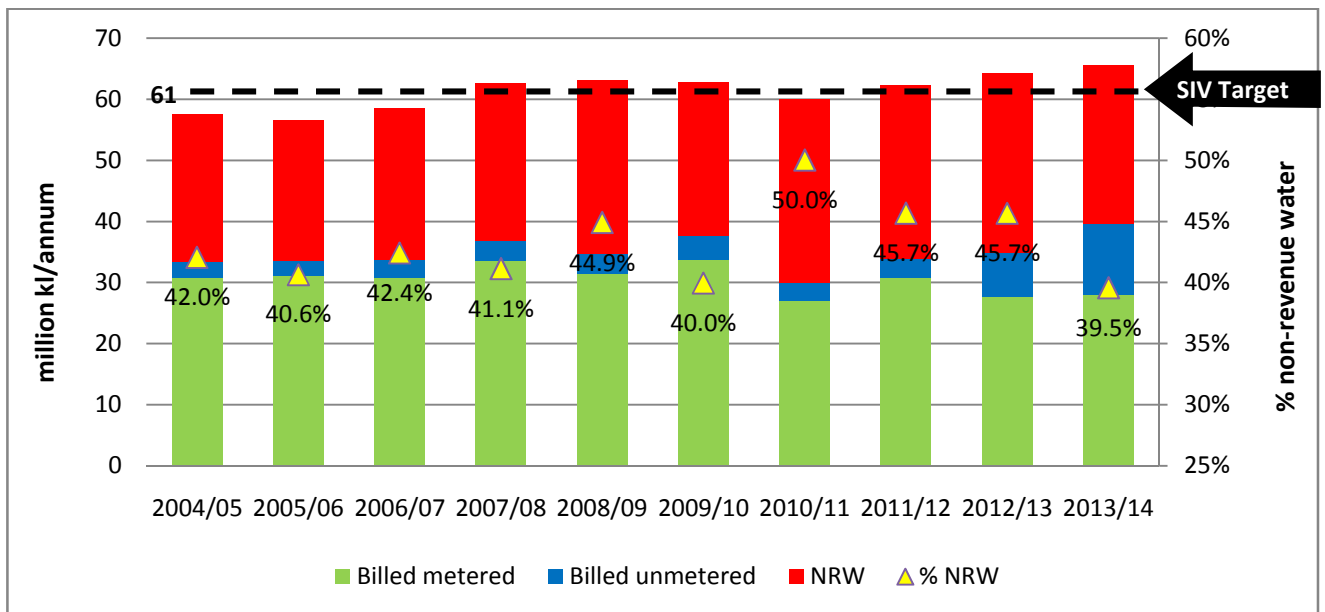
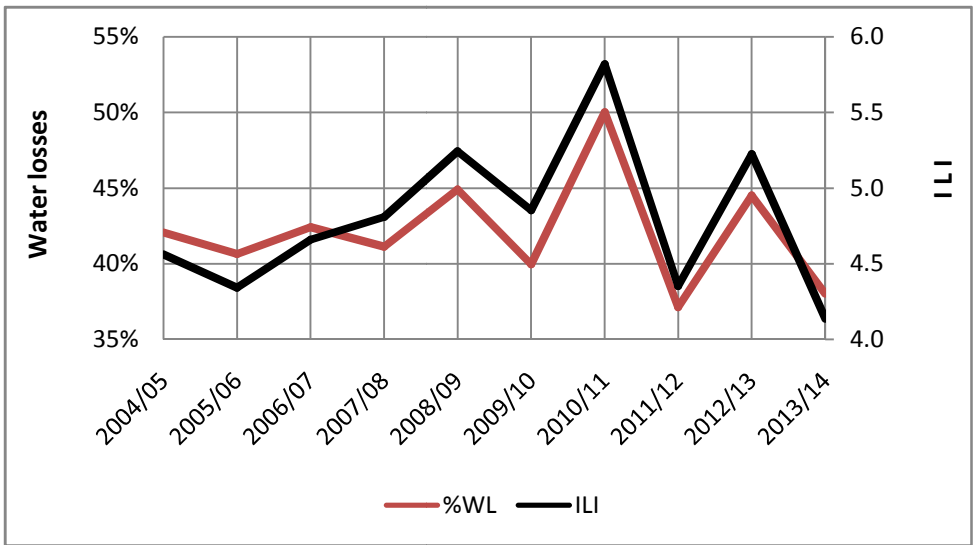


Figure 30: Buffalo City Metro NRW and SIV Trends and 2013/14 SIV Target

Buffalo City did not meet their SIV target, (which was only set in 2012).<sup>26</sup> Their SIV has shown a steady increase since 2010/11 and overall has increased at a faster rate than the population. The target should be achievable if the metro implements WC/WDM.

Historically Buffalo City has had very high NRW, so **figure 30**'s substantial drop to 39.5% in 2013/14 is to be welcomed, although still well above the metro average.

<sup>26</sup> Appendix A figure 67

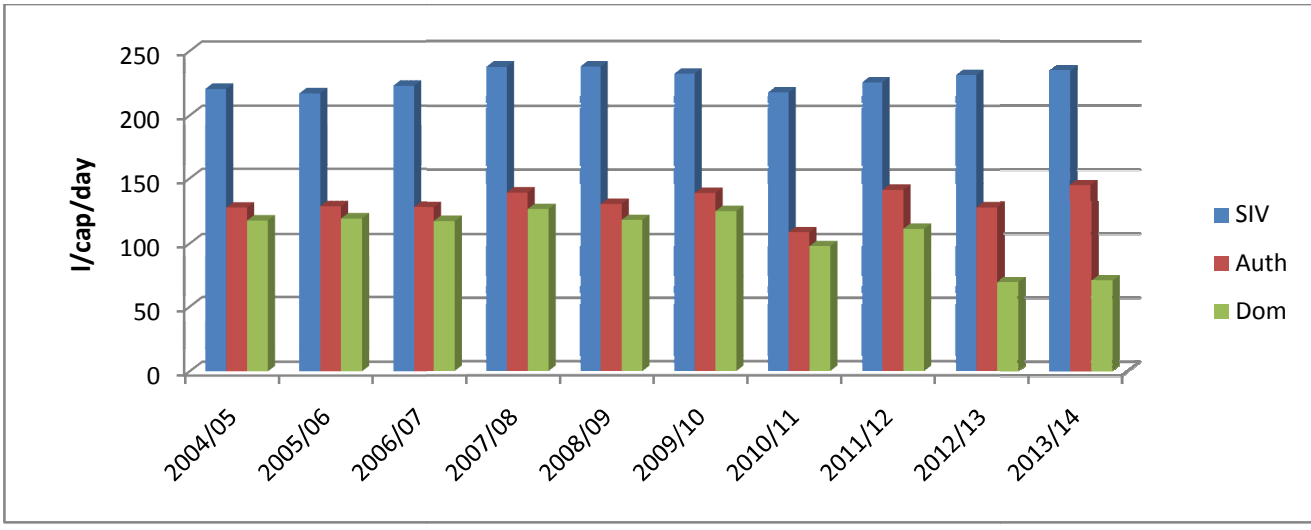


WL and ILI peaked in 2010/11, then there was an unexplained drop, that followed a hunting pattern, and calls into question data accuracy. The 2013/14 WL of 38% is still a high value, but surprisingly the ILI of 4.1 is not.

**Figure 31: Buffalo City Metro ILI and WL Trends**

<sup>27</sup>The improvement in ILI is reflected by the fact that physical losses have remained relatively constant, despite the overall increase in SIV.

The recent big increase in billed unmetered consumption needs clarification, especially as it appears to be partially at the expense of billed metered consumption. Nevertheless the overall recent improvement in billed consumption is welcomed. <sup>28</sup>Buffalo City started monitoring unbilled authorised consumption in 2011/12, but this showed a huge decrease the following two years, to the lowest values of any metro. <sup>29</sup>Authorised consumption has grown with the SIV.



**Figure 32: Buffalo City Metro Per Capita Consumption Trends**

**Figure 32** indicates a drop in all unit consumptions in 2010/11, followed by an increase in SIV and authorised unit consumptions and a big drop in unit domestic consumption to an unrealistic 70 l/c/d.

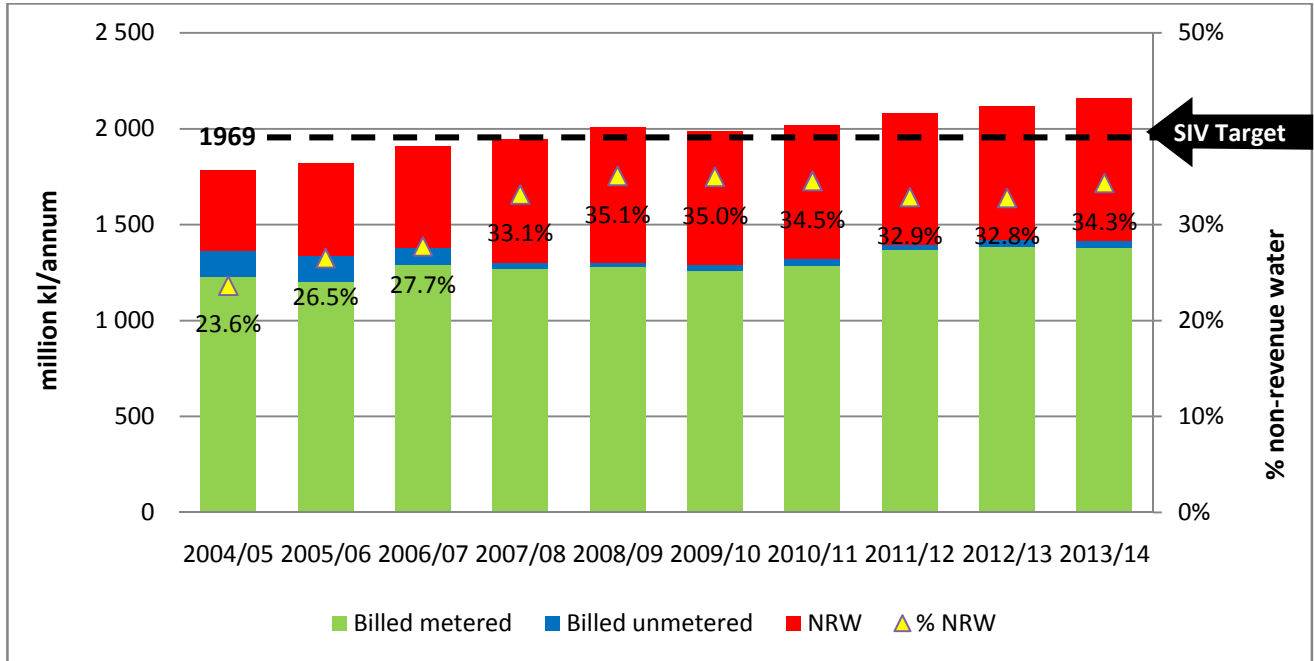
In conclusion, Buffalo City Metro has not met its SIV target and has high NRW and WL, yet a low ILI. It is characterised by a lack of clear recent trends, which makes a situational analysis difficult.

<sup>27</sup> Appendix A figure 69  
<sup>28</sup> Appendix A figure 69  
<sup>29</sup> Appendix A figure 68

### 3.2 Combined metro results and trends

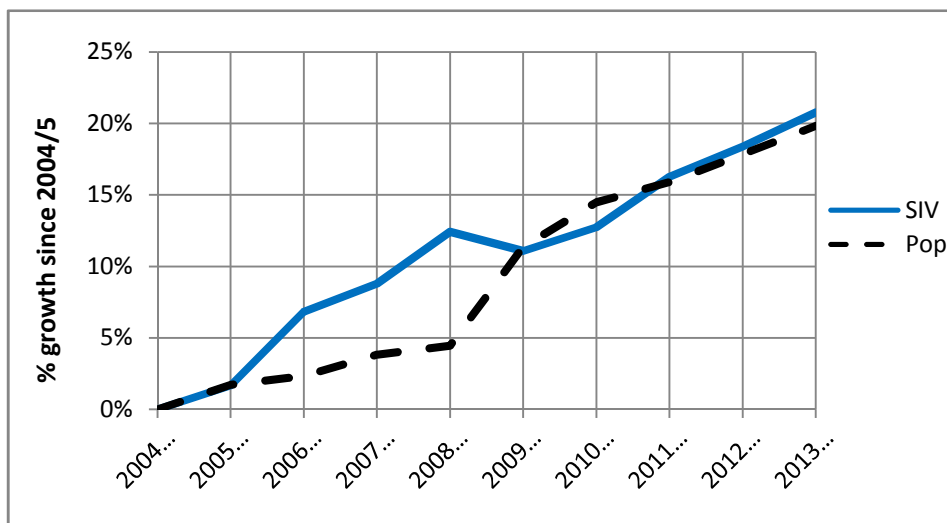
Trends for various key performance indicators for the eight metros combined, over the ten year period from 2004/5 to 2013/14, are summarised in the following sections and figures.

Although the metros have in recent years managed to reduce their % NRW, in 2013/14 it showed an increase. The NRW values in the first 3 years of analysis appear unrealistic and should be interpreted with caution. In recent years the metro NRW has been relatively stable at about 33%.



**Figure 33: Combined Metro NRW and SIV Trends and SIV Target**

The metros' SIV shows a long term increase. The reconciliation strategy 2013/14 SIV target of 1969 million kl/a was not met, being exceeded by about 10%. It appears unlikely that they will achieve this target in the short term, unless urgent action is taken. **Figure 34** shows clearly that in the longer

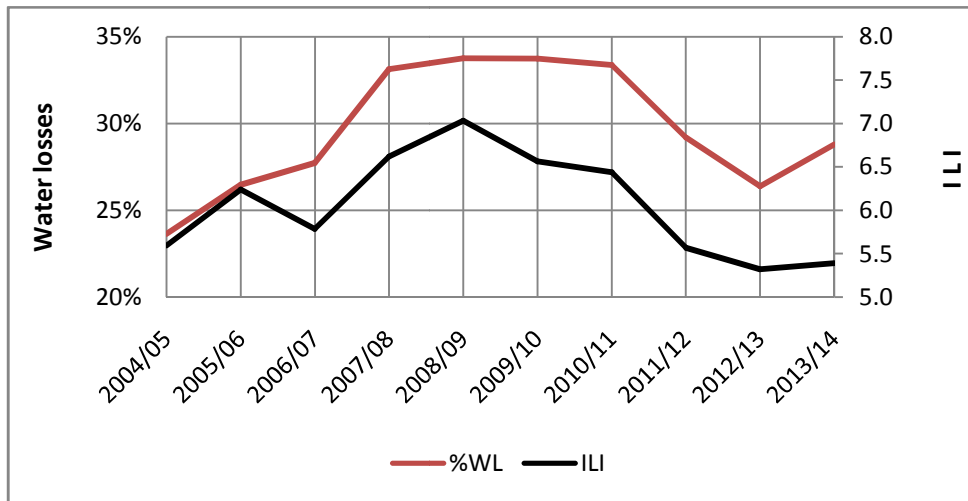


term the SIV has increased at the same rate as the population. This would seem to indicate that efficiency is not improving and that by implication WC/WDM is not being effectively implemented, if at all.

**Figure 34: Combined Metro SIV and Population Growth Rates**

Although the reconciliation strategy does not set a NRW target, based on the SIV target, the concomitant NRW volume should have been in the order of 538 million kl/a, a target that was far exceeded, (actual 741 mill kl/a). Billed consumption has shown little increase in the last three years.

<sup>30</sup> Authorised consumption as a % of SIV dropped steeply to 2007/8, remained constant until 2010/11 and then rose to its 2013/14 value of 71% and may be stabilising at this value. <sup>31</sup> Unbilled authorised consumption has increased substantially, especially in the last 3 years. Although in recent years the



ILI and %WL have decreased, in the longer term there appears to be little improvement.

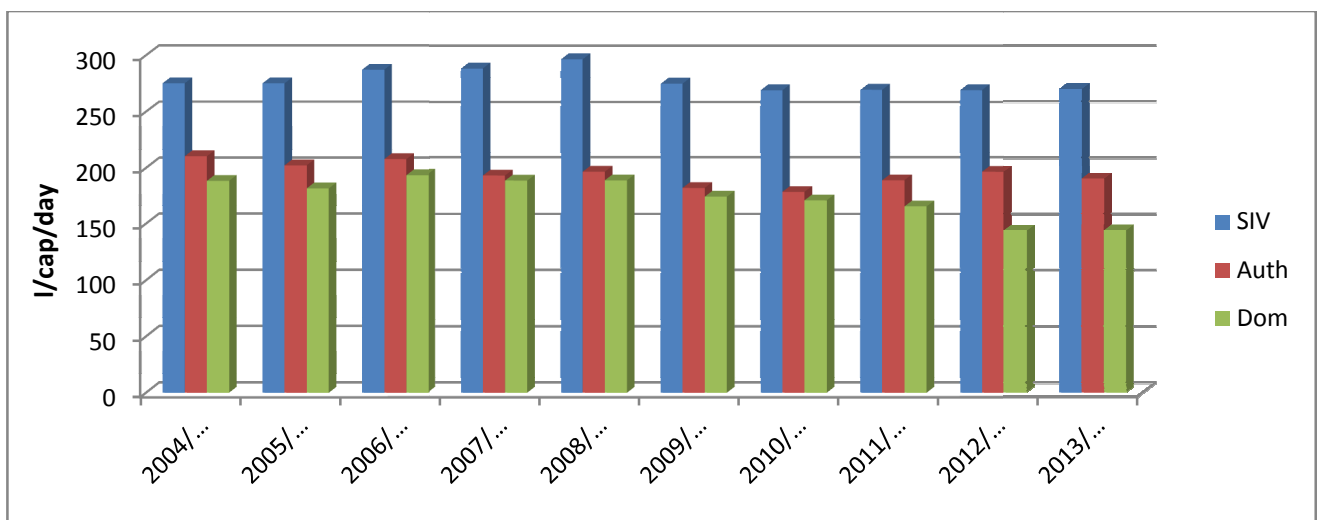
**Figure 35: Combined Metro ILI and WL Trends**

<sup>32</sup> CARL in terms of kl per km mains per day has varied between 15 and 21 over the 10

year period and appears to be increasing. In terms of l/c/d it peaked in 2008/9, dropped until 2011/12 and has been constant since at 342 l/c/d.

<sup>33</sup> The commercial loss component trend was stable from 2006/7 to 2011/12, whereafter it made a radical shift. It may be speculated that this is an indication that metros are moving away from using generalised guideline figures to more accurate values.

Based on the SIV target, an SIV per capita consumption target of 256 l/c/d was determined. From **figure 36** it can be seen that this was not met, with a 2013/14 value of 270 l/c/d. Since a drop in 2008/9, the SIV unit consumption has remained relatively constant. The authorised unit consumption on the other hand decreased until 2010/11, whereafter it increased. Domestic unit consumption shows a big drop in recent years, but as not all metros are able to differentiate accurately between domestic and non-domestic use, these values appear low, requiring verification.



**Figure 36: Combined Metro Per Capita Consumption Trends**

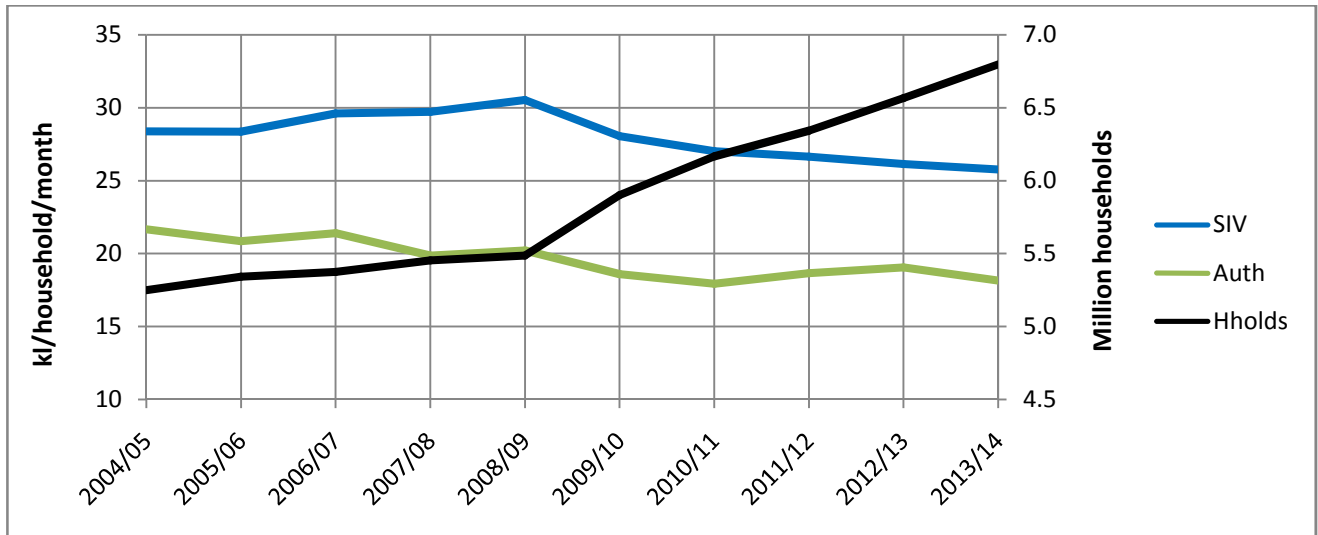
<sup>30</sup> Appendix A figures 71

<sup>31</sup> Appendix A figures 72

<sup>32</sup> Appendix A figure 73

<sup>33</sup> Appendix A figure 74

Demographic data indicates that the household growth rate exceeds that of the population. This places an additional burden on metros that is not always appreciated. **Figure 37** below shows that in terms of households served, the SIV and authorised household consumptions have actually shown a downward trend. Thus although the metros' SIV has grown in line with their population increase, their SIV has grown slower than their rate of household growth. This implies that the metros' performance is in fact slightly better than initially suggested.



**Figure 37: Combined Metro Households Versus Household Consumption Trends**

<sup>34</sup>Analysing the unit consumption in terms of connections shows a similar result with unit consumption per connection also decreasing for both SIV and authorised consumption. This would seem to imply that the number of connections is also increasing faster than population.<sup>35</sup>Whilst this is indeed so, it is not however increasing as fast as the number of households, an indication of metro densification. In 2013/14 there were on average 1.9 households per connection.

