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Secondary City Non-Revenue/Water Loss Assessment

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Business Intelligence Support

Secondary Cities National Non-revenue Water / Water Loss Assessment

EXECUTIVE SUMMARY

INTRODUCTION

There are nineteen Secondary Cities in South Africa in accordance with the Municipal Infrastructure Investment Framework categorisation. They are classified as B1 municipalities, or those local municipalities with the biggest budgets. They provide water services to approximately 7.4 million people or 14% of the South African population and utilise about 14% of the total urban water use. The water resources situation in these municipal areas has been investigated over the past few years by the Department of Water Affairs (DWA) and in each case water conservation and water demand management (WC/WDM) has been identified as a key intervention to balance available supply against the projected future demands.

The aim of this assessment is to review the status of non-revenue water, water losses, water consumption and water use efficiency within the Secondary Cities. Calculations are based on the International Water Association (IWA) standard water balance model, as modified slightly for South African conditions in order to accommodate the “free basic water” component. Previous studies undertaken by the Water Research Commission (WRC) and DWA have provided significant detail on the methodology and terminology, which is not repeated in this review.

Madibeng, Emalahleni and City of Matlosana can provide almost no credible information and were excluded from the trend analysis. Very few municipalities can provide a 2014 target except where these targets were set by the various reconciliation strategies.

RESULTS

System Input Volume = 537.038	Authorised consumption = 328.476	Billed authorised = 325.495	Billed metered = 302.235	Revenue water = 325.495
			Billed unmetered = 23.260	
	Water losses = 208.562	Apparent losses = 41.712	Apparent losses = 41.712	Non-revenue water = 211.543
		Real Losses = 166.850	Real Losses = 166.850	

Figure 1: Water balance (2011/12); for 16 Secondary Cities

From **Figure 1** it can be seen that for the 16 Secondary Cities for which information was available, the NRW and water losses are 211.5 million m³/annum (39.4%) and 208.5 million m³/annum (38.8%) respectively, whilst their SIV is 537.0 million m³/annum. NRW and water losses for the Secondary Cities will be well above 40% if the remaining three municipalities are included in the analyses.

Table 1 provides a comparison of the Secondary Cities with the Metros for Dec 2012 and the National NRW assessment for Jun 2010.

Table 1: KPI comparison

KPI	Unit	Metros (Dec 2012)	National (Jun 2010)	Secondary Cities (Jun 2012)
SIV	million m ³ /a	2085.0	3190.2	537.0
NRW	million m ³ /a	683.4	1174.7	211.5
% NRW	%	33.8	36.8	39.4
Water Loss	million m ³ /a	612	1014.5	208.6
% Water loss	%	29.7	31.8	38.8
SIV Unit consumption	ℓ / capita / day	274	235	264
Billed Unit consumption	ℓ / capita / day	190	149	160
ILI	-	5.7	6.8	6.2

The Secondary Cities are performing significantly worse than the Metros and national average figures. The reason for this is assumed to be staff and technical skills problems, exacerbated by a lack of budget allocation and prioritisation. If a typical production cost for water of R5.00/m³ is used as a guide, the financial cost to the sixteen Secondary Cities for their Non-Revenue Water is in the order of R 2.685 billion per annum. Since there will always be an element of NRW, at best only 50% of this R2.685 billion can realistically be saved.

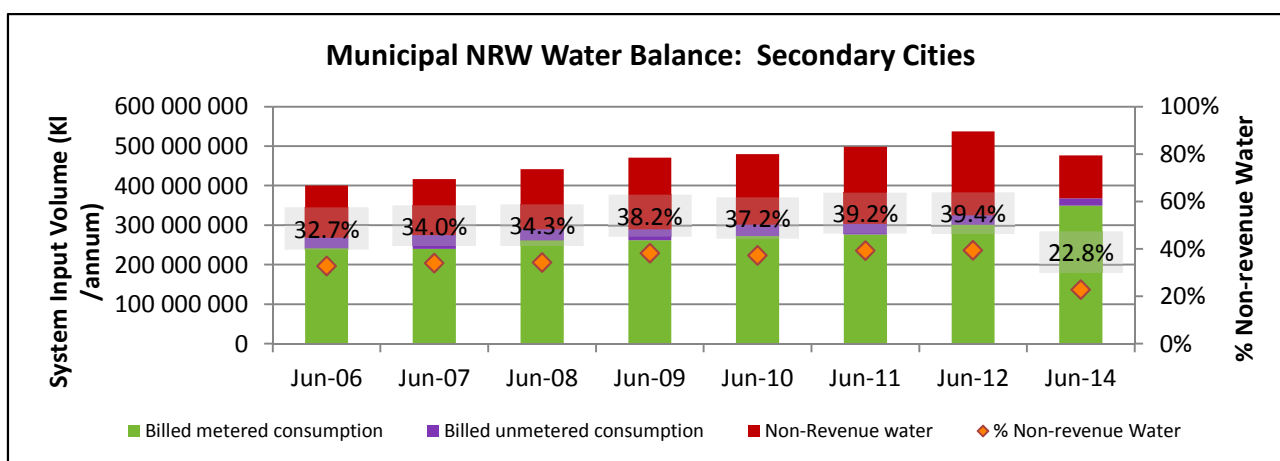


Figure 2: Non-revenue water trend

Non-revenue water has been consistently increasing over the past 7 years from 130.1 million m³/annum in 2006 to 211.5 million m³/annum in 2012. Water losses have increased from 130.1 million m³/annum to 208.5 million m³/annum over the same period.