<sup>34</sup> Appendix A figure 75

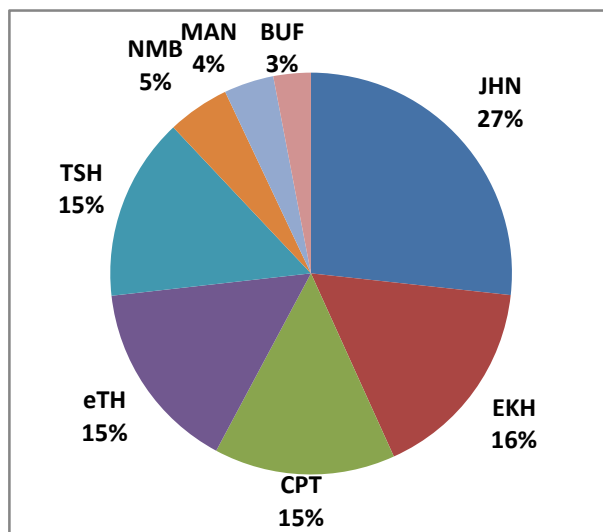
<sup>35</sup> Appendix A figure 76

**3.3 Metro 2013/14 Key Performance Indicator comparisons(2013/14 KPIs: NRW = 34.3%; WL = 28.8%; ILI = 5.4)**

System input volume 2159	Authorised consumption 1537	Billed authorised 1418	Billed metered 1378	Revenue water 1418
			Billed unmetered 40	
		Unbilled author 120	Unbilled metered 15	Non-revenue water 741
		Unbill. unmetered 105		
	Commercial losses	175		
	Water losses 622	Physical losses	447	

**Figure 38: Combined Metro IWA Water Balance for 2013/14(million kl/a)NTS**

Johannesburg Metro is by far the largest single urban water consumer at 577 million kl/annum, representing 27% of the metro water demand, a percentage that has been growing since 2006/7 and shows no sign of slowing. It is thus of paramount importance that Johannesburg Metro reduces its demand.



**Figure 39: 2013/14 Metro SIV Split**

Metro	Recon. target	2013/14 SIV	Projected 2014 SIV with WDM
JHN	455.72	576.76	510.4
EKH	339.82	356.64	338.8
CPT	337.25	314.77	389.6
eTH	273.27	332.85	300 (est)
TSH	330.34	318.03	322.7
NMB	87.76	107.67	87.8
MAN	83.50	86.57	83.5 (est)
BUF	60.87	65.47	61.9
<b>Total</b>	<b>1969</b>	<b>2159</b>	<b>2094</b>

The metro SIV target performance individually and as a whole, is reflected in **table 1**. Also shown is the projected 2014 SIV that can be achieved with the implementation of WC/WDM.

**Table 1: SIV Target, Actual and Projected Saving**



Table 1 shows that according to the projected WC/WDM SIV, the reconciliation SIV target is realistic. In terms of performance against the reconciliation target, the Johannesburg, NM Bay and eThekweni metros were the worst performers, all exceeding their target by over 20%. Only Cape Town and Tshwane Metros met their targets. Buffalo City, Ekurhuleni and Mangaung exceeded their targets by 8%, 5% and 4% respectively. Overall the metros exceeded the target by 10%.

The worst performing metro in terms of NRW is NM Bay, followed by Johannesburg, both above 40%. Cape Town at 21% is again the best performer followed by Tshwane at 23.5%.

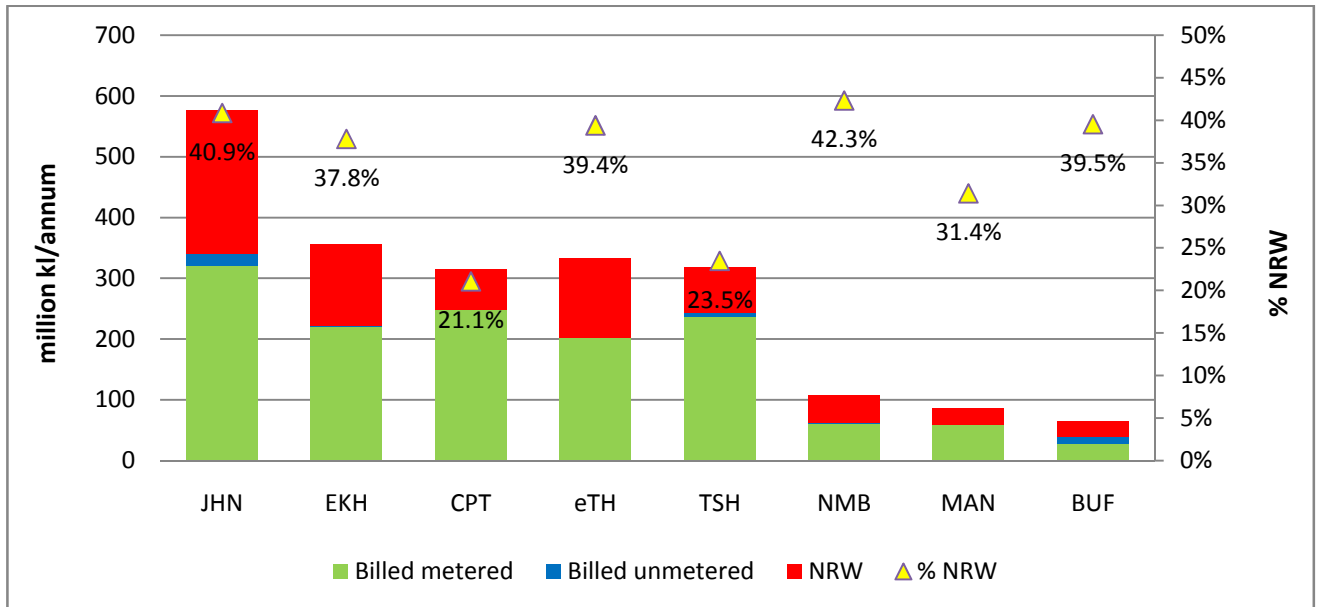


Figure 40: 2013/14 Metro NRW and SIV

Figure 41 compares the growth in population against that of SIV for each metro over the last six years. This period was used as it covers a time for which there is relatively good data and in this case going further back is of little benefit. It can immediately be seen how outstanding Cape Town's performance has been. The worst performing metro in this regard is clearly Mangaung.

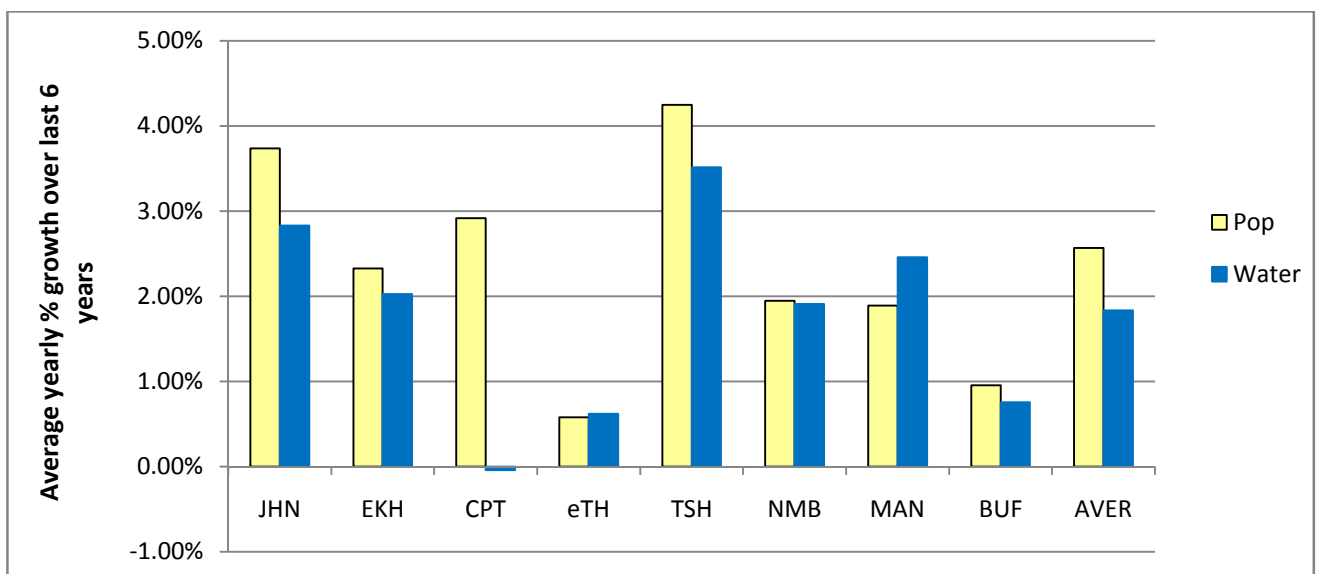
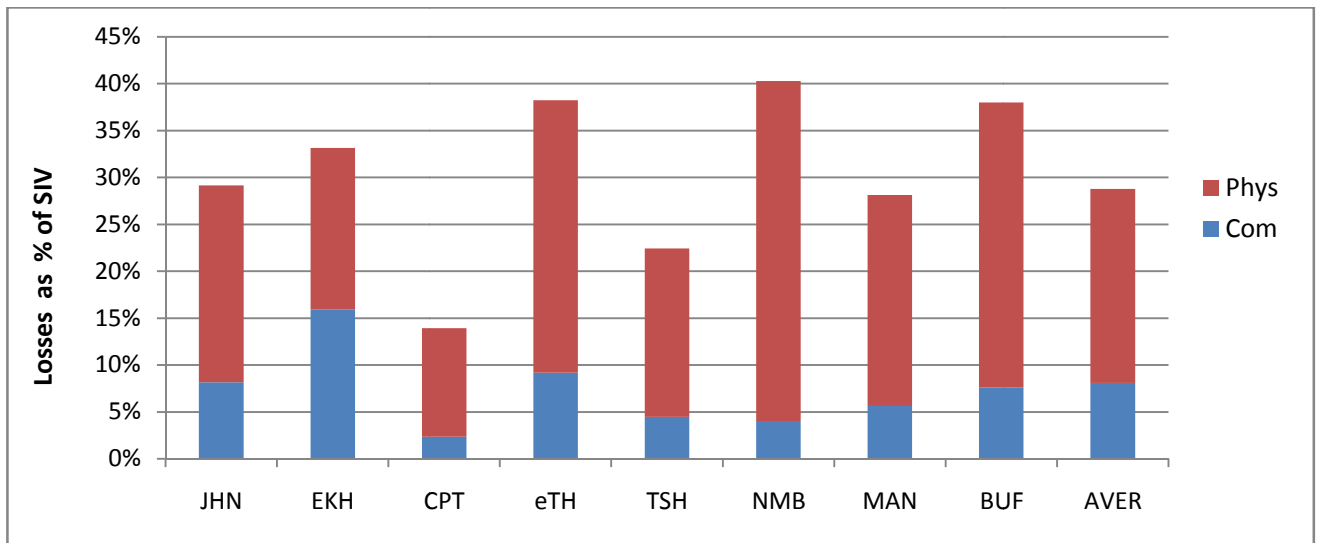


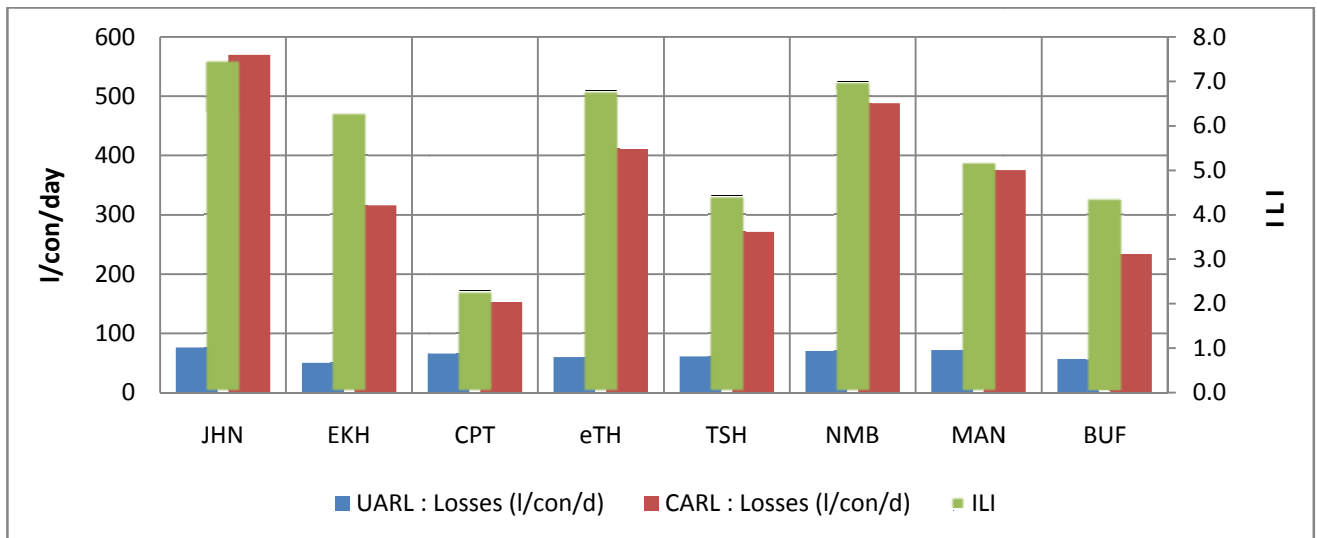
Figure 41: Metro Population and SIV growth over last 6 years

**Figure 42** shows that in terms of total water losses NM Bay metro is the worst performer, closely followed by eThekweni and Buffalo City. Once again Cape Town is the top performer.



**Figure 42: Metro 2013/14 Percentage Losses**

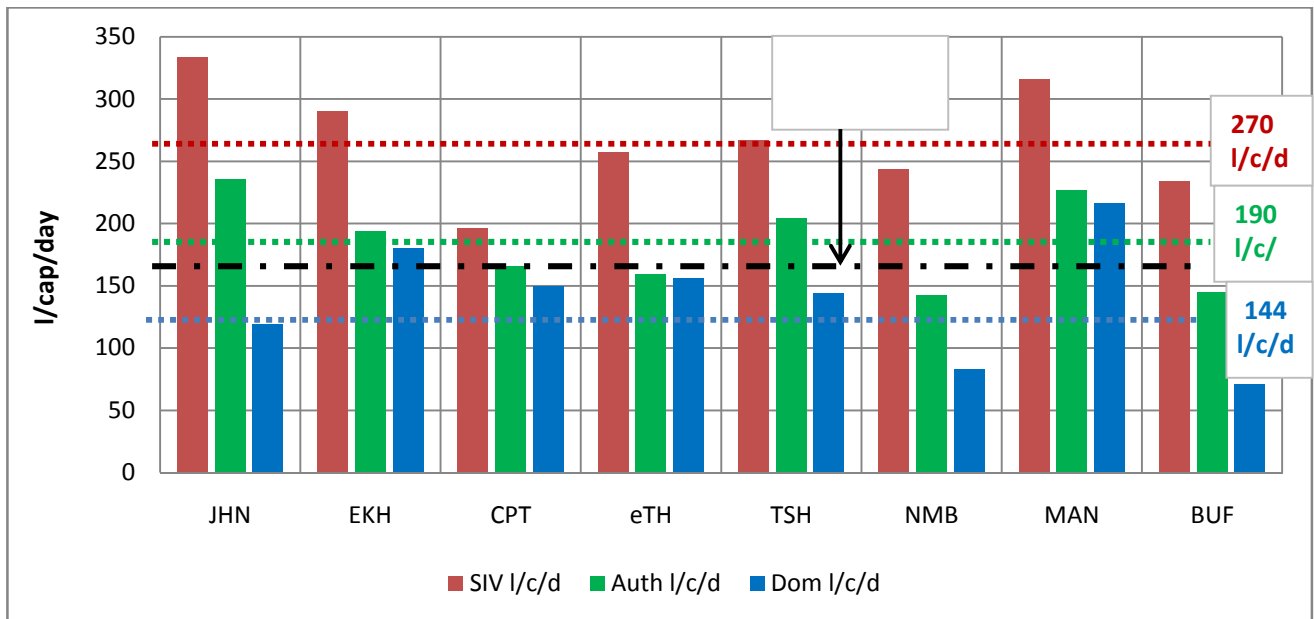
**Figure 43** compares the CARL and UARL, through the ILI. Based on physical losses, Johannesburg is the worst performer, with an ILI of 7.5, that is losses of 7.5 times what could be expected from their system. With a suggested ILI target of 3, only Cape Town, with an ILI of 2.5, is able to comply.



**Figure 43: Metro 2013/14 Physical Losses and ILI**

SIV per capita consumption in **figure 44** shows Johannesburg to have the highest unit consumption, followed closely by Mangaung. When one considers that the former has much more industrial demand than the latter, then the Mangaung performance is even worse. Best performer in this regard is Cape Town.

For authorised consumption Johannesburg and Mangaung again have the highest values, and NM Bay, Buffalo City, eThekweni and Cape Town have the lowest. Domestic consumption appears to be highest by a big margin in Mangaung and lowest in Buffalo City.



**Figure 44: Metro 2013/14 Per Capita Consumption**

<sup>36</sup>Household unit consumption varies less between the metros, than does per capita consumption. Mangaung, Johannesburg and eThekweni have the highest SIV unit consumptions, whilst Mangaung and Johannesburg have the highest unit authorised consumptions. The lowest SIV unit consumption is in Cape Town and lowest authorised unit consumption in Buffalo City and NM Bay.

<sup>37</sup>Lastly an analysis of unit consumption per connections shows that in terms of SIV/connection, Johannesburg has by far the highest value. The lowest is in Buffalo City. As regards authorised consumption, Johannesburg is again highest and Buffalo City lowest.

It is noteworthy that metro comparisons differ, depending against which of the 3 parameters, (i.e. capita, household or connection), is used. <sup>38</sup>Quite clearly the differences between the above graphs can be, at least partially, ascribed to the variation in the number of households per connection and further analysis shows that this is indeed so. Johannesburg has the highest number of households per connection at almost 3, well above the average of 2 and lowest (Buffalo City) of 1.

Although these figures can be interpreted in a number of ways, the underlying message is that the current water use per person in South Africa is extremely high, especially for a water scarce country. There is significant scope for reducing water use through a change in behaviour of the consumers and if this can be achieved, there will be sufficient water to support the growing population for many years ahead. This will of course require some change in mind-set by the consumers who must appreciate the true value of water and the necessity to save it, especially those in Mangaung Metro.

<sup>39</sup>In 2013/14 there was a huge variation in how the metros split their commercial losses and in the size of these allocations. In this regard Ekurhuleni is an outlier with enormous commercial losses of 48%. Why this is so needs investigation.

<sup>36</sup> Appendix A figure 77

<sup>37</sup> Appendix A figure 78

<sup>38</sup> Appendix A figure 79

<sup>39</sup> Appendix A figure 80

### 3.4 Lost revenue

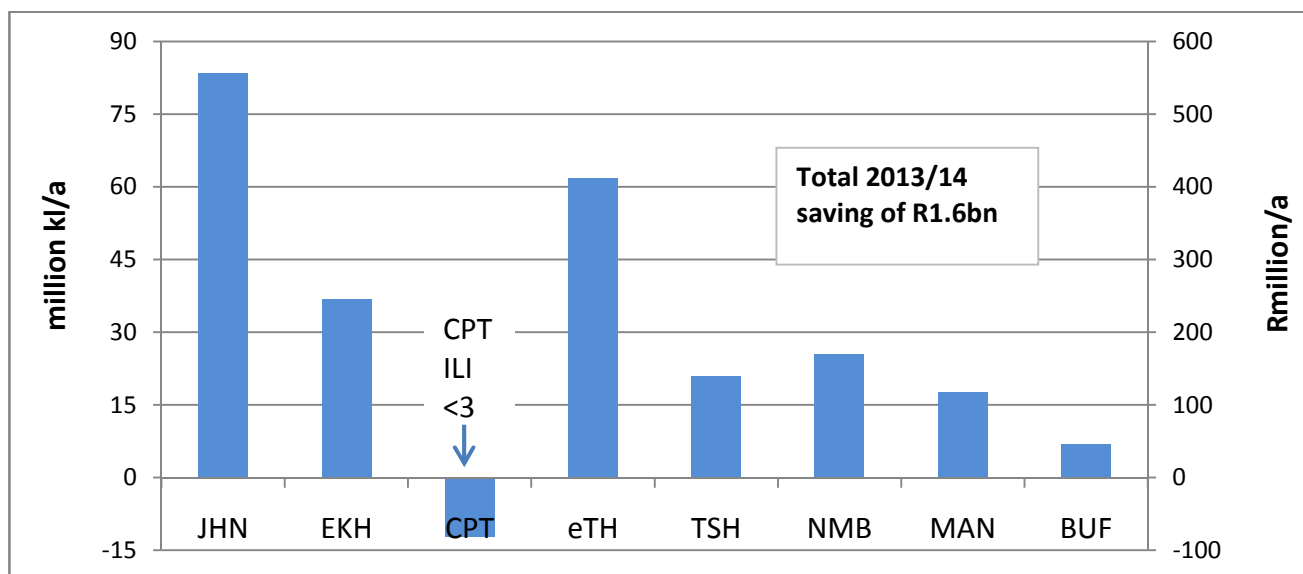
Using water production costs, the value of lost revenue can be calculated for the metros. This is shown in **table 2** below and amounts to R5.7 bn /year. It should be noted that some of the NRW is in the form of commercial losses, in which case the effective cost to the metro will not be the production cost of the water, but rather the loss in income based on the selling price, which will be considerably higher. The largest loss is not surprisingly in Johannesburg Metro, followed by the Ekurhuleni and eThekweni metros.

Metro	NRW (kl/annum)	Water production rate (R/kl)			Loss (Rm)	Bulk provider
		Raw	Bulk	Total		
Johannesburg	235 626 577	1.6	6.35	7.93	1 868 518 756	Rand Water
Tshwane	74 689 396	1.6	6.00	7.58	566 145 622	Rand + Magalies
Ekurhuleni	134 866 886	1.6	6.35	7.93	1 069 494 406	Rand Water
eThekweni	131 021 634	1.6	4.70	6.28	822 815 862	Umgeni Water
Cape Town	66 343 962	1.6	6.50	8.08	536 059 216	Self
Nelson Mandela Bay	45 554 450	1.6	6.50	8.08	368 079 956	Self
Buffalo City	25 887 918	1.6	8.15	9.73	251 889 442	Amatola Water
Mangaung	27 195 616	1.6	5.05	6.63	180 306 934	Bloem Water
<b>741 186 439</b>					<b>5 663 310 193</b>	<b>R7.6/kl</b>

*Notes:*  
 Raw water = WR Man Charge + Water Research Fund Levy + WR Infrastructure Charge.  
 Bulk water = Water Board charge if relevant, otherwise average bulk cost for SA is used.  
 Costs are 2012/13 costs escalated to 2013/14 at previous year's escalation rate.  
 Tshwane assumption is 80% from Rand Water and 20% from Magalies Water.  
 Reference: Water Services Tariffs 2012/13: DWA (PULA) 2013

**Table 2: Metro 2013/14 Lost Revenue**

It is however not possible to reduce NRW to zero. An ILI of 3 is considered a realistic goal and as per **figure 45**, this equates to a saving of R1.6bn/annum. The largest potential saving lies in Johannesburg Metro, as a consequence of their combined high SIV and NRW.



**Figure 45: Metro 2013/14 Potential Saving Comparison**

## 4 FINDINGS

- Data quality is consistently improving, however some data, prior to 2007/8, is of questionable reliability;
- The % NRW decreased from 35.1 in 2008/9 to 32.8 in 2012/13, whereafter it rose to 34.3 in 2013/14;
- The % WL decreased substantially from 33.8 in 2008/9 to 26.4 in 2012/13, whereafter it rose to 28.8 in 2013/14;
- The ILI decreased from 7 in 2008/9 to 5.3 in 2012/13, only to increase to 5.4 in 2013/14;
- Physical losses have been relatively constant since 2007/8, despite an increase in SIV;
- The metros supplied 2159 mill kl in 2013/14, falling short of the reconciliation target of 1969 mill kl/a. This target is in line with metro projected SIV with WC/WDM;
- Overall the SIV has increased in line with population growth, but slower than the household growth rate;
- The number of households per connection has increased, evidence of metro densification;
- Per capita consumption in terms of SIV has been relatively constant at 270 l/c/d since 2009/10. In terms of authorised consumption, this has increased since 2010/11. The current water use per person in South Africa is extremely high, especially for a water scarce country
- Unbilled authorised consumption has increased rapidly recently, for reasons unknown;
- Reducing the ILI to 3 will result in a saving of over R1.6 bn/annum;
- Johannesburg Metro: The metro hugely exceeded its SIV target and the recent increase in % NRW is concerning. Water resource adequacy is of concern given the unavailability of any additional water before 2022. The metro has 2.8 households per connection, more than any other metro. There has been a huge increase in unbilled authorised consumption, (12% of SIV by 2013/14);
- Ekurhuleni Metro has shown little improvement in recent years and if its SIV target is to be met and its NRW and WL figures reduced, business as usual will not be good enough; it commercial losses need to be investigated as they may be artificially inflating these to reduce physical losses;
- Cape Town Metro is overall the best performing metro, but will face growing challenges to further improve;
- eThekweni Metro's failure to meet its SIV target and its increasing NRW and WL are cause for concern;
- Tshwane Metro: The negative impact of adding problematic municipalities to a metro can be clearly seen in the Tshwane scenario and the metro has done well to bring this under control, to meet their SIV target and to have relatively low NRW and WL:
- Nelson Mandela Bay Metro's situation is deteriorating rapidly and is a huge cause for concern;
- Mangaung Metro has made good progress in reducing WL and ILI, but despite this has very high per capita consumption, (and despite a relative lack of industry); in recent years there has been an upward trend. It would thus appear that the public is failing to play their part in conserving water. The metro's water is relatively cheap and their tariff structure is very flat for block 2 to 5, thus not conducive to water conservation; and
- Buffalo City Metro has not met its SIV target and has high NRW and WL, but is also characterised by a lack of clear trends, which makes a situational analysis difficult. Their reduced %NRW is however encouraging.

## **5 STRATEGIC RECOMMENDATIONS**

- On-going monitoring and reporting of metros' water balances is crucial;
- Metros must increase their efforts to achieve their reconciliation targets and ensure water security; this is particularly important for the Gauteng metros where no additional water will be available until 2022;
- Reconciliation strategy targets need to be reviewed and updated as necessary;
- Metros should increase their efforts to reduce NRW and WL and the negative impact it has on their ability to generate own income and run a viable water business;
- Metros need to reduce per capita consumption, which is too high for a water scarce country;
- WC/WDM must be implemented; this should where needed include steps to increase consumer appreciation of the value of water;
- Political support to promote payment for water services and the persecution of illegal water connections and theft is vital;
- Johannesburg Metro's SIV must be closely monitored and the sudden, big, increase in NRW investigated;
- Ekurhuleni Metro must implement WC/WDM and validate their high commercial losses;
- Reasons for eThekweni Metro's failure to reduce their SIV, NRW and WL, given their WC/WDM initiative, need to be determined;
- The impact of Tshwane Metro's O&M budget cuts on their water losses must be closely monitored
- Nelson Mandela Bay Metro needs to put plans in place to curtail their downward spiral and reduce their high NRW;
- Mangaung Metro must take steps to reduce domestic consumption; they should consider revising their tariff structure; and
- Buffalo City must take steps to reduce their high NRW and WL.

**Appendix A**  
**Supplementary Figures**

### INDIVIDUAL METROS

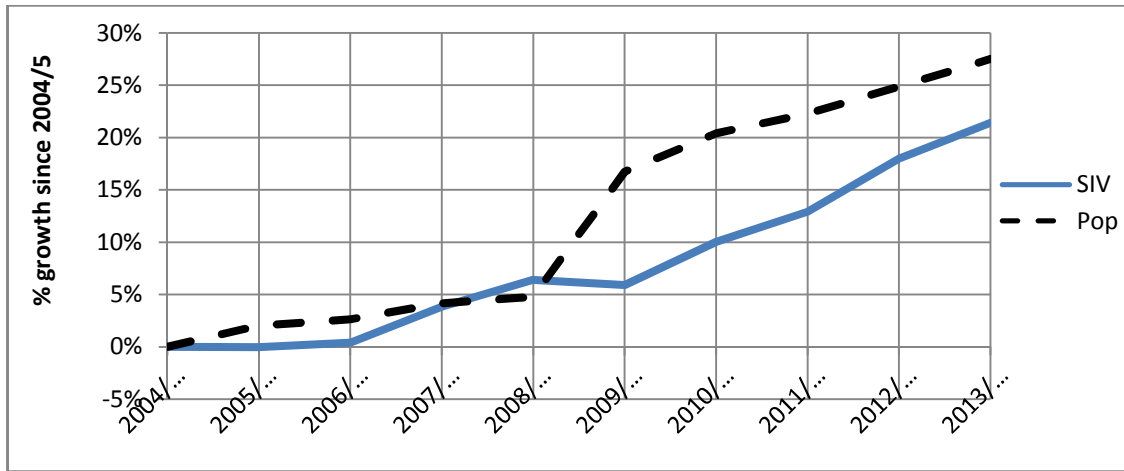


Figure 46 Johannesburg Metro SIV and Population Growth Rates

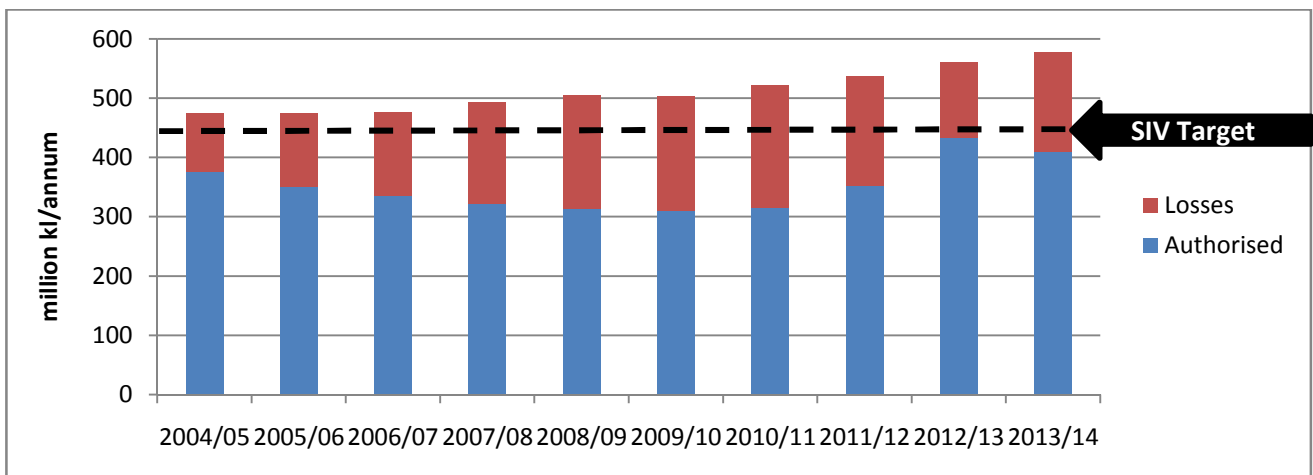


Figure 47: Johannesburg Metro SIV Component Trend and 2013/14 Target

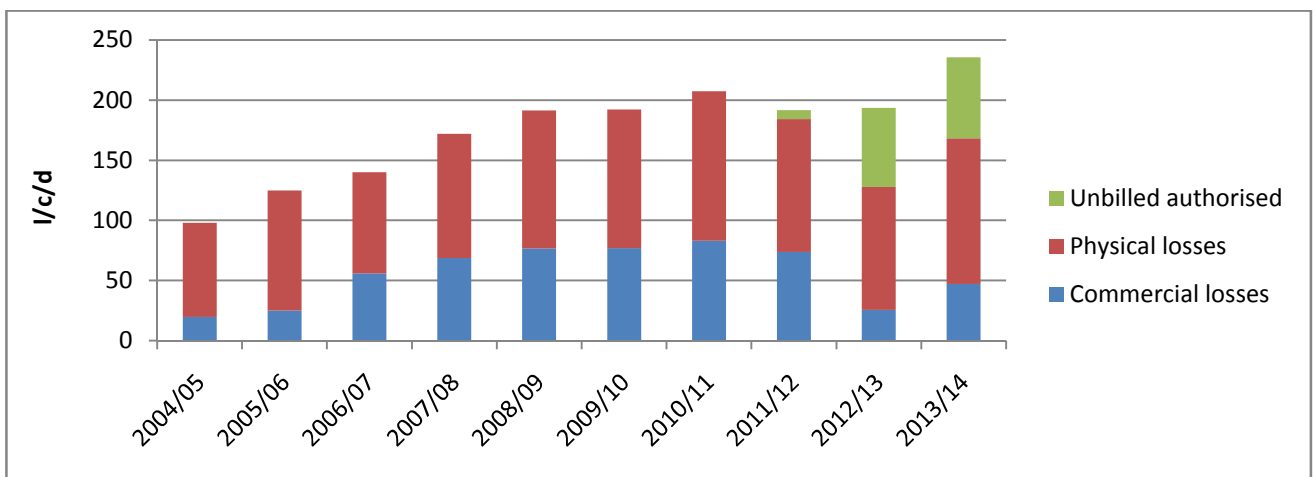


Figure 48: Johannesburg Metro NRW Component Trend



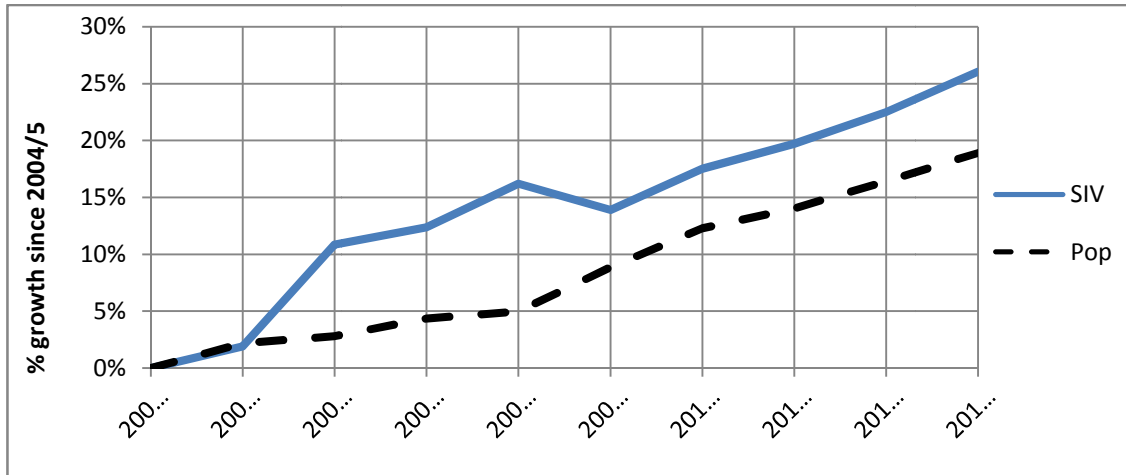


Figure 49: Ekurhuleni Metro SIV and Population Growth Rates

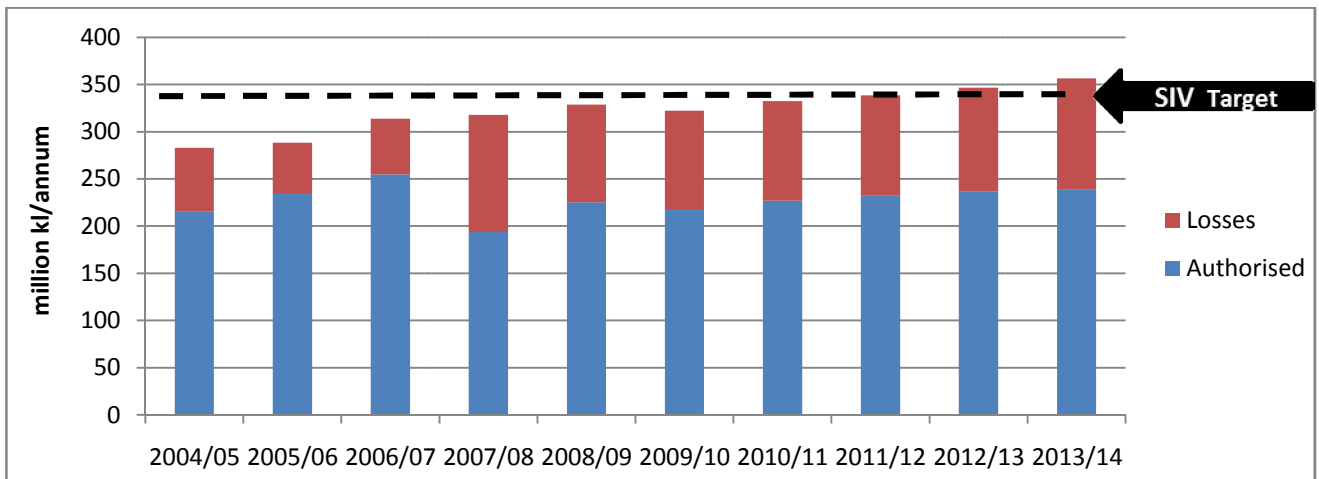


Figure 50: Ekurhuleni Metro SIV Component Trend and 2013/14 Target

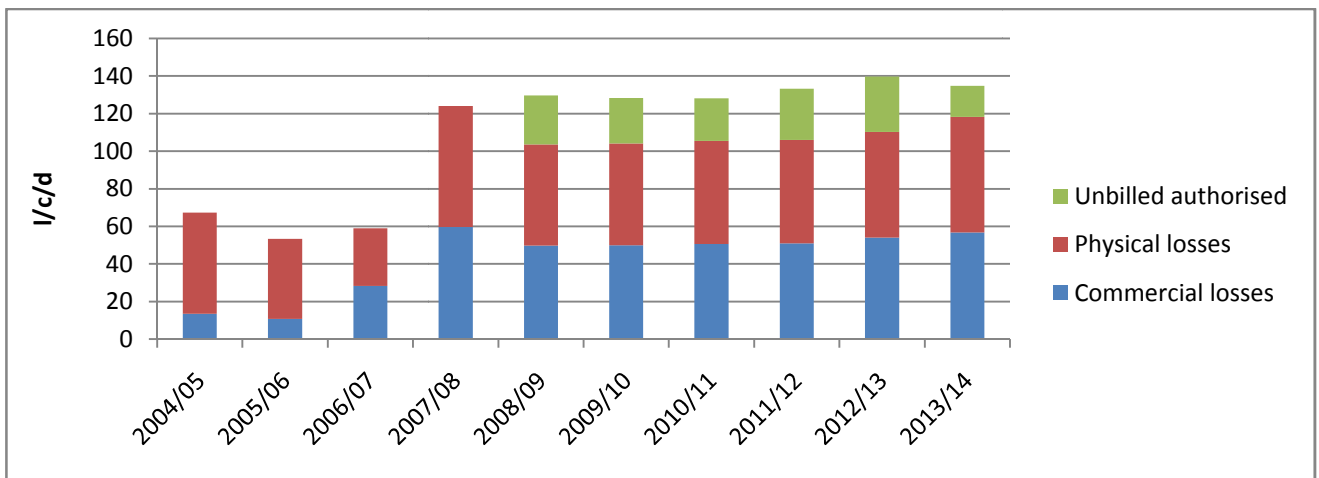


Figure 51: Ekurhuleni Metro NRW Component Trend

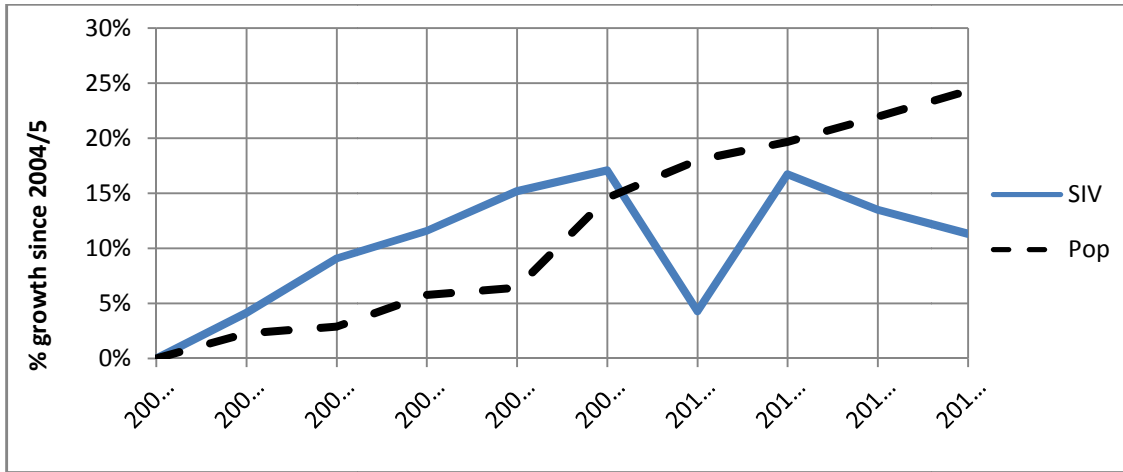


Figure 52: Cape Town Metro SIV and Population Growth Rates

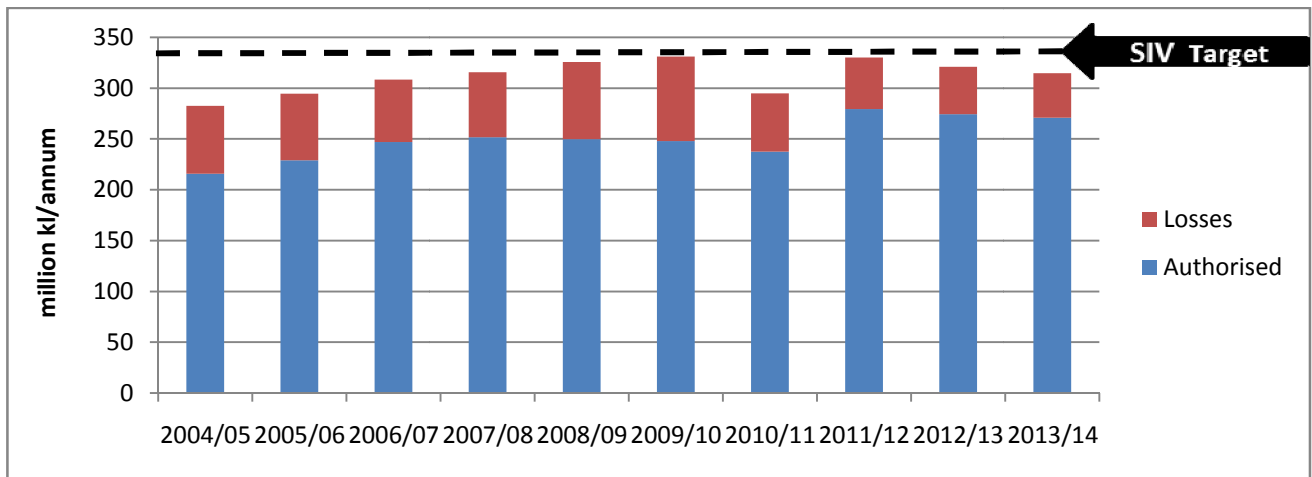


Figure 53: Cape Town Metro SIV Component Trend and 2013/14 Target

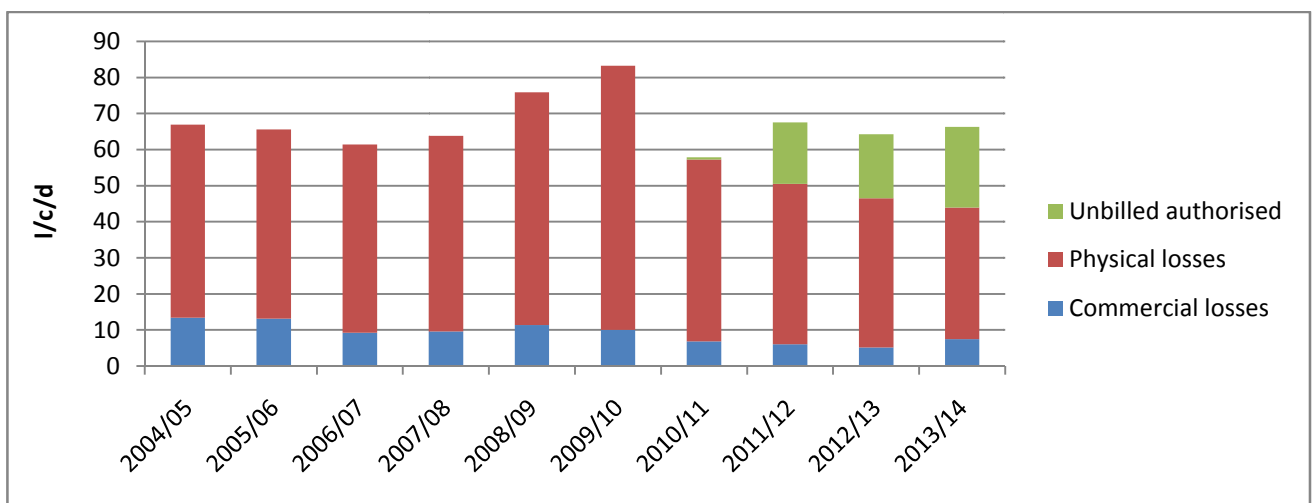


Figure 54: Cape Town Metro NRW Component Trend

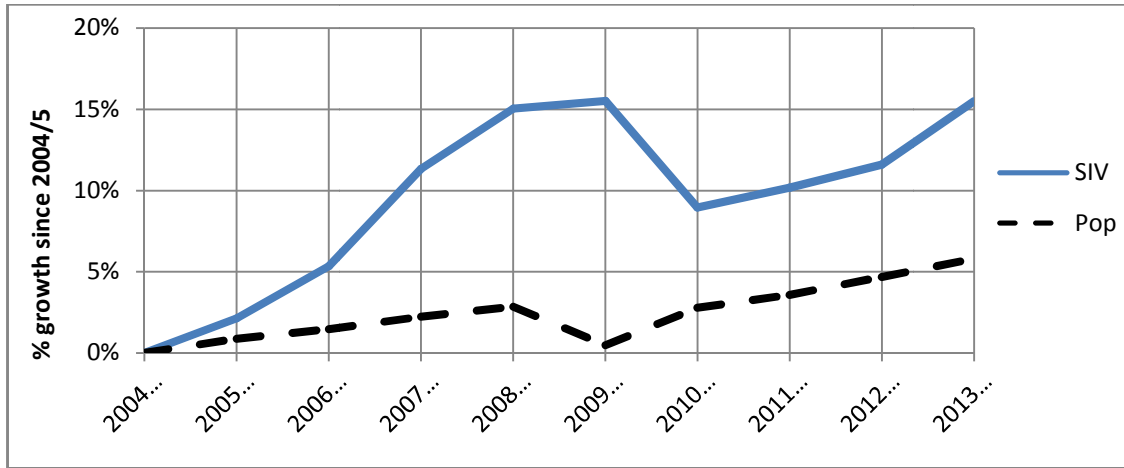


Figure 55: Ethekwini Metro SIV and Population Growth Rates

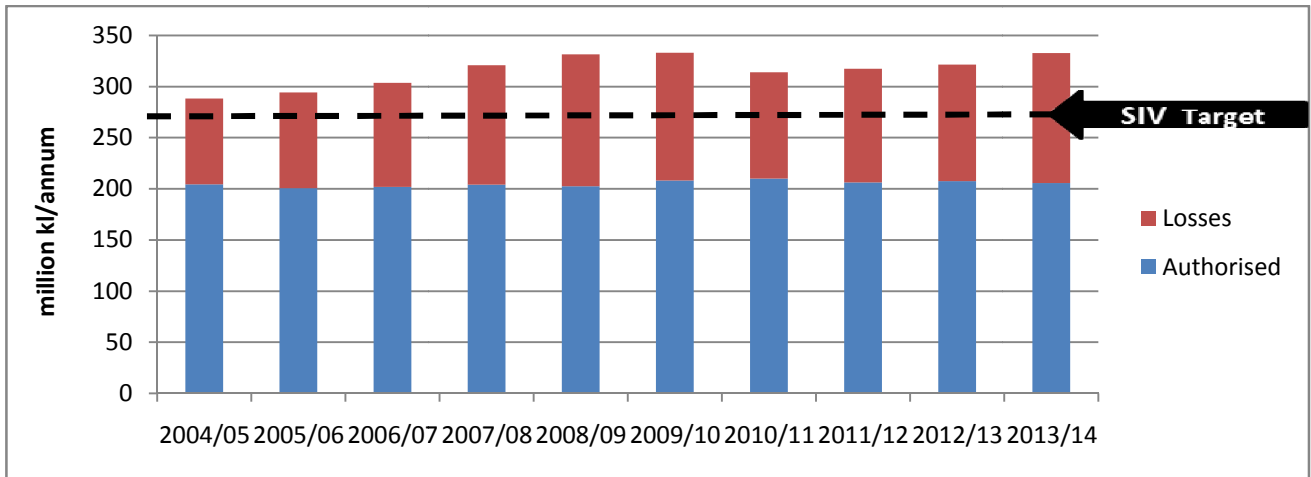


Figure 56: Ethekwini Metro SIV Component Trend and 2013/14 Target

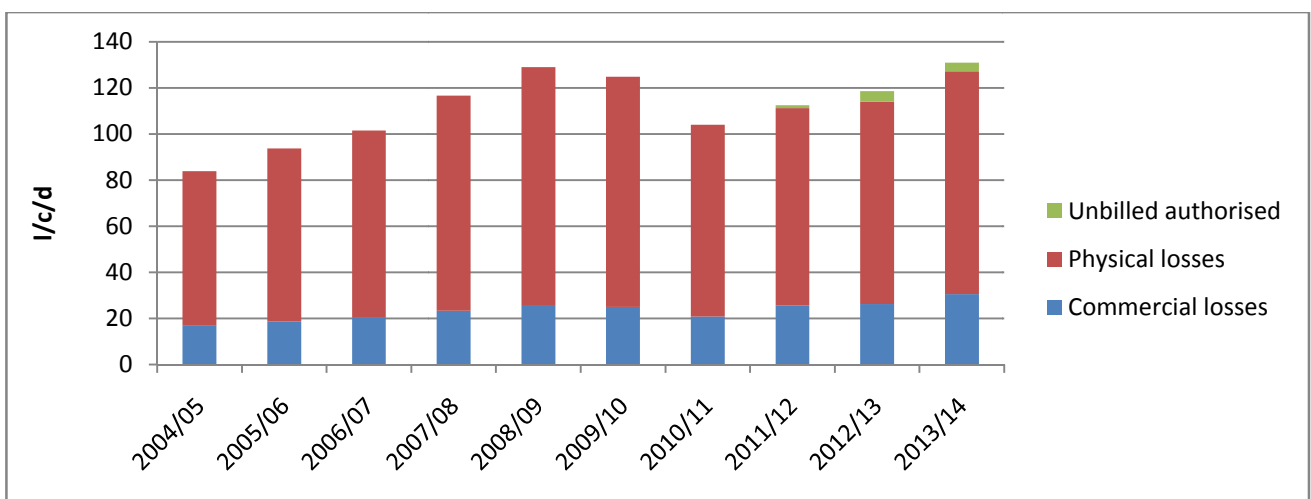


Figure 57: Ethekwini Metro NRW Component Trend

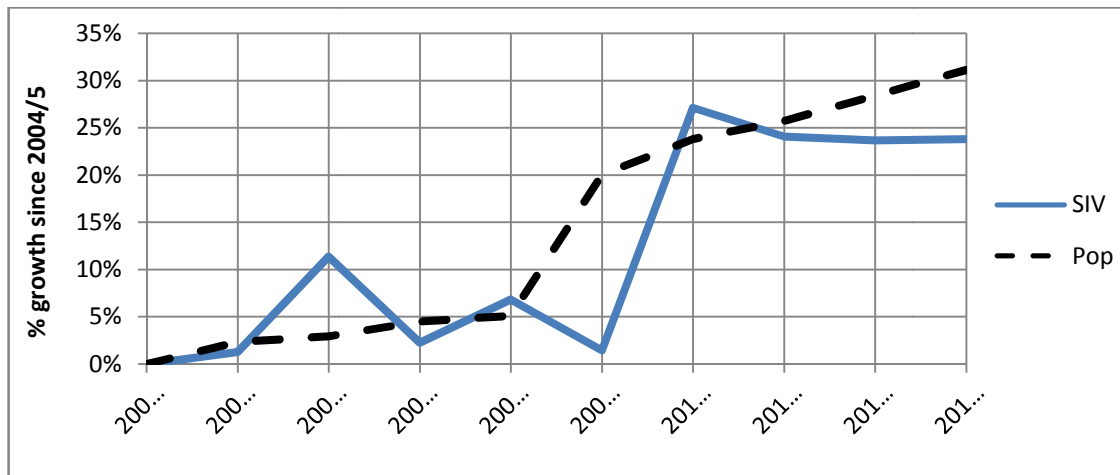


Figure 58: Tshwane Metro SIV and Population Growth Rates

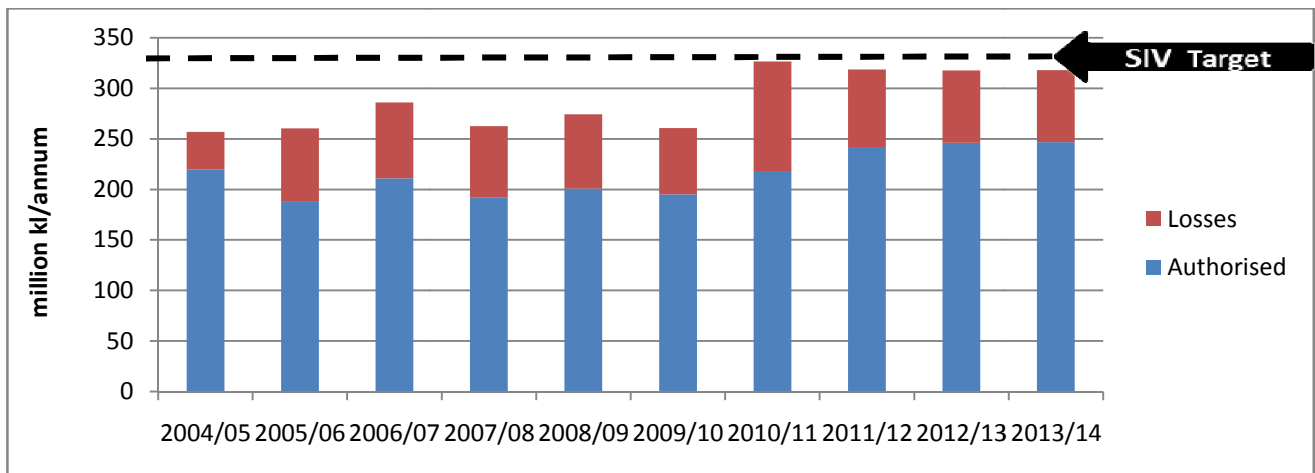


Figure 59: Tshwane Metro SIV Component Trend and 2013/14 Target

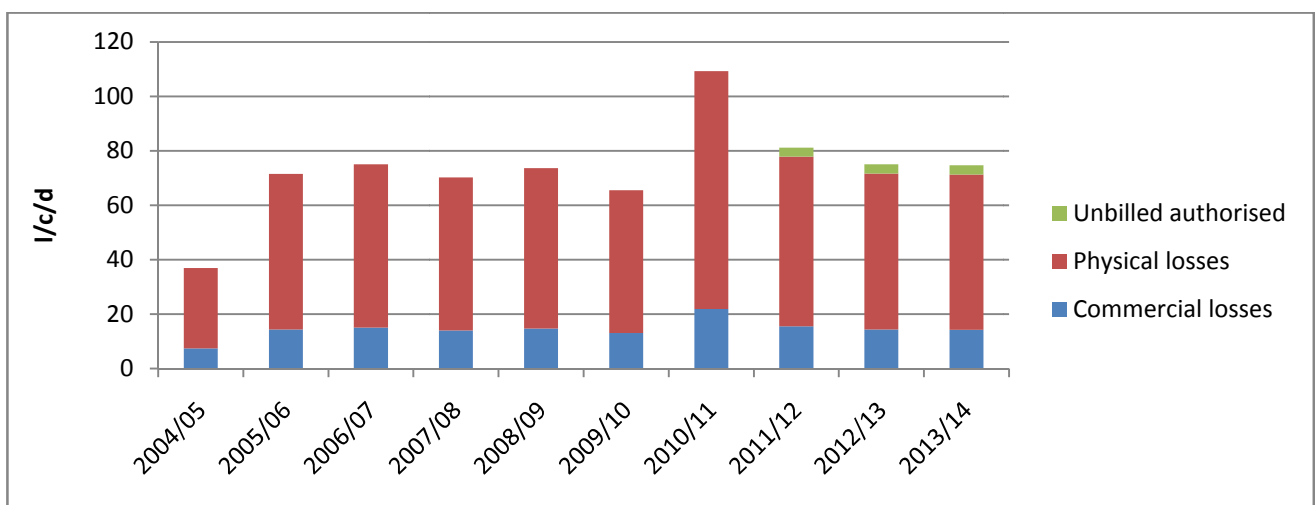


Figure 60: Tshwane Metro NRW Component Trend

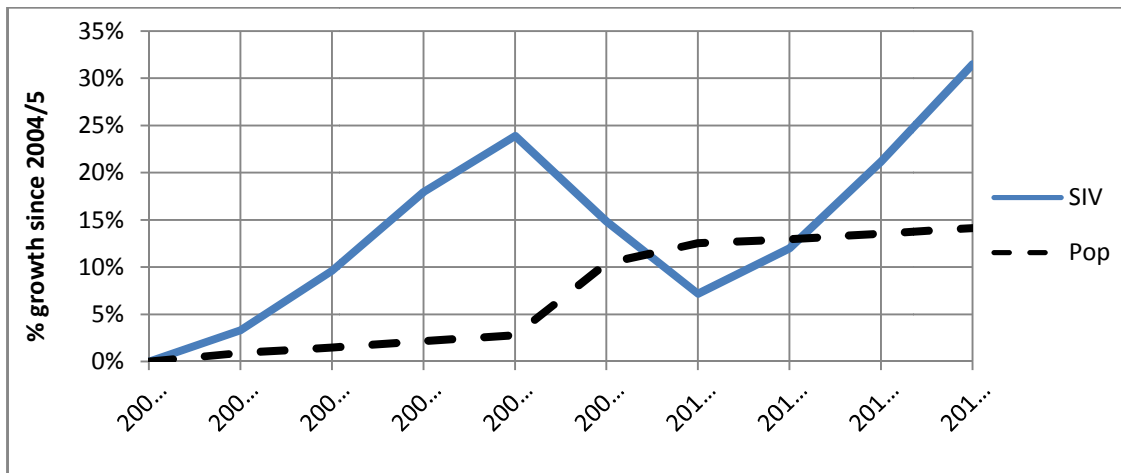


Figure 61: Nelson Mandela Bay Metro SIV and Population Growth Rates

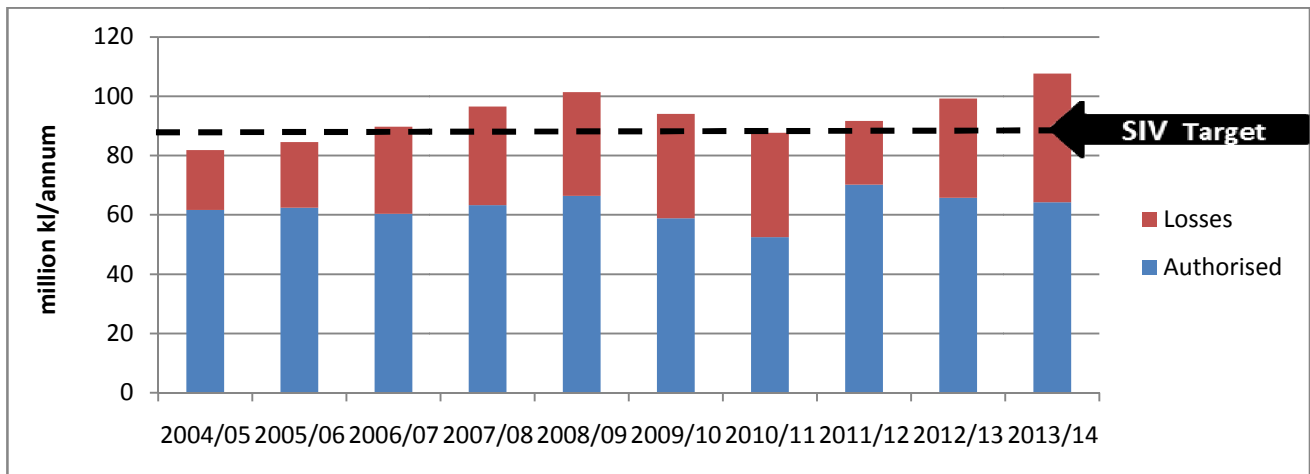


Figure 62: Nelson Mandela Bay Metro SIV Component Trend and 2013/14 Target

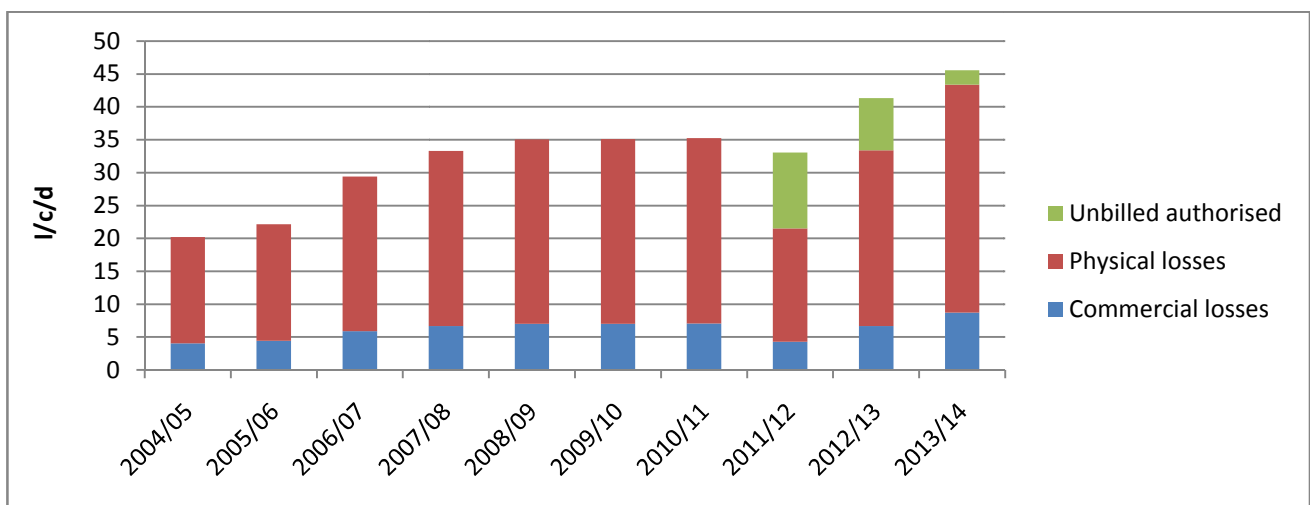


Figure 63: Nelson Mandela Bay Metro NRW Component Trend

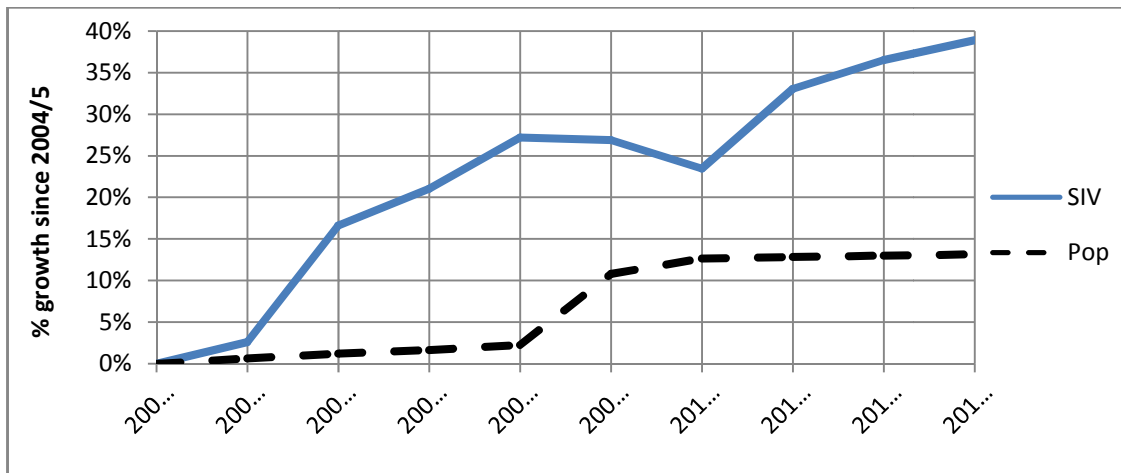


Figure 64: Manguang Metro SIV and Population Growth Rates

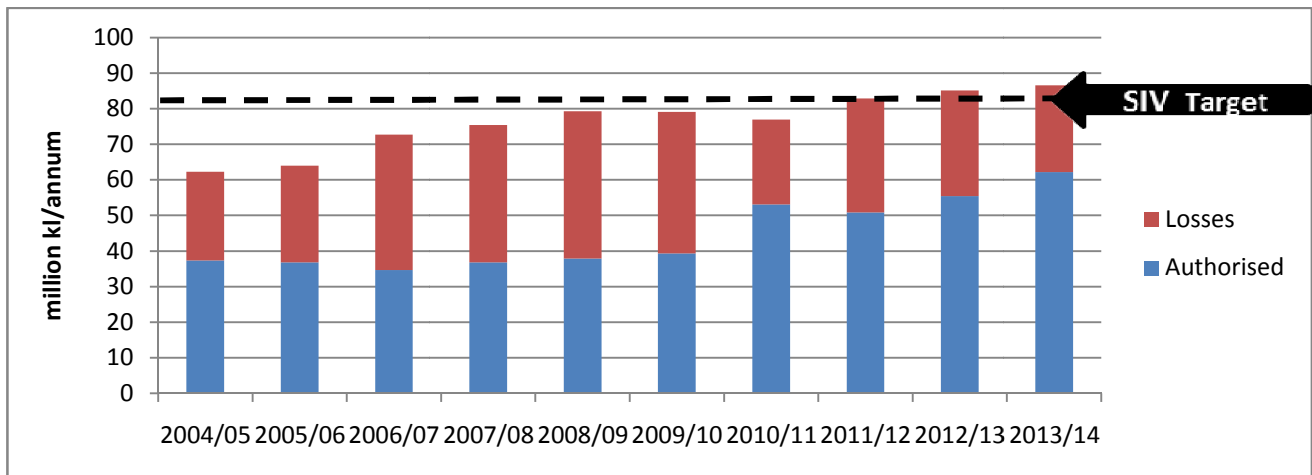


Figure 65: Manguang SIV Component Trend and 2013/14 Target

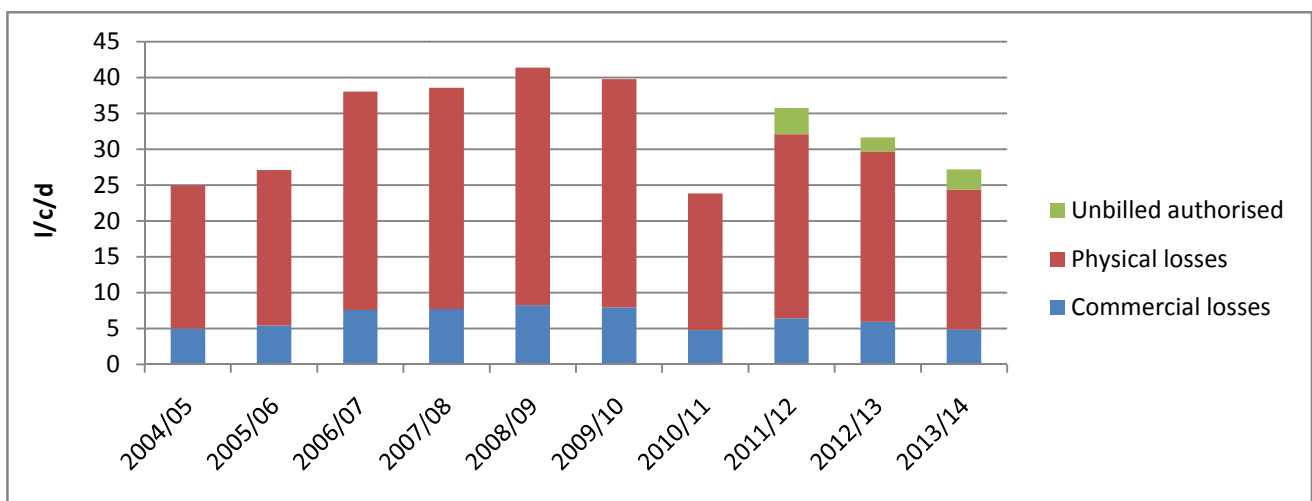


Figure 66: Manguang Metro NRW Component Trend

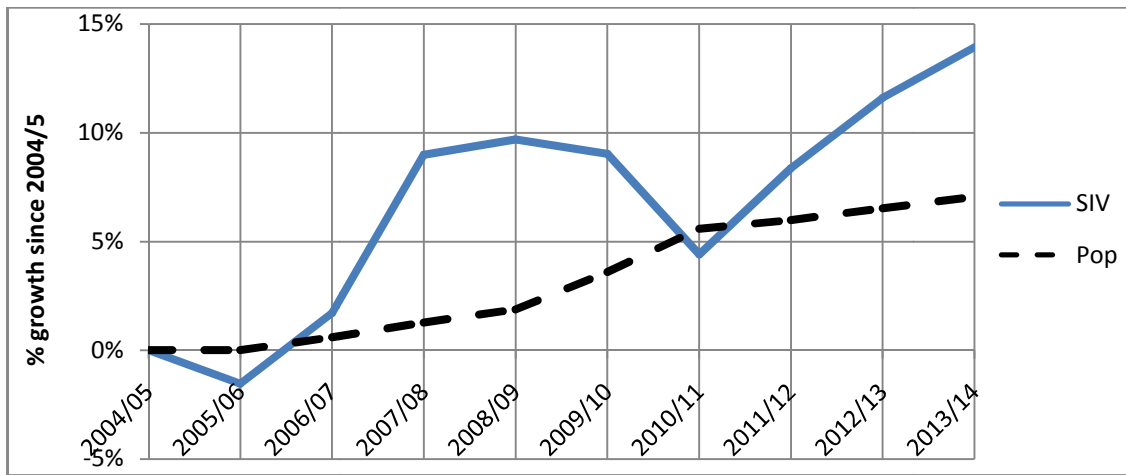


Figure 67: Buffalo City Metro SIV and Population Growth Rates

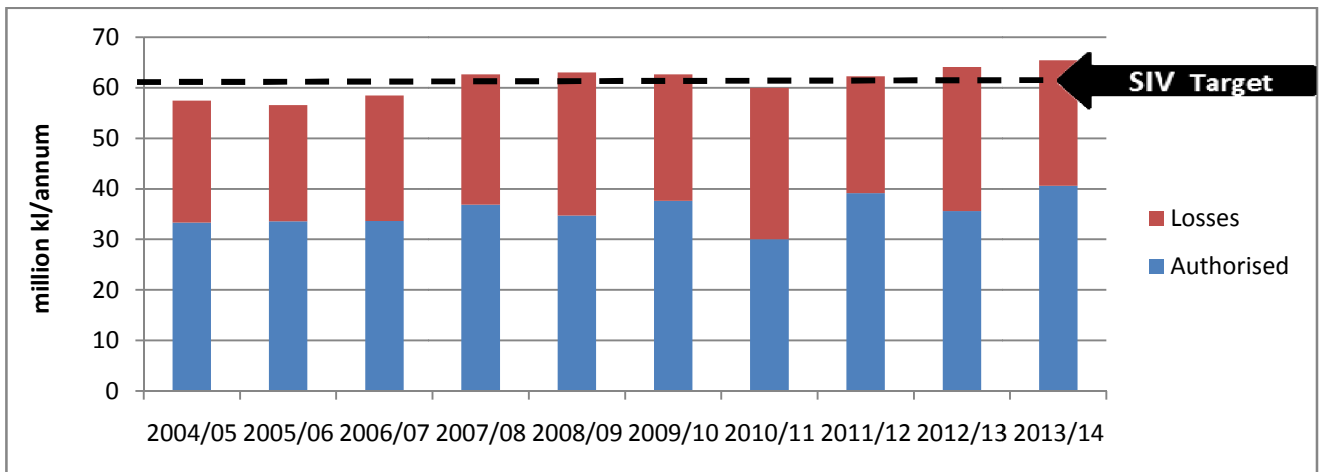


Figure 68: Buffalo City Metro SIV Component Trend and 2013/14 Target

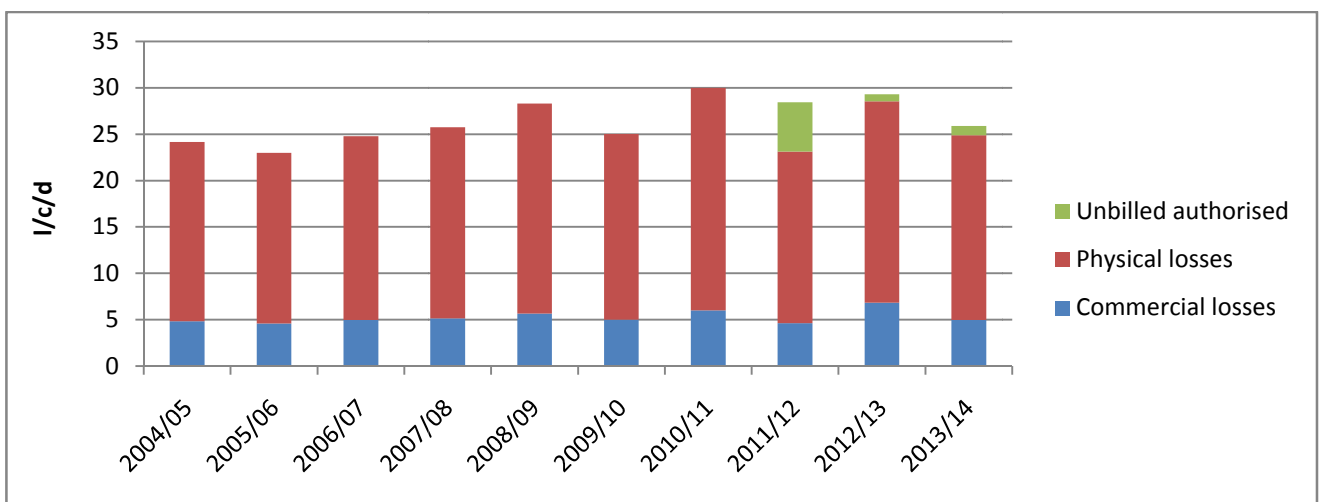


Figure 69: Buffalo City Metro NRW Component Trend

### COMBINED METRO TRENDS

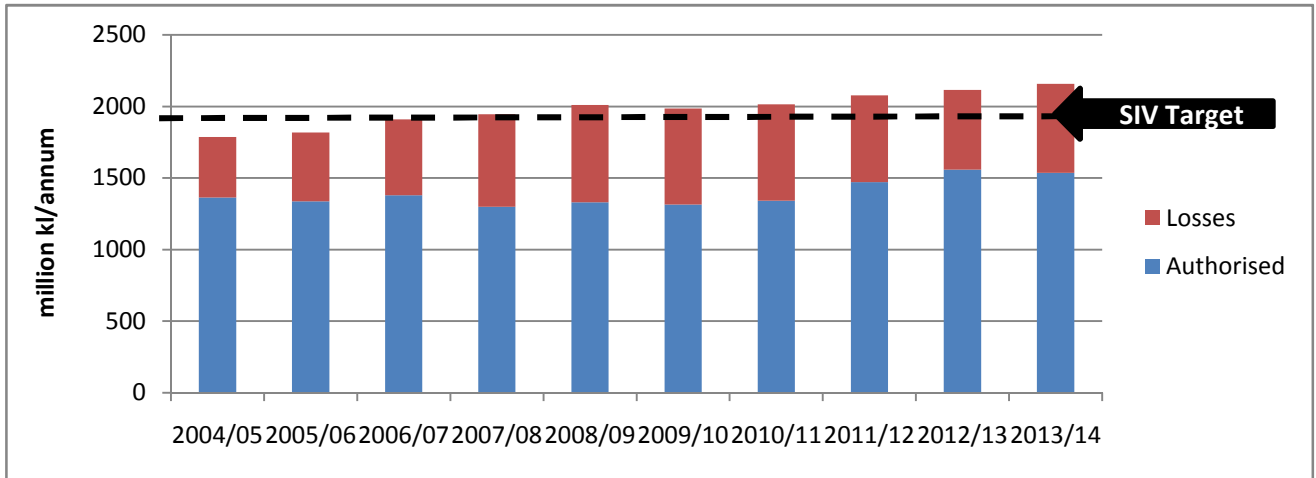


Figure 70: Combined Metro SIV Component Trend and 2013/14 Target

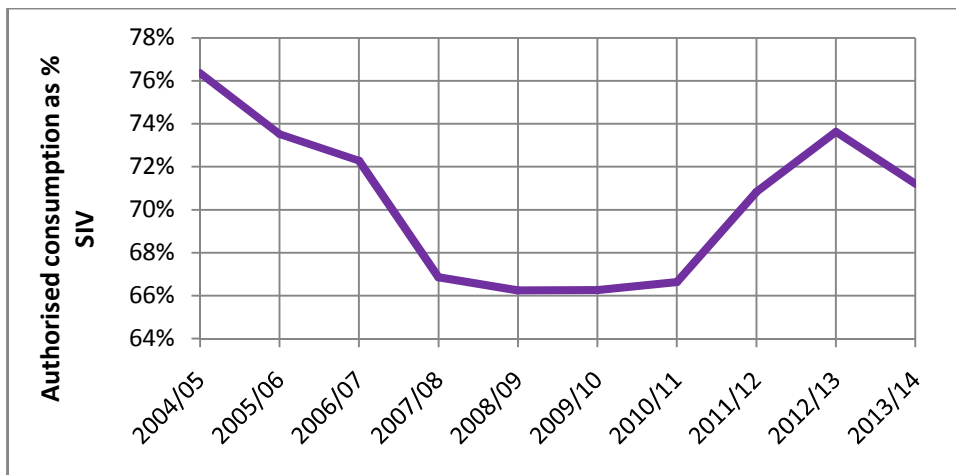


Figure 71: Authorised Consumption as % of SIV Trend

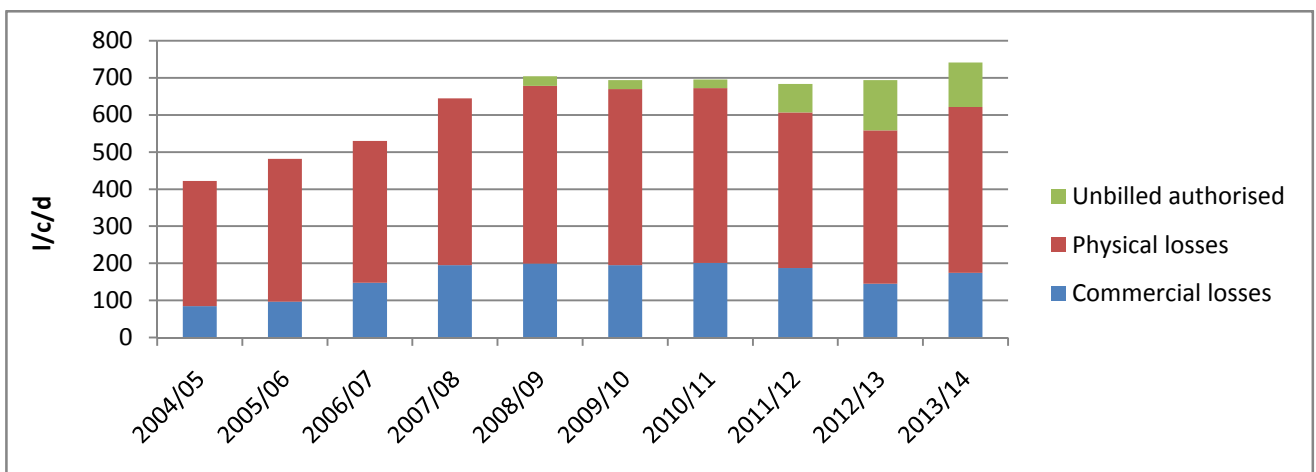


Figure 72: NRW Component Trend



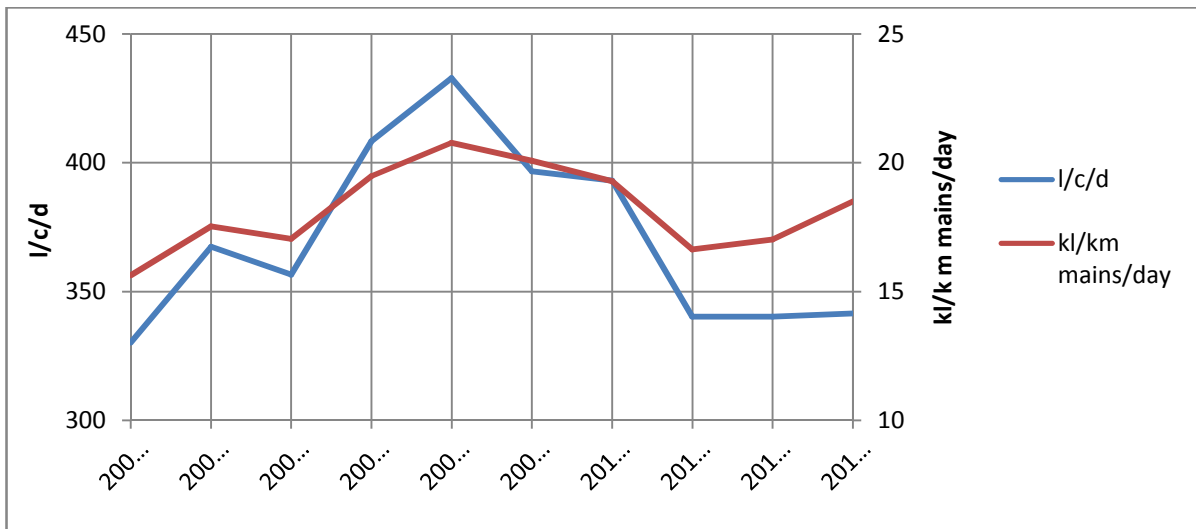


Figure 73: Combined Metro CARL Trend

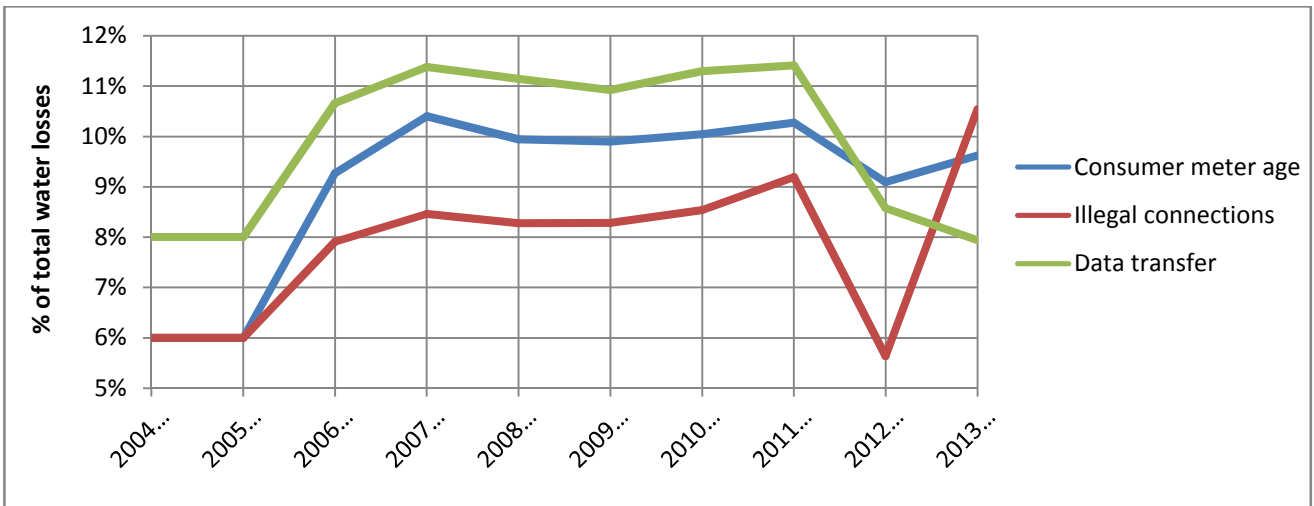


Figure 74: Combined Metro Commercial Loss Component Trends

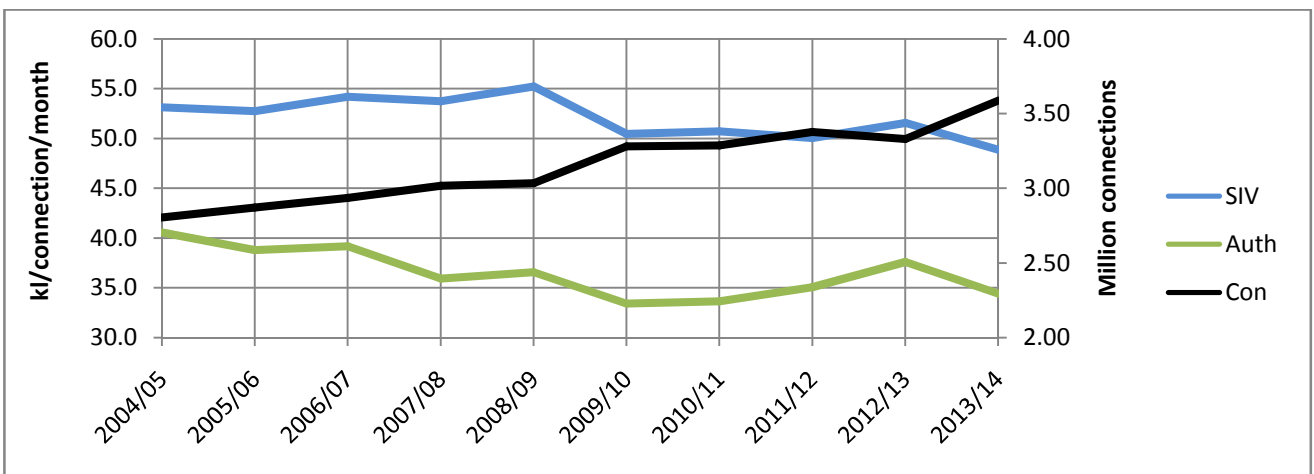
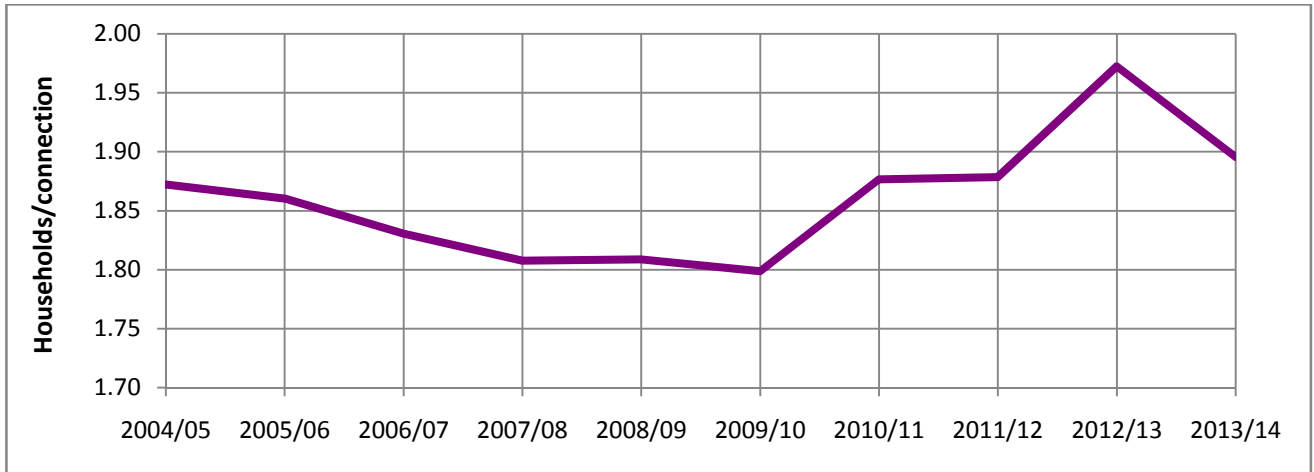


Figure 75: Combined Metro Connections Versus Connection Consumption Trends



**Figure 76: Combined Metro Households Per Connection Trend**

### METRO 2013/14 KPI COMPARISONS

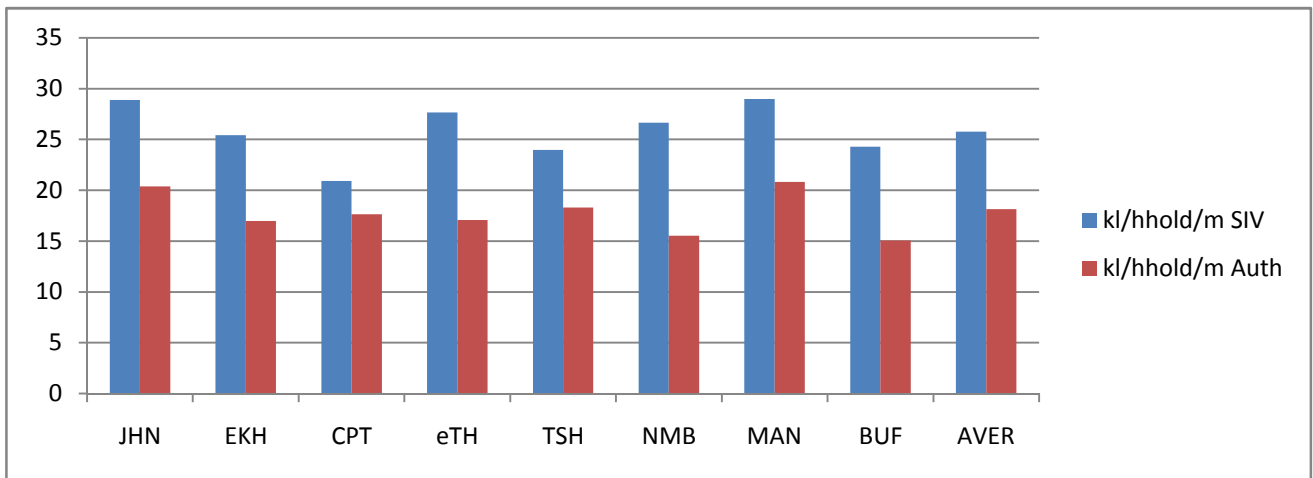


Figure 77: Metro 2013/14 Household Consumption Comparison

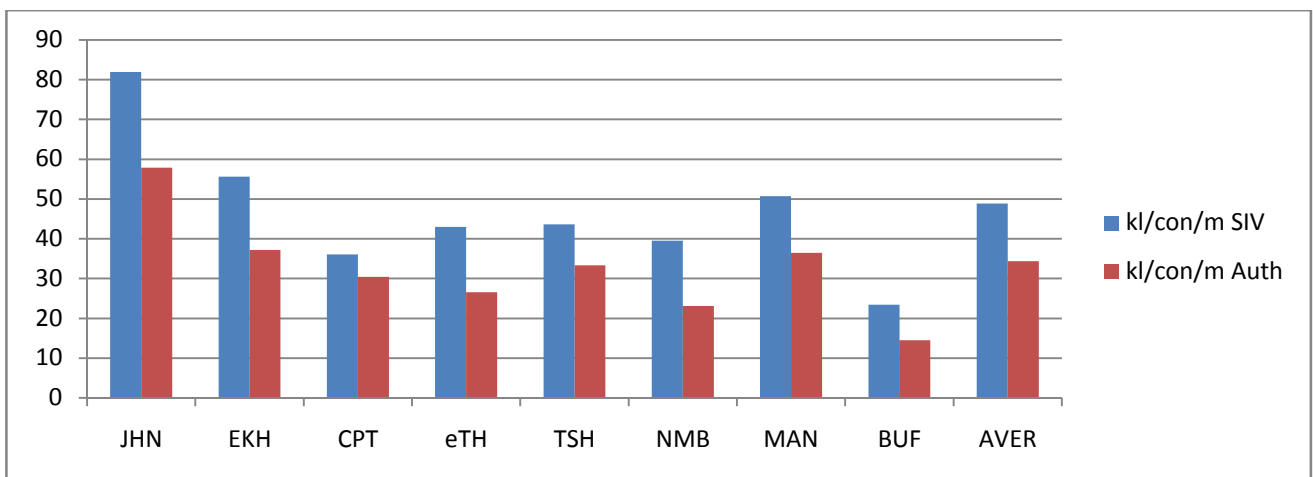


Figure 78: Metro 2013/14 Consumption Per Connection Comparison

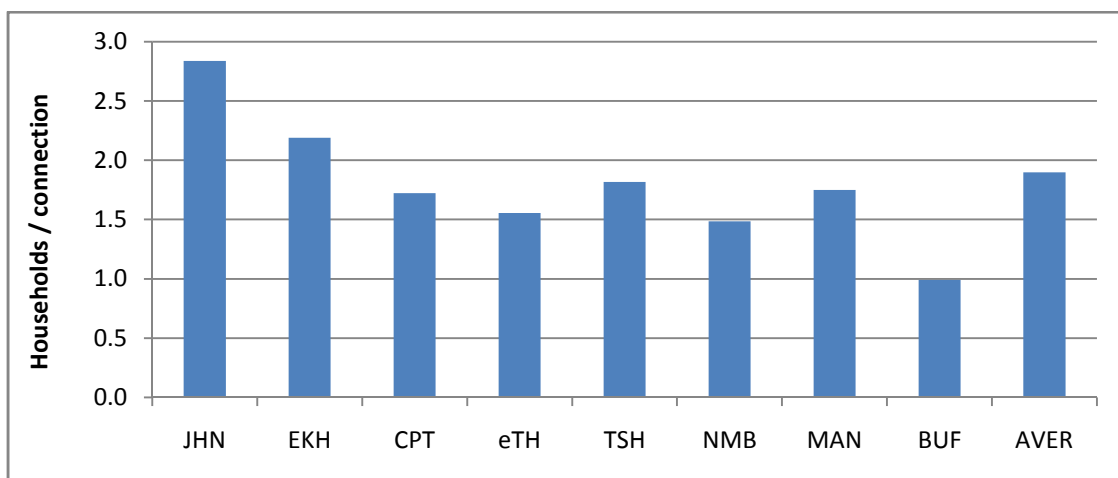


Figure 79: Metro 2013/14 Households Per Connection Comparison

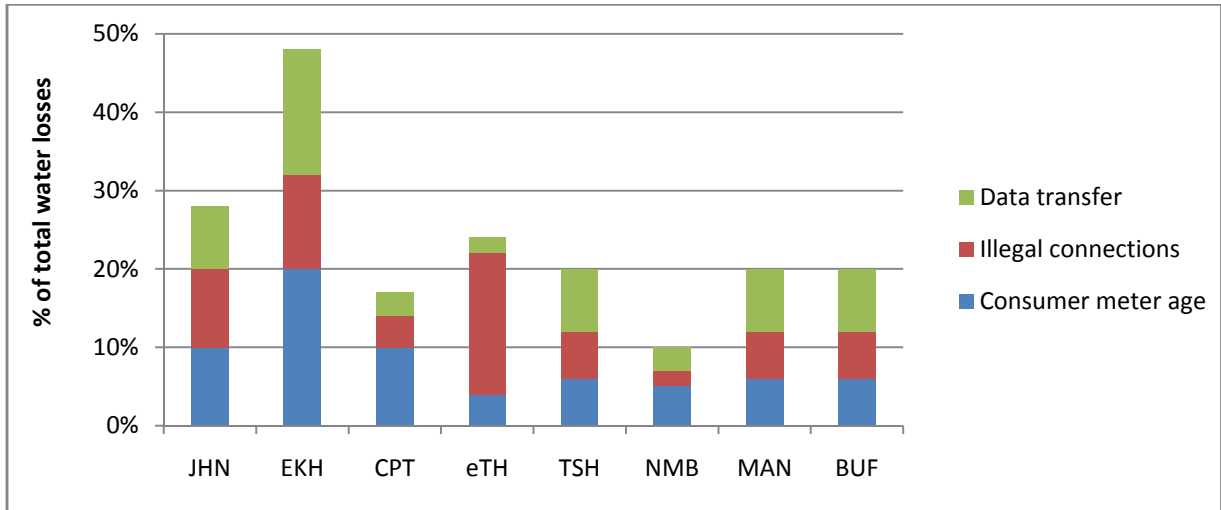


Figure 80: Metro 2013/14 Commercial Loss Comparison

## **Appendix B**

### **Water Balance data for metropolitan municipalities**

Note: Data based on original 2004/5 to 2011/12 and No Drop 2012/13 to 2013/14 spreadsheets, but pop figs amended and few changes made. Also limited alignment with the Municipal Benchmarking Initiative data was done.

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		JOHANNESBURG									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	3 683 235	3 757 176	3 779 716	3 836 405	3 859 421	4 299 568	4 434 852	4 503 584	4 598 963	4 696 366
Households served	No	1 206 903	1 231 136	1 238 524	1 257 092	1 264 631	1 323 652	1 434 871	1 524 578	1 586 791	1 651 536
Connections - total	No	529 854	563 783	585 171	591 526	567 919	686 179	692 371	713 143	558 911	582 186
Connections - metered	No	308 674	362 960	405 937	442 910	450 489	554 723	559 730	576 522	430 081	476 614
Domestic	No	308 674	362 960	405 937	442 910	450 489	554 723	559 730	576 522	386 042	427 810
Non-domestic	No	0	0	0	0	0	0	0	0	44 039	48 804
Connections - unmetered	No	221 180	200 823	179 234	148 616	117 430	131 455	132 642	136 621	128 830	105 572
Households / connection	No	2.3	2.2	2.1	2.1	2.2	1.9	2.1	2.1	2.8	2.8
Length of mains	km	10 607	10 607	10 787	10 958	10 990	11 067	11 167	11 526	11 768	11 847
Connections / km	No / km	50	53	54	54	52	62	62	62	47	49
Average system pressure	m	50	50	50	50	50	50	50	50	65	65
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	40%	40%	40%	40%	40%	40%	20%	28%
Consumer meter age	%	6%	6%	12%	12%	12%	12%	12%	12%	10%	10%
Illegal connections	%	6%	6%	12%	12%	12%	12%	12%	12%	2%	10%
Data transfer	%	8%	8%	16%	16%	16%	16%	16%	16%	8%	8%
System input volume	k/annum	474 951 381	474 756 204	476 728 007	493 039 487	505 350 244	502 956 153	522 560 000	536 312 001	560 464 136	576 762 893
Own sources	k/annum	0	0	0	0	0	0	0	0	0	0
Other sources	k/annum	474 951 381	474 756 204	476 728 007	493 039 487	505 350 244	502 956 153	522 560 000	536 312 001	560 464 136	576 762 893
Authorised Consumption	k/annum	376 876 529	349 997 310	336 638 695	321 039 752	313 823 724	310 677 660	315 131 000	352 151 845	432 777 383	408 507 042
Billed authorised	k/annum	376 876 529	349 997 310	336 638 695	321 039 752	313 823 724	310 677 660	315 131 000	344 641 579	367 022 874	341 136 316
Billed metered	k/annum	307 368 665	276 050 358	257 973 928	301 199 969	299 164 941	289 415 013	299 454 000	326 857 391	346 282 186	320 310 874
Domestic	k/annum	307 368 665	276 050 358	257 973 928	301 199 969	299 164 941	289 415 013	299 454 000	326 857 391	209 537 484	204 275 008
Non-domestic	k/annum	0	0	0	0	0	0	0	0	132 146 693	111 696 292
Export volume	k/annum	0	0	0	0	0	0	0	0	4 598 009	4 339 574
Billed unmetered	k/annum	69 507 864	73 946 952	78 664 767	19 839 783	14 658 783	21 262 647	15 677 000	17 784 188	20 740 688	20 825 442
Unbilled authorised	k/annum	0	0	0	0	0	0	0	7 510 266	65 754 509	67 370 726
Unbilled metered	k/annum	0	0	0	0	0	0	0	7 510 266	0	0
Unbilled unmetered	k/annum	0	0	0	0	0	0	0	0	65 754 509	67 370 726
Water Losses	k/annum	98 074 852	124 758 894	140 089 312	171 999 735	191 526 520	192 278 493	207 429 000	184 160 156	127 686 753	168 255 851
Commercial / Apparent losses	k/annum	19 614 970	24 951 779	56 035 725	68 799 894	76 610 608	76 911 397	82 971 600	73 664 062	25 537 351	47 111 638
Physical / Real losses	k/annum	78 459 882	99 807 115	84 053 587	103 199 841	114 915 912	115 367 096	124 457 400	110 496 094	102 149 402	121 144 213
UARL	k/annum	11 220 176	11 715 539	12 087 105	12 235 943	11 901 685	13 653 852	13 777 073	14 198 174	15 633 470	16 109 152
Potential real loss saving	k/annum	67 239 706	88 091 576	71 966 482	90 963 898	103 014 227	101 713 244	110 680 327	96 297 920	86 515 933	105 035 061
Revenue water	k/annum	376 876 529	349 997 310	336 638 695	321 039 752	313 823 724	310 677 660	315 131 000	344 641 579	367 022 874	341 136 316
Non-Revenue water	k/annum	98 074 852	124 758 894	140 089 312	171 999 735	191 526 520	192 278 493	207 429 000	191 670 422	193 441 262	235 626 577
Projected SIV without WDM	k/annum	No data	No data	No data	No data	No data	502 951 907	511 120 098	519 418 979	547 378 537	558 677 493
Projected SIV with WDM	k/annum	No data	No data	No data	No data	No data	502 951 907	481 624 394	471 123 250	517 882 834	510 381 765
	Year ending	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		79.4%	73.7%	70.6%	65.1%	62.1%	61.8%	60.3%	64.3%	65.5%	59.1%
% Non-revenue water		20.6%	26.3%	29.4%	34.9%	37.9%	38.2%	39.7%	35.7%	34.5%	40.9%
% Water Losses		20.6%	26.3%	29.4%	34.9%	37.9%	38.2%	39.7%	34.3%	22.8%	29.2%
System input volume unit consumption											
Litres / capita / day		353	346	346	352	359	320	323	326	331	334
m <sup>3</sup> / household / month		33	32	32	33	33	32	30	29	29	29
m <sup>3</sup> / connection / month		75	70	68	69	74	61	63	63	83	82
Authorised Unit Consumption											
Litres / capita / day		280	255	244	229	223	198	195	214	255	236
m <sup>3</sup> / household / month		26	24	23	21	21	20	18	19	22	20
m <sup>3</sup> / connection / month		59	52	48	45	46	38	38	41	64	58
Domestic (&ND) m <sup>3</sup> / connection / month		59	52	48	45	46	38	38	41	48	46
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	250	191
Water loss indicators											
Litres / capita / day		73	91	102	123	136	123	128	112	76	98
m <sup>3</sup> / household / month		7	8	9	11	13	12	12	10	7	8
m <sup>3</sup> / connection / month		15	18	20	24	28	23	25	22	19	24
UARL : Losses (litres / connection / day)		58	57	57	57	57	55	55	55	77	76
CARL : Losses (litres / connection / day)		406	485	394	478	554	461	492	424	501	570
Infrastructure Leakage Index (ILI)		7.0	8.5	7.0	8.4	9.7	8.4	9.0	7.8	6.5	7.5
CARL : Losses (m <sup>3</sup> / km mains / day)		20	26	21	26	29	29	31	26	24	28
% Population growth			2.01%	0.60%	1.50%	0.60%	11.40%	3.15%	1.55%	2.12%	2.12%
% Water demand growth			-0.04%	0.42%	3.42%	2.50%	-0.47%	3.90%	2.63%	4.50%	2.91%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	1.62%	1.62%	5.38%	2.06%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	-4.24%	-2.18%	9.93%	-1.45%
5 Year Annualised Population Growth							3.14%	3.37%	3.57%	3.69%	4.00%
5 Year Annualised Water Growth							1.15%	1.94%	2.38%	2.60%	2.68%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		EKURHULENI									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	2 830 679	2 892 820	2 910 177	2 953 829	2 971 555	3 081 528	3 178 493	3 227 756	3 296 125	3 365 931
Households served	No	892 587	912 185	917 658	931 422	937 010	936 763	1 015 484	1 078 979	1 122 991	1 168 804
Connections - total	No	377 263	378 727	396 390	421 409	426 295	497 570	501 954	517 012	578 496	533 952
Connections - metered	No	377 263	378 727	396 390	421 409	426 295	430 462	434 255	447 282	516 038	478 979
Domestic	No	377 263	378 727	396 390	421 409	426 295	430 462	434 255	447 282	516 038	478 979
Non-domestic	No	0	0	0	0	0	0	0	0	0	0
Connections - unmetered	No	0	0	0	0	0	67 108	67 699	69 730	62 458	54 973
Households / connection	No	2.4	2.4	2.3	2.2	2.2	1.9	2.0	2.1	1.9	2.2
Length of mains	km	8 384	8 416	8 809	9 365	9 473	10 077	11 155	11 489	11 570	10 096
Connections / km	No / km	45	45	45	45	45	49	45	45	50	53
Average system pressure	m	50	50	50	50	50	50	50	50	50	44
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	48%	48%	48%	48%	48%	48%	49%	48%
Consumer meter age	%	6%	6%	20%	20%	20%	20%	20%	20%	20%	20%
Illegal connections	%	6%	6%	12%	12%	12%	12%	12%	12%	12%	12%
Data transfer	%	8%	8%	16%	16%	16%	16%	16%	16%	17%	16%
System input volume	k/annum	282 970 013	288 375 444	313 659 638	317 977 186	328 769 346	322 249 616	332 555 664	338 742 752	346 582 721	356 640 839
Own sources	k/annum	0	0	0	0	0	0	0	0	0	0
Other sources	k/annum	282 970 013	288 375 444	313 659 638	317 977 186	328 769 346	322 249 616	332 555 664	338 742 752	346 582 721	356 640 839
Authorised Consumption	k/annum	215 700 847	235 004 771	254 623 170	193 888 712	225 207 002	218 162 990	227 135 519	232 716 271	236 369 415	238 375 817
Billed authorised	k/annum	215 700 847	235 004 771	254 623 170	193 888 712	199 057 077	193 973 397	204 396 405	205 497 030	206 909 884	221 773 953
Billed metered	k/annum	215 700 847	235 004 771	254 623 170	193 888 712	199 057 077	193 973 397	204 396 405	205 497 030	206 909 884	221 764 593
Domestic	k/annum	215 700 847	235 004 771	254 623 170	193 888 712	199 057 077	193 973 397	204 396 405	205 497 030	206 909 884	221 764 593
Non-domestic	k/annum	0	0	0	0	0	0	0	0	0	0
Export volume	k/annum	0	0	0	0	0	0	0	0	0	0
Billed unmetered	k/annum	0	0	0	0	0	0	0	0	0	9 360
Unbilled authorised	k/annum	0	0	0	0	26 149 925	24 189 593	22 739 114	27 219 241	29 459 531	16 601 864
Unbilled metered	k/annum	0	0	0	0	26 149 925	24 189 593	22 739 114	27 219 241	0	0
Unbilled unmetered	k/annum	0	0	0	0	0	0	0	0	29 459 531	16 601 864
Water Losses	k/annum	67 269 166	53 370 673	59 036 468	124 088 474	103 562 344	104 086 626	105 420 145	106 026 481	110 213 306	118 265 022
Commercial / Apparent losses	k/annum	13 453 833	10 674 135	28 337 505	59 562 468	49 709 925	49 961 580	50 601 670	50 892 711	54 004 520	56 767 211
Physical / Real losses	k/annum	53 815 333	42 696 538	30 698 963	64 526 006	53 852 419	54 125 046	54 818 476	55 133 770	56 208 786	61 497 811
UARL	k/annum	8 262 060	8 294 121	8 680 941	9 228 857	9 335 861	10 574 817	10 992 793	11 322 563	12 246 787	9 778 767
Potential real loss saving	k/annum	45 553 273	34 402 417	22 018 022	55 297 149	44 516 558	43 550 229	43 825 683	43 811 208	43 961 999	51 719 044
Revenue water	k/annum	215 700 847	235 004 771	254 623 170	193 888 712	199 057 077	193 973 397	204 396 405	205 497 030	206 909 884	221 773 953
Non-Revenue water	k/annum	67 269 166	53 370 673	59 036 468	124 088 474	129 712 269	128 276 219	128 159 259	133 245 722	139 672 837	134 866 886
Projected SIV without WDM	k/annum	No data	No data	No data	No data	No data	322 249 616	333 408 888	347 626 368	345 311 163	352 004 304
Projected SIV with WDM	k/annum	No data	No data	No data	No data	No data	322 249 616	324 048 977	334 414 443	335 951 252	338 792 379
Year ending		Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		76.2%	81.5%	81.2%	61.0%	60.5%	60.2%	61.5%	60.7%	59.7%	62.2%
% Non-revenue water		23.8%	18.5%	18.8%	39.0%	39.5%	39.8%	38.5%	39.3%	40.3%	37.8%
% Water Losses		23.8%	18.5%	18.8%	39.0%	31.5%	32.3%	31.7%	31.3%	31.8%	33.2%
System input volume unit consumption											
Litres / capita / day		274	273	295	295	303	287	287	288	288	290
m <sup>3</sup> / household / month		26	26	28	28	29	29	27	26	26	25
m <sup>3</sup> / connection / month		63	63	66	63	64	54	55	55	50	56
Authorised Unit Consumption											
Litres / capita / day		209	223	240	180	208	194	196	198	196	194
m <sup>3</sup> / household / month		20	21	23	17	20	19	19	18	18	17
m <sup>3</sup> / connection / month		48	52	54	38	44	37	38	38	34	37
Domestic (&ND) m <sup>3</sup> / connection / month		48	52	54	38	44	37	38	38	34	37
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Water loss indicators											
Litres / capita / day		65	51	56	115	95	93	91	90	92	96
m <sup>3</sup> / household / month		6	5	5	11	9	9	9	8	8	8
m <sup>3</sup> / connection / month		15	12	12	25	20	17	18	17	16	18
UARL : Losses (litres / connection / day)		60	60	60	60	60	58	60	60	58	50
CARL : Losses (litres / connection / day)		391	309	212	420	346	298	299	292	266	316
Infrastructure Leakage Index (ILI)		6.5	5.1	3.5	7.0	5.8	5.1	5.0	4.9	4.6	6.3
CARL : Losses (m <sup>3</sup> / km mains / day)		18	14	10	19	16	15	13	13	13	17
% Population growth			2.20%	0.60%	1.50%	0.60%	3.70%	3.15%	1.55%	2.12%	2.12%
% Water demand growth			1.91%	8.77%	1.38%	3.39%	-1.98%	3.20%	1.86%	2.31%	2.90%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	3.46%	4.26%	-0.67%	1.94%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	0.56%	3.20%	0.46%	0.85%
5 Year Annualised Population Growth							3.28%	3.01%	3.03%	2.87%	2.89%
5 Year Annualised Water Growth							2.63%	2.89%	1.55%	1.74%	1.64%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		CAPE TOWN									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	3 169 041	3 241 420	3 260 871	3 352 175	3 372 289	3 631 564	3 740 018	3 792 371	3 864 951	3 938 918
Households served	No	873 735	893 691	899 054	924 224	929 768	1 062 161	1 068 560	1 058 950	1 091 375	1 124 805
Connections - total	No	542 017	554 397	557 725	573 339	576 778	604 248	604 248	623 191	633 820	652 492
Connections - metered	No	542 017	554 397	557 725	573 339	576 778	604 248	604 248	623 191	628 756	631 492
Domesic	No	542 017	554 397	557 725	573 339	576 778	604 248	604 248	604 241	594 004	593 996
Non-domestic	No	0	0	0	0	0	0	0	18 950	34 752	37 496
Connections - unmetered	No	0	0	0	0	0	0	0	0	5 064	21 000
Households / connection	No	1.6	1.6	1.6	1.6	1.6	1.8	1.8	1.7	1.7	1.7
Length of mains	km	9 345	9 559	9 616	9 885	9 944	10 418	10 418	10 805	10 263	10 867
Connections / km	No / km	58	58	58	58	58	58	58	58	62	60
Average system pressure	m	50	50	55	55	55	55	55	55	60	60
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	15%	15%	15%	12%	12%	12%	11%	17%
Consumer meter age	%	6%	6%	7%	7%	7%	6%	6%	6%	5%	10%
Illegal connections	%	6%	6%	3%	3%	3%	3%	3%	3%	3%	4%
Data transfer	%	8%	8%	5%	5%	5%	3%	3%	3%	3%	3%
System input volume	kl/annum	282 738 423	294 495 896	308 431 938	315 555 297	325 691 626	331 062 488	294 861 095	330 040 938	320 921 723	314 773 795
Own sources	kl/annum	282 738 423	294 495 896	308 431 938	315 555 297	325 691 626	331 062 488	294 861 095	330 040 938	320 921 723	314 773 795
Other sources	kl/annum	0	0	0	0	0	0	0	0	0	0
Authorised Consumption	kl/annum	215 778 554	228 918 192	246 978 552	251 745 818	249 790 408	247 787 926	237 618 170	279 497 420	274 447 703	270 880 566
Billed authorised	kl/annum	215 778 554	228 918 192	246 978 552	251 745 818	249 790 408	247 787 926	237 028 448	262 499 805	256 624 501	248 429 833
Billed metered	kl/annum	180 746 365	197 293 056	242 740 152	251 745 818	249 790 408	247 787 926	229 078 955	262 499 805	256 624 501	248 429 833
Domesic	kl/annum	180 746 365	197 293 056	242 740 152	251 745 818	249 790 408	247 787 926	229 078 955	157 843 833	156 512 967	215 856 596
Non-domestic	kl/annum	0	0	0	0	0	0	0	70 847 785	67 076 986	0
Export volume	kl/annum	0	0	0	0	0	0	0	33 808 187	33 034 548	32 573 237
Billed unmetered	kl/annum	35 032 189	31 625 136	4 238 400	0	0	0	7 949 493	0	0	0
Unbilled authorised	kl/annum	0	0	0	0	0	0	589 722	16 997 615	17 823 202	22 450 733
Unbilled metered	kl/annum	0	0	0	0	0	0	0	13 535 555	15 696 322	13 630 733
Unbilled unmetered	kl/annum	0	0	0	0	0	0	589 722	3 462 060	2 126 880	8 820 000
Water Losses	kl/annum	66 959 869	65 577 704	61 453 386	63 809 479	75 901 218	83 274 562	57 242 925	50 543 518	46 474 020	43 893 229
Commercial / Apparent losses	kl/annum	13 391 974	13 115 541	9 218 008	9 571 422	11 385 183	9 992 947	6 869 151	6 065 222	5 112 142	7 461 849
Physical / Real losses	kl/annum	53 567 895	52 462 163	52 235 378	54 238 057	64 516 035	73 281 615	50 373 774	44 478 296	41 361 878	36 431 380
UARL	kl/annum	10 983 329	11 234 187	12 431 777	12 779 818	12 856 478	13 468 792	13 468 792	13 912 834	15 150 201	15 715 431
Potential real loss saving	kl/annum	42 584 566	41 227 976	39 803 601	41 458 239	51 659 557	59 812 822	36 904 982	30 565 462	26 211 677	20 715 949
Revenue water	kl/annum	215 778 554	228 918 192	246 978 552	251 745 818	249 790 408	247 787 926	237 028 448	262 499 805	256 624 501	248 429 833
Non-Revenue water	kl/annum	66 959 869	65 577 704	61 453 386	63 809 479	75 901 218	83 274 562	57 832 647	67 541 133	64 297 222	66 343 962
Projected SIV without WDM	kl/annum	No data	No data	308 431 938	318 548 100	328 391 236	338 538 525	348 999 366	359 783 446	493 318 500	504 180 558
Projected SIV with WDM	kl/annum	No data	No data	308 431 938	313 418 700	317 900 587	322 446 567	327 057 552	331 734 475	383 907 600	389 598 189
Source of information		DWA NIS StatsSA	DWA NIS StatsSA	DWA NIS StatsSA	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS MBI		
Comments											
Indicator as % of system input volume	Year ending	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
% Revenue water		76.3%	77.7%	80.1%	79.8%	76.7%	74.8%	80.4%	79.5%	80.0%	78.9%
% Non-revenue water		23.7%	22.3%	19.9%	20.2%	23.3%	25.2%	19.6%	20.5%	20.0%	21.1%
% Water Losses		23.7%	22.3%	19.9%	20.2%	23.3%	25.2%	19.4%	15.3%	14.5%	13.9%
System input volume unit consumption											
Litres / capita / day		244	249	259	258	265	250	216	214	204	196
m³ / household / month		27	27	29	28	29	26	23	23	22	21
m³ / connection / month		43	44	46	46	47	46	41	40	38	36
Authorised Unit Consumption											
Litres / capita / day		187	193	208	206	203	187	174	177	171	166
m³ / household / month		21	21	23	23	22	19	19	19	18	18
m³ / connection / month		33	34	37	37	36	34	33	33	32	30
Domesic (&ND) m³ / connection / month		33	34	37	37	36	34	33	24	24	32
Non-domestic m³ / connection / month		No data	No data	No data	No data	No data	No data	No data	312	161	0
Water loss indicators											
Litres / capita / day		58	55	52	52	62	63	42	37	33	31
m³ / household / month		6	6	6	6	7	7	4	4	4	3
m³ / connection / month		10	10	9	9	11	11	8	7	6	6
UARL : Losses (litres / connection / day)		56	56	61	61	61	61	61	61	65	66
CARL : Losses (litres / connection / day)		271	259	257	259	306	332	228	196	179	153
Infrastructure Leakage Index (ILI)		4.9	4.7	4.2	4.2	5.0	5.4	3.7	3.2	2.7	2.3
CARL : Losses (m³ / km mains / day)		16	15	15	15	18	19	13	11	11	9
% Population growth			2.28%	0.60%	2.80%	0.60%	7.69%	2.99%	1.40%	1.91%	1.91%
% Water demand growth			4.16%	4.73%	2.31%	3.21%	1.65%	-10.93%	11.93%	-2.76%	-1.92%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	3.09%	3.09%	37.12%	2.20%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	1.43%	1.43%	15.73%	1.48%
5 Year Annualised Population Growth								2.76%	2.90%	3.07%	2.89%
5 Year Annualised Water Growth								3.21%	0.02%	1.36%	0.34%



Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		ETHEKWINI									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	3 348 998	3 377 914	3 398 167	3 423 865	3 444 398	3 364 810	3 442 365	3 468 289	3 505 502	3 543 113
Households served	No	895 155	902 884	908 289	915 149	920 629	956 136	956 706	942 934	972 448	1 002 888
Connections - total	No	381 254	398 331	410 455	420 044	431 856	442 721	460 723	474 193	476 436	645 125
Connections - metered	No	381 254	398 331	410 455	420 044	431 856	442 721	460 723	474 193	476 436	488 270
Domestic	No	381 254	398 331	410 455	420 044	431 856	442 721	460 723	474 193	476 436	488 270
Non-domestic	No	0	0	0	0	0	0	0	0	0	0
Connections - unmetered	No	0	0	0	0	0	0	0	0	0	156 855
Households / connection	No	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.0	2.0	1.6
Length of mains	km	10 572	10 782	10 922	11 659	11 311	11 643	12 124	12 479	11 472	12 219
Connections / km	No / km	36	37	38	36	38	38	38	38	42	53
Average system pressure	m	50	50	54	54	54	54	54	54	48	53
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	20%	20%	20%	20%	20%	23%	23%	24%
Consumer meter age	%	6%	6%	6%	6%	6%	6%	6%	6%	7%	4%
Illegal connections	%	6%	6%	6%	6%	6%	6%	6%	9%	7%	18%
Data transfer	%	8%	8%	8%	8%	8%	8%	8%	8%	9%	2%
System input volume	kl/annum	288 217 464	294 379 376	303 628 029	320 877 966	331 525 801	332 941 393	314 000 000	317 551 273	321 595 048	332 848 060
Own sources	kl/annum	0	0	0	0	0	0	0	0	321 595 048	332 848 060
Other sources	kl/annum	288 217 464	294 379 376	303 628 029	320 877 966	331 525 801	332 941 393	314 000 000	317 551 273	0	0
Authorised Consumption	kl/annum	204 369 175	200 685 625	202 045 211	204 220 551	202 431 500	208 119 455	210 000 000	206 297 410	207 601 707	205 566 946
Billed authorised	kl/annum	204 369 175	200 685 625	202 045 211	204 220 551	202 431 500	208 119 455	210 000 000	205 086 705	202 961 287	201 826 426
Billed metered	kl/annum	204 369 175	200 685 625	202 045 211	204 220 551	202 431 500	208 119 455	210 000 000	205 086 705	202 961 287	201 826 426
Domestic	kl/annum	204 369 175	200 685 625	202 045 211	204 220 551	202 431 500	208 119 455	210 000 000	205 086 705	202 961 287	201 826 426
Non-domestic	kl/annum	No data	No data	No data	No data	No data	No data	No data	No data	0	0
Export volume	kl/annum	0	0	0	0	0	0	0	0	0	0
Billed unmetered	kl/annum	0	0	0	0	0	0	0	0	0	0
Unbilled authorised	kl/annum	0	0	0	0	0	0	0	1 210 705	4 640 420	3 740 520
Unbilled metered	kl/annum	0	0	0	0	0	0	0	328 500	4 640 420	299 242
Unbilled unmetered	kl/annum	0	0	0	0	0	0	0	882 205	0	3 441 278
Water Losses	kl/annum	83 848 289	93 693 751	101 582 818	116 657 415	129 094 301	124 821 938	104 000 000	111 253 863	113 993 341	127 281 114
Commercial / Apparent losses	kl/annum	16 769 658	18 738 750	20 316 564	23 331 483	25 818 860	24 964 388	20 800 000	25 693 552	26 218 468	30 547 467
Physical / Real losses	kl/annum	67 078 631	74 955 001	81 266 254	93 325 932	103 275 441	99 857 550	83 200 000	85 560 311	87 774 873	96 733 647
UARL	kl/annum	9 039 210	9 357 520	10 346 962	10 759 634	10 822 422	11 111 528	11 566 136	11 904 291	10 295 537	14 238 732
Potential real loss saving	kl/annum	58 039 421	65 597 481	70 919 293	82 566 298	92 453 019	88 746 022	71 633 864	73 656 020	77 479 336	82 494 914
Revenue water	kl/annum	204 369 175	200 685 625	202 045 211	204 220 551	202 431 500	208 119 455	210 000 000	205 086 705	202 961 287	201 826 426
Non-Revenue water	kl/annum	83 848 289	93 693 751	101 582 818	116 657 415	129 094 301	124 821 938	104 000 000	112 464 568	118 633 761	131 021 634
Projected SIV without WDM	kl/annum	No data	No data	303 628 029	308 668 254	313 792 147	319 001 097	324 296 515	329 679 837	331 064 069	332 448 300
Projected SIV with WDM	kl/annum	No data	No data	303 628 029	297 555 468	291 482 908	285 410 347	279 337 787	273 265 226	No data	299203470
Year ending		Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		70.9%	68.2%	66.5%	63.6%	61.1%	62.5%	66.9%	64.6%	63.1%	60.6%
% Non-revenue water		29.1%	31.8%	33.5%	36.4%	38.9%	37.5%	33.1%	35.4%	36.9%	39.4%
% Water Losses		29.1%	31.8%	33.5%	36.4%	38.9%	37.5%	33.1%	35.0%	35.4%	38.2%
System input volume unit consumption											
Litres / capita / day		236	239	245	257	264	271	250	251	251	257
m <sup>3</sup> / household / month		27	27	28	29	30	29	27	28	28	28
m <sup>3</sup> / connection / month		63	62	62	64	64	63	57	56	56	43
Authorised Unit Consumption											
Litres / capita / day		167	163	163	163	161	169	167	163	162	159
m <sup>3</sup> / household / month		19	19	19	19	18	18	18	18	18	17
m <sup>3</sup> / connection / month		45	42	41	41	39	39	38	36	36	27
Domestic (&ND) m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	No data	36
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Water loss indicators											
Litres / capita / day		69	76	82	93	103	102	83	88	89	98
m <sup>3</sup> / household / month		8	9	9	11	12	11	9	10	10	11
m <sup>3</sup> / connection / month		18	20	21	23	25	23	19	20	20	16
UARL : Losses (litres / connection / day)		65	64	69	70	69	69	69	69	59	60
CARL : Losses (litres / connection / day)		482	516	542	609	655	618	495	494	505	411
Infrastructure Leakage Index (ILI)		7.4	8.0	7.9	8.7	9.5	9.0	7.2	7.2	8.5	6.8
CARL : Losses (m <sup>3</sup> / km mains / day)		17	19	20	22	25	23	19	19	21	22
% Population growth			0.86%	0.60%	0.76%	0.60%	-2.31%	2.30%	0.75%	1.07%	1.07%
% Water demand growth			2.14%	3.14%	5.68%	3.32%	0.43%	-5.69%	1.13%	1.27%	3.50%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	1.66%	1.66%	0.42%	0.42%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	-2.13%	-2.17%	No data	No data
5 Year Annualised Population Growth							0.09%	0.38%	0.41%	0.47%	0.57%
5 Year Annualised Water Growth							2.93%	1.30%	0.90%	0.04%	0.08%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		TSHWANE									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	2 359 285	2 414 305	2 428 793	2 465 222	2 480 015	2 832 384	2 921 455	2 966 737	3 029 573	3 093 757
Households served	No	699 485	715 813	720 106	730 911	735 295	840 888	911 538	968 522	1 008 034	1 049 169
Connections - total	No	417 917	418 443	425 968	447 445	463 527	482 980	458 514	472 269	483 689	577 074
Connections - metered	No	412 723	413 424	420 919	442 320	458 372	477 747	432 675	445 655	456 889	530 674
Domestic	No	412 723	413 424	420 919	442 320	458 372	477 747	432 675	445 655	456 889	508 128
Non-domestic	No	0	0	0	0	0	0	0	0	0	22546
Connections - unmetered	No	5 194	5 019	5 049	5 125	5 155	5 233	25 839	26 614	26 800	46400
Households / connection	No	1.7	1.7	1.7	1.6	1.6	1.7	2.0	2.1	2.1	1.8
Length of mains	km	9 114	9 535	9 935	9 990	10 033	10 332	10 628	10 757	10 437	10 116
Connections / km	No / km	46	44	43	45	46	47	43	44	46	57
Average system pressure	m	50	50	50	50	50	50	50	50	50	55
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Consumer meter age	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Illegal connections	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Data transfer	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
System input volume	kl/annum	256 866 038	260 206 214	286 103 619	262 654 995	274 447 660	260 630 972	326 554 616	318 733 465	317 641 091	318 032 271
Own sources	kl/annum	0	0	54 513 224	52 946 639	55 014 086	45 565 670	74 092 743	90 689 710	90 378 895	75 077 070
Other sources	kl/annum	256 866 038	260 206 214	231 590 395	209 708 356	219 433 574	215 065 302	252 461 873	228 043 755	227 262 196	242 955 201
Authorised Consumption	kl/annum	219 921 231	188 619 803	211 020 897	192 379 814	200 798 023	195 064 410	217 229 729	240 902 105	246 034 830	246 694 060
Billed authorised	kl/annum	219 921 231	188 619 803	211 020 897	192 379 814	200 798 023	195 064 410	217 229 729	237 530 661	242 528 725	243 342 875
Billed metered	kl/annum	193 798 328	165 074 984	206 405 472	187 764 389	196 182 598	190 864 302	212 465 189	232 338 974	236 099 849	236 843 363
Domestic	kl/annum	193 798 328	165 074 984	206 405 472	187 764 389	196 182 598	190 864 302	196 670 504	214 754 509	220 121 242	162 969 131
Non-domestic	kl/annum	0	0	0	0	0	0	0	0	0	57 744 956
Export volume	kl/annum	0	0	0	0	0	0	15 794 685	17 584 465	15 978 607	16 129 276
Billed unmetered	kl/annum	26 122 903	23 544 819	4 615 425	4 615 425	4 615 425	4 200 108	4 764 540	5 191 687	6 428 876	6 499 512
Unbilled authorised	kl/annum	0	0	0	0	0	0	0	3 371 444	3 506 105	3 351 185
Unbilled metered	kl/annum	0	0	0	0	0	0	0	0	0	0
Unbilled unmetered	kl/annum	0	0	0	0	0	0	0	3 371 444	3 506 105	3 351 185
Water Losses	kl/annum	36 944 807	71 586 411	75 082 722	70 275 181	73 649 637	65 566 562	109 324 887	77 831 360	71 606 261	71 338 211
Commercial / Apparent losses	kl/annum	7 388 961	14 317 282	15 016 544	14 055 036	14 729 927	13 113 312	21 864 977	15 566 272	14 321 252	14 267 642
Physical / Real losses	kl/annum	29 555 846	57 269 129	60 066 178	56 220 145	58 919 710	52 453 250	87 459 910	62 265 088	57 285 009	57 070 569
UARL	kl/annum	9 095 431	9 241 558	9 482 936	9 814 320	10 063 250	10 445 567	10 185 524	10 428 802	10 490 414	12 923 225
Potential real loss saving	kl/annum	20 460 414	48 027 571	50 583 241	46 405 825	48 856 460	42 007 682	77 274 386	51 836 286	46 794 595	44 147 344
Revenue water	kl/annum	219 921 231	188 619 803	211 020 897	192 379 814	200 798 023	195 064 410	217 229 729	237 530 661	242 528 725	243 342 875
Non-Revenue water	kl/annum	36 944 807	71 586 411	75 082 722	70 275 181	73 649 637	65 566 562	109 324 887	81 202 804	75 112 366	74 689 396
Projected SIV without WDM	kl/annum	No data	No data	No data	No data	No data	No data	315 459 362	326 553 834	337 996 744	328 851 663
Projected SIV with WDM	kl/annum	No data	No data	No data	No data	No data	No data	315 459 362	319 067 302	327 009 930	321 396 401
	Year ending	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		85.6%	72.5%	73.8%	73.2%	73.2%	74.8%	66.5%	74.5%	76.4%	76.5%
% Non-revenue water		14.4%	27.5%	26.2%	26.8%	26.8%	25.2%	33.5%	25.5%	23.6%	23.5%
% Water Losses		14.4%	27.5%	26.2%	26.8%	26.8%	25.2%	33.5%	24.4%	22.5%	22.4%
System input volume unit consumption											
Litres / capita / day		298	295	323	292	303	252	291	278	273	267
m <sup>3</sup> / household / month		31	30	33	30	31	26	28	26	25	24
m <sup>3</sup> / connection / month		51	52	56	49	49	45	56	53	52	44
Authorised Unit Consumption											
Litres / capita / day		255	214	238	214	222	189	189	206	208	204
m <sup>3</sup> / household / month		26	22	24	22	23	19	18	19	19	18
m <sup>3</sup> / connection / month		44	38	41	36	36	34	37	39	40	33
Domestic (&ND) m <sup>3</sup> / connection / month		44	38	41	36	36	34	37	39	40	26
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	No data	213
Water loss indicators											
Litres / capita / day		43	81	85	78	81	63	103	72	65	63
m <sup>3</sup> / household / month		4	8	9	8	8	6	10	7	6	6
m <sup>3</sup> / connection / month		7	14	15	13	13	11	20	14	12	10
UARL : Losses (litres / connection / day)		60	61	61	60	59	59	61	60	59	61
CARL : Losses (litres / connection / day)		194	375	386	344	348	298	523	361	324	271
Infrastructure Leakage Index (ILI)		3.2	6.2	6.3	5.7	5.9	5.0	8.6	6.0	5.5	4.4
CARL : Losses (m <sup>3</sup> / km mains / day)		9	16	17	15	16	14	23	16	15	15
% Population growth			2.33%	0.60%	1.50%	0.60%	14.21%	3.14%	1.55%	2.12%	2.12%
% Water demand growth			1.30%	9.95%	-8.20%	4.49%	-5.03%	25.29%	-2.40%	-0.34%	0.12%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	3.52%	3.50%	-4.21%	1.57%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	1.14%	2.49%	-1.72%	0.42%
5 Year Annualised Population Growth								3.72%	3.89%	4.08%	4.21%
5 Year Annualised Water Growth								0.29%	4.65%	2.18%	3.87%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		NELSON MANDELA BAY									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	1 023 900	1 033 109	1 039 307	1 046 235	1 052 509	1 130 395	1 152 123	1 156 562	1 162 535	1 168 529
Households served	No	278 753	281 261	282 946	284 833	286 546	330 303	324 281	313 395	319 490	325 705
Connections - total	No	197 508	199 286	200 480	201 817	203 030	203 774	205 755	204 882	217 716	219 321
Connections - metered	No	188 542	190 239	191 379	192 655	193 813	194 523	196 414	195 218	217 594	219 158
Domestic	No	188 542	190 239	191 379	192 655	193 813	194 523	196 414	195 218	207 809	209 211
Non-domestic	No	0	0	0	0	0	0	0	0	9 785	9 947
Connections - unmetered	No	8 966	9 047	9 101	9 162	9 217	9 251	9 341	9 664	122	163
Households / connection	No	1.4	1.4	1.4	1.4	1.4	1.6	1.6	1.5	1.5	1.5
Length of mains	km	3 873	3 908	3 931	3 957	3 981	3 988	4 189	4 327	4 427	4 454
Connections / km	No / km	51	51	51	51	51	51	49	47	49	49
Average system pressure	m	50	50	60	60	60	60	60	60	60	60
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Consumer meter age	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Illegal connections	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Data transfer	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
System input volume	kl/annum	81 870 640	84 594 000	89 757 111	96 600 000	101 452 000	94 036 000	87 755 000	91 700 100	99 216 287	107 665 114
Own sources	kl/annum	81 870 640	84 594 000	89 757 111	96 600 000	101 452 000	94 036 000	87 755 000	91 700 100	99 216 287	107 665 114
Other sources	kl/annum	0	0	0	0	0	0	0	0	0	0
Authorised Consumption	kl/annum	61 672 000	62 435 000	60 344 783	63 300 000	66 414 272	58 914 000	52 501 520	70 202 390	65 795 067	64 274 558
Billed authorised	kl/annum	61 672 000	62 435 000	60 344 783	63 300 000	66 414 272	58 914 000	52 501 520	58 656 520	57 817 971	62 110 664
Billed metered	kl/annum	55 912 000	61 911 200	58 344 783	60 800 000	63 914 272	56 414 000	51 869 000	58 024 000	57 004 371	61 297 064
Domestic	kl/annum	55 912 000	61 911 200	58 344 783	60 800 000	63 914 272	56 414 000	51 869 000	58 024 000	32 622 396	35 412 884
Non-domestic	kl/annum	0	0	0	0	0	0	0	0	21 827 109	22 332 209
Export volume	kl/annum	0	0	0	0	0	0	0	0	2 554 866	3 551 971
Billed unmetered	kl/annum	5 760 000	523 800	2 000 000	2 500 000	2 500 000	2 500 000	632 520	632 520	813 600	813 600
Unbilled authorised	kl/annum	0	0	0	0	0	0	0	11 545 870	7 977 096	2 163 894
Unbilled metered	kl/annum	0	0	0	0	0	0	0	5 920 870	5 992 770	10 792
Unbilled unmetered	kl/annum	0	0	0	0	0	0	0	5 625 000	1 984 326	2 153 102
Water Losses	kl/annum	20 198 640	22 159 000	29 412 328	33 300 000	35 037 728	35 122 000	35 253 480	21 497 710	33 421 220	43 390 556
Commercial / Apparent losses	kl/annum	4 039 728	4 431 800	5 882 466	6 660 000	7 007 546	7 024 400	7 050 696	4 299 542	6 684 244	8 678 111
Physical / Real losses	kl/annum	16 158 912	17 727 200	23 529 862	26 640 000	28 030 182	28 097 600	28 202 784	17 198 168	26 736 976	34 712 445
UARL	kl/annum	4 155 801	4 193 212	5 062 002	5 095 761	5 126 388	5 142 190	5 256 131	5 295 236	5 559 508	5 598 271
Potential real loss saving	kl/annum	12 003 111	13 533 988	18 467 860	21 544 239	22 903 794	22 955 410	22 946 653	11 902 932	21 177 468	29 114 174
Revenue water	kl/annum	61 672 000	62 435 000	60 344 783	63 300 000	66 414 272	58 914 000	52 501 520	58 656 520	57 817 971	62 110 664
Non-Revenue water	kl/annum	20 198 640	22 159 000	29 412 328	33 300 000	35 037 728	35 122 000	35 253 480	33 043 580	41 398 316	45 554 450
Projected SIV without WDM	kl/annum	No data	No data	No data	No data	101 452 000	105 002 820	108 677 919	112 481 646	116 418 503	120 493 151
Projected SIV with WDM	kl/annum	No data	No data	No data	No data	101 452 000	98 712 625	95 973 250	93 233 875	90 494 500	87 755 125
Year ending		Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		75.3%	73.8%	67.2%	65.5%	65.5%	62.7%	59.8%	64.0%	58.3%	57.7%
% Non-revenue water		24.7%	26.2%	32.8%	34.5%	34.5%	37.3%	40.2%	36.0%	41.7%	42.3%
% Water Losses		24.7%	26.2%	32.8%	34.5%	34.5%	37.3%	40.2%	23.4%	33.7%	40.3%
System input volume unit consumption											
Litres / capita / day		219	224	237	253	264	228	209	217	228	244
m <sup>3</sup> / household / month		24	25	26	28	30	24	23	24	25	27
m <sup>3</sup> / connection / month		35	35	37	40	42	38	36	37	37	40
Authorised Unit Consumption											
Litres / capita / day		165	166	159	166	173	143	125	166	149	142
m <sup>3</sup> / household / month		18	18	18	19	19	15	13	19	16	16
m <sup>3</sup> / connection / month		26	26	25	26	27	24	21	29	24	23
Domestic (&ND) m <sup>3</sup> / connection / month		26	26	25	26	27	24	21	29	17	15
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	186	187
Water loss indicators											
Litres / capita / day		54	59	78	87	91	85	84	51	79	102
m <sup>3</sup> / household / month		6	7	9	10	10	9	9	6	9	11
m <sup>3</sup> / connection / month		9	9	12	14	14	14	14	9	13	16
UARL : Losses (litres / connection / day)		58	58	69	69	69	69	70	71	70	70
CARL : Losses (litres / connection / day)		224	244	322	362	378	378	376	230	336	434
Infrastructure Leakage Index (ILI)		3.9	4.2	4.6	5.2	5.5	5.5	5.4	3.2	4.8	6.2
CARL : Losses (m <sup>3</sup> / km mains / day)		11	12	16	18	19	19	18	11	17	21
% Population growth			0.90%	0.60%	0.67%	0.60%	7.40%	1.92%	0.39%	0.52%	0.52%
% Water demand growth			3.33%	6.10%	7.62%	5.02%	-7.31%	-6.68%	4.50%	8.20%	8.52%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	3.50%	3.50%	3.50%	3.50%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	-2.78%	-2.85%	-2.94%	-3.03%
5 Year Annualised Population Growth							2.00%	2.20%	2.16%	2.13%	2.11%
5 Year Annualised Water Growth							2.81%	0.74%	0.43%	0.54%	1.20%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		MANGAUNG									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	663 407	667 591	671 597	674 285	678 330	735 101	747 431	748 548	749 632	750 719
Households served	No	199 616	200 876	202 081	202 887	204 103	222 900	231 921	237 463	243 119	248 911
Connections - total	No	158 768	158 768	158 768	158 768	159 579	167 954	167 954	170 377	161 837	142 310
Connections - metered	No	89 757	102 529	102 378	107 840	113 344	115 727	115 727	126 583	123 142	133 972
Domestic	No	89 757	102 529	102 378	107 840	113 344	115 727	115 727	126 583	123 142	133 972
Non-domestic	No	0	0	0	0	0	0	0	0	0	0
Connections - unmetered	No	69 011	56 239	56 390	50 928	46 235	52 227	52 227	43 794	38 695	8 338
Households / connection	No	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.5	1.7
Length of mains	km	3 345	3 356	3 368	3 384	3 396	3 401	3 428	3 658	3 658	3 658
Connections / km	No / km	47	47	47	47	47	49	49	47	44	39
Average system pressure	m	50	50	54	54	54	54	54	54	58	57
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Consumer meter age	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Illegal connections	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Data transfer	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
System input volume	kl/annum	62 328 407	63 962 428	72 696 207	75 442 966	79 293 547	79 085 845	76 967 193	82 933 978	85 094 142	86 571 262
Own sources	kl/annum	0	0	0	0	0	0	0	0	0	0
Other sources	kl/annum	62 328 407	63 962 428	72 696 207	75 442 966	79 293 547	79 085 845	76 967 193	82 933 978	85 094 142	86 571 262
Authorised Consumption	kl/annum	37 363 127	36 855 554	34 681 776	36 855 554	37 912 025	39 305 132	53 123 304	50 829 701	55 407 215	62 215 630
Billed authorised	kl/annum	37 363 127	36 855 554	34 681 776	36 855 554	37 912 025	39 305 132	53 123 304	47 174 698	53 460 449	59 375 646
Billed metered	kl/annum	37 363 127	36 855 554	34 681 776	36 855 554	37 912 025	39 305 132	53 123 304	47 174 698	53 460 449	59 375 646
Domestic	kl/annum	37 363 127	36 855 554	34 681 776	36 855 554	37 912 025	39 305 132	53 123 304	47 174 698	53 460 449	59 375 646
Non-domestic	kl/annum	0	0	0	0	0	0	0	0	0	0
Export volume	kl/annum	0	0	0	0	0	0	0	0	0	0
Billed unmetered	kl/annum	0	0	0	0	0	0	0	0	0	0
Unbilled authorised	kl/annum	0	0	0	0	0	0	0	3 655 003	1 946 766	2 839 984
Unbilled metered	kl/annum	0	0	0	0	0	0	0	3 655 003	1 946 766	0
Unbilled unmetered	kl/annum	0	0	0	0	0	0	0	0	0	2 839 984
Water Losses	kl/annum	24 965 280	27 106 874	38 014 431	38 587 412	41 381 522	39 780 713	23 843 889	32 104 277	29 686 927	24 355 632
Commercial / Apparent losses	kl/annum	4 993 056	5 421 375	7 602 886	7 717 482	8 276 304	7 956 143	4 768 778	6 420 855	5 937 385	4 871 126
Physical / Real losses	kl/annum	19 972 224	21 685 499	30 411 545	30 869 930	33 105 218	31 824 570	19 075 111	25 683 422	23 749 542	19 484 506
UARL	kl/annum	3 416 845	3 420 459	3 698 353	3 704 029	3 721 075	3 854 905	3 864 354	3 984 290	4 134 789	3 738 492
Potential real loss saving	kl/annum	16 555 379	18 265 040	26 713 192	27 165 900	29 384 143	27 969 665	15 210 757	21 699 132	19 614 753	15 746 014
Revenue water	kl/annum	37 363 127	36 855 554	34 681 776	36 855 554	37 912 025	39 305 132	53 123 304	47 174 698	53 460 449	59 375 646
Non-Revenue water	kl/annum	24 965 280	27 106 874	38 014 431	38 587 412	41 381 522	39 780 713	23 843 889	35 759 280	31 633 693	27 195 616
Projected SIV without WDM	kl/annum	No data	No data	No data	No data	No data	No data	No data	82 933 978	85 421 997	87 984 657
Projected SIV with WDM	kl/annum	No data	No data	No data	No data	No data	No data	No data	82 933 978	83 181 997	83 504 657
	Year ending	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		59.9%	57.6%	47.7%	48.9%	47.8%	49.7%	69.0%	56.9%	62.8%	68.6%
% Non-revenue water		40.1%	42.4%	52.3%	51.1%	52.2%	50.3%	31.0%	43.1%	37.2%	31.4%
% Water Losses		40.1%	42.4%	52.3%	51.1%	52.2%	50.3%	31.0%	38.7%	34.9%	28.1%
System input volume unit consumption											
Litres / capita / day		257	262	297	307	320	295	282	304	311	316
m <sup>3</sup> / household / month		26	27	30	31	32	30	28	29	29	29
m <sup>3</sup> / connection / month		33	34	38	40	41	39	38	41	44	51
Authorised Unit Consumption											
Litres / capita / day		154	151	141	150	153	146	195	186	203	227
m <sup>3</sup> / household / month		16	15	14	15	15	15	19	18	19	21
m <sup>3</sup> / connection / month		20	19	18	19	20	20	26	25	29	36
Domestic (&ND) m <sup>3</sup> / connection / month		20	19	18	19	20	20	26	25	29	36
Non-domestic m <sup>3</sup> / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Water loss indicators											
Litres / capita / day		103	111	155	157	167	148	87	118	108	89
m <sup>3</sup> / household / month		10	11	16	16	17	15	9	11	10	8
m <sup>3</sup> / connection / month		13	14	20	20	22	20	12	16	15	14
UARL : Losses (litres / connection / day)		59	59	64	64	64	63	63	64	70	72
CARL : Losses (litres / connection / day)		345	374	525	533	568	519	311	413	402	375
Infrastructure Leakage Index (ILI)		5.8	6.3	8.2	8.3	8.9	8.3	4.9	6.4	5.7	5.2
CARL : Losses (m <sup>3</sup> / km mains / day)		16	18	25	25	27	26	15	19	18	15
% Population growth			0.63%	0.60%	0.40%	0.60%	8.37%	1.68%	0.15%	0.14%	0.15%
% Water demand growth			2.62%	13.65%	3.78%	5.10%	-0.26%	-2.68%	7.75%	2.60%	1.74%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	No data	No data	3.00%	3.00%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	No data	No data	0.30%	0.39%
5 Year Annualised Population Growth							2.07%	2.29%	2.19%	2.14%	2.05%
5 Year Annualised Water Growth							4.88%	3.77%	2.67%	2.44%	1.77%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		BUFFALO									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	715 216	715 216	719 501	724 287	728 624	740 981	755 173	758 016	761 849	765 705
Households served	No	204 288	204 288	205 495	206 874	208 096	227 693	223 621	216 246	220 363	224 560
Connections - total	No	199 904	199 904	201 086	202 435	204 051	194 877	194 884	200 733	217 652	233 259
Connections - metered	No	156 828	156 828	157 754	158 813	160 081	152 884	152 889	157 478	109 908	111 565
Domestic	No	156 828	156 828	157 754	158 813	160 081	152 884	152 889	157 478	103 652	104 639
Non-domestic	No	0	0	0	0	0	0	0	0	6 256	6 926
Connections - unmetered	No	43 077	43 077	43 331	43 622	43 970	41 993	41 995	43 255	107 744	121 694
Households / connection	No	1.0	1.0	1.0	1.0	1.0	1.2	1.1	1.1	1.0	1.0
Length of mains	km	4 018	4 018	4 022	4 049	4 081	3 898	3 898	4 015	2 954	2 954
Connections / km	No / km	50	50	50	50	50	50	50	50	74	79
Average system pressure	m	50	50	50	50	50	50	50	50	50	55
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	20%	20%	20%	20%	20%	20%	24%	20%
Consumer meter age	%	6%	6%	6%	6%	6%	6%	6%	6%	8%	6%
Illegal connections	%	6%	6%	6%	6%	6%	6%	6%	6%	8%	6%
Data transfer	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
System input volume	kl/annum	57 466 405	56 580 616	58 453 856	62 626 224	63 038 875	62 652 039	60 000 000	62 276 300	64 134 932	65 469 165
Own sources	kl/annum	57 466 405	56 580 616	58 453 856	62 626 224	63 038 875	62 652 039	60 000 000	62 276 300	36 297 319	36 774 434
Other sources	kl/annum	0	0	0	0	0	0	0	0	27 837 613	28 694 731
Authorised Consumption	kl/annum	33 303 452	33 585 568	33 660 073	36 869 253	34 733 505	37 620 667	30 000 000	39 160 850	35 591 309	40 587 056
Billed authorised	kl/annum	33 303 452	33 585 568	33 660 073	36 869 253	34 733 505	37 620 667	30 000 000	33 842 800	34 845 735	39 581 247
Billed metered	kl/annum	30 719 002	31 127 020	30 847 454	33 485 690	31 448 300	33 841 267	27 000 000	30 827 900	27 726 295	28 049 625
Domestic	kl/annum	30 719 002	31 127 020	30 847 454	33 485 690	31 448 300	33 841 267	27 000 000	30 827 900	19 293 645	19 706 752
Non-domestic	kl/annum	0	0	0	0	0	0	0	0	8 432 650	8 342 873
Export volume	kl/annum	0	0	0	0	0	0	0	0	0	0
Billed unmetered	kl/annum	2 584 450	2 458 548	2 812 619	3 383 563	3 285 205	3 779 400	3 000 000	3 014 900	7 119 440	11 531 622
Unbilled authorised	kl/annum	0	0	0	0	0	0	0	5 318 050	745 574	1 005 809
Unbilled metered	kl/annum	0	0	0	0	0	0	0	3 777 750	617 304	874 871
Unbilled unmetered	kl/annum	0	0	0	0	0	0	0	1 540 300	128 270	130 938
Water Losses	kl/annum	24 162 953	22 995 048	24 793 783	25 756 971	28 305 370	25 031 372	30 000 000	23 115 450	28 543 623	24 882 109
Commercial / Apparent losses	kl/annum	4 832 591	4 599 010	4 958 757	5 151 394	5 661 074	5 006 274	6 000 000	4 623 090	6 879 013	4 976 422
Physical / Real losses	kl/annum	19 330 362	18 396 038	19 835 026	20 605 577	22 644 296	20 025 098	24 000 000	18 492 360	21 664 610	19 905 687
UARL	kl/annum	4 238 436	4 238 436	4 256 983	4 285 549	4 319 769	4 125 554	4 125 691	4 249 518	4 148 108	4 813 567
Potential real loss saving	kl/annum	15 091 926	14 157 602	15 578 044	16 320 028	18 324 527	15 899 544	19 874 309	14 242 842	17 516 502	15 092 120
Revenue water	kl/annum	33 303 452	33 585 568	33 660 073	36 869 253	34 733 505	37 620 667	30 000 000	33 842 800	34 845 735	39 581 247
Non-Revenue water	kl/annum	24 162 953	22 995 048	24 793 783	25 756 971	28 305 370	25 031 372	30 000 000	28 433 500	29 289 197	25 887 918
Projected SIV without WDM	kl/annum	No data	No data	No data	No data	No data	No data	No data	62 276 300	63 272 721	64 285 084
Projected SIV with WDM	kl/annum	No data	No data	No data	No data	No data	No data	No data	62 276 300	62 072 721	61 885 084
	Year ending	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		58.0%	59.4%	57.6%	58.9%	55.1%	60.0%	50.0%	54.3%	54.3%	60.5%
% Non-revenue water		42.0%	40.6%	42.4%	41.1%	44.9%	40.0%	50.0%	45.7%	45.7%	39.5%
% Water Losses		42.0%	40.6%	42.4%	41.1%	44.9%	40.0%	50.0%	37.1%	44.5%	38.0%
System input volume unit consumption											
Litres / capita / day		220	217	223	237	237	232	218	225	231	234
m³ / household / month		23	23	24	25	25	23	22	24	24	24
m³ / connection / month		24	24	24	26	26	27	26	26	25	23
Authorised Unit Consumption											
Litres / capita / day		128	129	128	139	131	139	109	142	128	145
m³ / household / month		14	14	14	15	14	14	11	15	13	15
m³ / connection / month		14	14	14	15	14	16	13	16	14	14
Domestic (&ND) m³ / connection / month		14	14	14	15	14	16	13	16	11	12
Non-domestic m³ / connection / month		No data	No data	No data	No data	No data	No data	No data	No data	112	100
Water loss indicators											
Litres / capita / day		93	88	94	97	106	93	109	84	103	89
m³ / household / month		10	9	10	10	11	9	11	9	11	9
m³ / connection / month		10	10	10	11	12	11	13	10	11	9
UARL : Losses (litres / connection / day)		58	58	58	58	58	58	58	58	52	57
CARL : Losses (litres / connection / day)		265	252	270	279	304	282	337	252	273	234
Infrastructure Leakage Index (ILI)		4.6	4.3	4.7	4.8	5.2	4.9	5.8	4.4	5.2	4.1
CARL : Losses (m³ / km mains / day)		13	13	14	14	15	14	17	13	20	18
% Population growth			0.00%	0.60%	0.67%	0.60%	1.70%	1.92%	0.38%	0.51%	0.51%
% Water demand growth			-1.54%	3.31%	7.14%	0.66%	-0.61%	-4.23%	3.79%	2.98%	2.08%
% Water demand growth without WDM		No data	No data	No data	No data	No data	No data	No data	No data	1.60%	1.60%
% Water demand growth with WDM		No data	No data	No data	No data	No data	No data	No data	No data	-0.33%	-0.30%
5 Year Annualised Population Growth							0.71%	1.09%	1.05%	1.02%	1.00%
5 Year Annualised Water Growth							1.74%	1.18%	1.27%	0.48%	0.76%

Business Intelligence Support: Activity: Metropolitan Municipality Water Balance Assessment 2015

Updated Nov 2015		TOTAL METRO PERSPECTIVE									
Year		1 Jul 04 - 30 Jun 05	1 Jul 05 - 30 Jun 06	1 Jul 06 - 30 Jun 07	1 Jul 07 - 30 Jun 08	1 Jul 08 - 30 Jun 09	1 Jul 09 - 30 Jun 10	1 Jul 10 - 30 Jun 11	1 Jul 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	1 Jul 13 - 30 Jun 14
Population served	No	17 793 761	18 099 551	18 208 129	18 476 303	18 587 141	19 816 331	20 371 910	20 621 863	20 969 130	21 323 038
Households served	No	5 250 522	5 342 134	5 374 153	5 453 392	5 486 078	5 900 496	6 166 982	6 341 067	6 564 611	6 796 378
Connections - total	No	2 804 486	2 871 639	2 936 042	3 016 783	3 033 036	3 280 302	3 286 404	3 375 800	3 328 557	3 585 719
Connections - metered	No	2 457 058	2 557 435	2 642 937	2 759 330	2 811 028	2 973 035	2 956 661	3 046 122	2 958 844	3 070 724
Domestic	No	2 457 058	2 557 435	2 642 937	2 759 330	2 811 028	2 973 035	2 956 661	3 027 172	2 864 012	2 945 005
Non-domestic	No	0	0	0	0	0	0	0	18 950	94 832	125 719
Connections - unmetered	No	347 428	314 205	293 105	257 453	222 008	307 267	329 743	329 678	369 713	514 995
Households / connection	No	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9
Length of mains	km	59 257	60 180	61 390	63 246	63 209	64 824	67 006	69 056	66 549	66 211
Connections / km	No / km	47	48	48	48	48	51	49	49	50	54
Average system pressure	m	50	50	53	53	53	53	53	53	55	56
Time system pressurised	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apparent losses	%	20%	20%	28%	30%	29%	29%	30%	31%	24%	28%
Consumer meter age	%	6%	6%	9%	10%	10%	10%	10%	10%	9%	10%
Illegal connections	%	6%	6%	8%	8%	8%	8%	9%	9%	6%	11%
Data transfer	%	8%	8%	11%	11%	11%	11%	11%	11%	9%	8%
System input volume	kl/annum	1 787 408 771	1 817 350 178	1 909 458 405	1 944 774 121	2 009 569 099	1 985 614 506	2 015 253 568	2 078 290 807	2 115 650 080	2 158 763 399
Own sources	kl/annum	422 075 468	435 670 512	511 156 129	527 728 160	545 196 587	533 316 197	516 708 838	574 707 048	868 409 272	867 138 473
Other sources	kl/annum	1 365 333 303	1 381 679 666	1 398 302 276	1 417 045 961	1 464 372 512	1 452 298 309	1 498 544 730	1 503 583 759	1 247 240 808	1 291 624 926
Authorised Consumption	kl/annum	1 364 984 915	1 336 101 823	1 379 993 157	1 300 299 454	1 331 110 459	1 315 652 240	1 342 739 242	1 471 757 991	1 557 530 734	1 537 101 675
Billed authorised	kl/annum	1 364 984 915	1 336 101 823	1 379 993 157	1 300 299 454	1 304 960 534	1 291 462 647	1 319 410 406	1 394 929 798	1 422 171 426	1 417 576 960
Billed metered	kl/annum	1 225 977 509	1 204 002 568	1 287 661 946	1 269 960 683	1 279 901 121	1 259 720 492	1 287 386 853	1 368 306 503	1 387 068 822	1 377 897 424
Domestic	kl/annum	1 225 977 509	1 204 002 568	1 287 661 946	1 269 960 683	1 279 901 121	1 259 720 492	1 271 592 168	1 246 066 066	1 101 419 354	1 121 187 036
Non-domestic	kl/annum								70 847 785	229 483 438	200 116 330
Export volume	kl/annum	0	0	0	0	0	0	15 794 685	51 392 652	56 166 030	56 594 058
Billed unmetered	kl/annum	139 007 406	132 099 255	92 331 211	30 338 771	25 059 413	31 742 155	32 023 553	26 623 295	35 102 604	39 679 536
Unbilled authorised	kl/annum	0	0	0	0	26 149 925	24 189 593	23 328 836	76 828 193	135 359 308	119 524 715
Unbilled metered	kl/annum	0	0	0	0	26 149 925	24 189 593	22 739 114	61 947 184	32 399 687	14 815 638
Unbilled unmetered	kl/annum	0	0	0	0	0	0	589 722	14 881 009	102 959 621	104 709 077
Water Losses	kl/annum	422 423 856	481 248 355	529 465 248	644 474 667	678 458 640	669 962 266	672 514 326	606 532 816	558 119 346	621 661 724
Commercial / Apparent losses	kl/annum	84 484 771	96 249 671	147 368 454	194 849 179	199 199 427	194 930 442	200 926 872	187 225 307	144 694 376	174 681 467
Physical / Real losses	kl/annum	337 939 085	384 998 684	382 096 794	449 625 488	479 259 213	475 031 824	471 587 454	419 307 509	413 424 970	446 980 257
UARL	kl/annum	60 411 289	61 695 032	66 047 059	67 903 911	68 146 926	72 377 206	73 236 494	75 295 707	77 658 813	82 915 638
Potential real loss saving	kl/annum	277 527 796	323 303 652	316 049 736	381 721 577	411 112 286	402 654 618	398 350 960	344 011 802	335 766 157	364 064 620
Revenue water	kl/annum	1 364 984 915	1 336 101 823	1 379 993 157	1 300 299 454	1 304 960 534	1 291 462 647	1 319 410 406	1 394 929 798	1 422 171 426	1 417 576 960
Non-Revenue water	kl/annum	422 423 856	481 248 355	529 465 248	644 474 667	704 608 565	694 151 859	695 843 162	683 361 009	693 478 654	741 186 439
Projected SIV without WDM	kl/annum								2 152 197 298	2 305 938 422	2 348 925 210
Projected SIV with WDM	kl/annum								1 975 991 477		2 093 865 518
Year ending		Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14
Indicator as % of system input volume											
% Revenue water		76.4%	73.5%	72.3%	66.9%	64.9%	65.0%	65.5%	67.1%	67.2%	65.7%
% Non-revenue water		23.6%	26.5%	27.7%	33.1%	35.1%	35.0%	34.5%	32.9%	32.8%	34.3%
% Water Losses		23.6%	26.5%	27.7%	33.1%	33.8%	33.7%	33.4%	29.2%	26.4%	28.8%
System input volume unit consumption											
Litres / capita / day		275	275	287	288	296	275	269	269	269	270
m <sup>3</sup> / household / month		28	28	30	30	31	28	27	27	26	26
m <sup>3</sup> / connection / month		53	53	54	54	55	50	51	50	52	49
Authorised Unit Consumption											
Litres / capita / day		210	202	208	193	196	182	178	189	196	190
m <sup>3</sup> / household / month		22	21	21	20	20	19	18	19	19	18
m <sup>3</sup> / connection / month		41	39	39	36	37	33	34	35	38	34
Domestic (&ND) m <sup>3</sup> / connection / month		41	39	39	36	37	33	34	34	33	31
Non-domestic m <sup>3</sup> / connection / month											
Water loss indicators											
Litres / capita / day		65	73	80	96	100	93	90	81	73	80
m <sup>3</sup> / household / month		7	8	8	10	10	9	9	8	7	8
m <sup>3</sup> / connection / month		13	14	15	18	19	17	17	15	14	14
UARL : Losses (litres / connection / day)		59	59	62	62	62	60	61	61	64	63
CARL : Losses (litres / connection / day)		330	367	357	408	433	397	393	340	340	342
Infrastructure Leakage Index (ILI)		5.59	6.24	5.79	6.62	7.03	6.56	6.44	5.57	5.32	5.39
CARL : Losses (m <sup>3</sup> / km mains / day)		16	18	17	19	21	20	19	17	17	18
% Population growth			1.72%	0.60%	1.47%	0.60%	6.61%	2.80%	1.23%	1.68%	1.69%
% Water demand growth			1.68%	5.07%	1.85%	3.33%	-1.19%	1.49%	3.13%	1.80%	2.04%
% Water demand growth without WDM											
% Water demand growth with WDM											
5 Year Annualised Population Growth							2.18%	2.39%	2.52%	2.56%	2.78%
5 Year Annualised Water Growth							2.13%	2.09%	1.71%	1.70%	1.44%