CONCLUSIONS

The following conclusions have been made:

- The Secondary Cities are of high economic significance and reducing water losses and non-revenue water in Secondary Cities is of utmost importance.
- This study, based on 7 years of data, is the most detailed assessment of non-revenue water/water losses.
- Secondary Cities account for approximately 12% of the total urban consumption. This is almost 25% of the metro consumption.
- NRW in Secondary Cities is 39.4% which is higher than the metro NRW of 33.8% (Dec 2012) and the (2009/10) National average of 36.8%.
- NRW for Secondary Cities has consistently been increasing over the past 7 years, which is of concern.
- Population growth for Secondary Cities has been 2.5% over the past 7 years while water demand has grown by 5.0%. This is an indication of deteriorating water services and municipalities are not able not keep up with the demand.
- Unit consumption per capita per day based on the system input volume has increased from 229 ℓ/capita/day in 2006 to 264 ℓ/capita/day in 2012. The per capita consumption is slightly below the average metro consumption of 274 ℓ/capita/day.
- Unit consumption per household based on the system input volume has increased from 25 m³/household/month in 2006 to 29 m³/household/month in 2012.
- Authorised consumption has reduced from 25 m³/connection/month to 21 m³/connection/month.
- Water losses (38.8%) and NRW (39.4%) for Secondary Cities are higher than for Metros although metro systems are significantly bigger.
- The potential for water savings is the greatest in Emfuleni and Sol Plaatjie municipalities.
- The average ILI for the Secondary Cities is 6.2. The average ILI is higher than the Metro ILI of 5.6.
- Most Secondary Cities do not have a 2014 target and do not take cognisance of the targets set under the various DWA Reconciliation Strategies.
- Most Secondary Cities will not half their water losses by 2014 and in most cases water losses have increased over the past 3 years.
- Most municipalities are able to provide water balance information but the completeness, plausibility and understanding thereof are of concern in some instances.

It appears that the importance of demand management is slowly being appreciated by some Secondary Cities, but not by others. With the exception of a few municipalities, most of the Secondary Cities are in in crisis and require urgent intervention to ensure water security and sustainability.

RECOMMENDATIONS

Based on the results the following recommendations are made :

- On-going monitoring and reporting of Secondary City NRW performance by DWA against determined targets and baselines is critical;

- On-going provision of mentorship to municipalities and DWA Regional Offices is critical;
- Secondary Cities should increase their efforts to achieve the targets set under the various Water Reconciliation Strategies (WRSs) to ensure water security.
- WRS targets need to be reviewed on a regular basis;
- Secondary Cities should increase their efforts to reduce water losses in line with WRS targets in order to reduce their negative impact on water security;
- Secondary Cities 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;
- Secondary Cities should, through on-going awareness programmes, encourage the consumer to appreciate the value of water and enforce the user pays principal;
- Secondary Cities should increase payment levels, encourage consumer fixing of leaks, and prosecution of illegal water connections and reduce theft of water;
- Secondary Cities asset management needs to be improved to ensure greater sustainability of water supply services;
- Water management reform need to be considered by Secondary Cities in order to attract increased levels of private sector finance to Secondary Cities' WC/WDM initiatives.
- Urgent intervention is required in Madibeng, Emalahleni and City of Matlosana as these municipalities can provide no credible information.

Business Intelligence Support

Secondary Cities Non-Revenue Water / Water Loss Assessment

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List of symbols and abbreviations

Symbol or abbreviation	Definition
DWA	Department of Water Affairs
IBNET	The International Benchmarking Network for Water and Sanitation Utilities
ILI	Infrastructure Leakage Index
IWA	International Water Association
KPI	Key Performance Indicator
NRW	Non-Revenue Water
SIV	System Input Volume
UARL	Unavoidable Annual Real Losses
UFW or UAW	Unaccounted For Water
WC/WDM	Water Conservation and Water Demand Management
WRC	Water Research Commission
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider

1 INTRODUCTION

There are nineteen Secondary Cities in South Africa in accordance with the Municipal Infrastructure Investment Framework categorisation, as listed in **Table 1.1**. They are classified as B1 municipalities, or those local municipalities with the biggest budgets. They provide water services to approximately 7.4 million people or 14% of the South African population and utilise about 14% of the total urban water use. The water resources situation in these municipal areas has been investigated over the past few years by the Department of Water Affairs (DWA) and in each case water conservation and water demand management (WC/WDM) has been identified as a key intervention to balance available supply against the projected future demands.

Table 1.1: List of Secondary Cities

Province	Code	Local Municipality	Main Demand Centre	Census 2011	
				Population	Households
Free State	FS184	Matjhabeng	Welkom	406 461	123 195
Gauteng	GT421	Emfuleni	Vanderbijlpark	721 663	220 134
	GT481	Mogale City	Krugersdorp	362 422	117 374
KwaZulu Natal	KZN225	Msunduzi	Pietermaritzburg	618 536	163 991
	KZN252	Newcastle	Newcastle	363 236	84 272
	KZN282	uMhlathuze	Richards Bay	334 459	86 610
Limpopo	LIM354	Polokwane	Polokwane	628 999	178 001
Mpumalanga	MP307	Govan Mbeki	Secunda	294 538	83 874
	MP312	Emalahleni	eMalahleni (Witbank)	395 466	119 875
	MP313	Steve Tshwete	Middelburg	229 831	64 972
	MP322	Mbombela	Nelspruit	588 794	161 774
Northern Cape	NC091	Sol Plaatjie	Kimberley	248 041	60 297
North West	NW372	Madibeng	Brits	477 381	160 724
	NW373	Rustenburg	Rustenburg	549 575	199 044
	NW402	Tlokwe	Potchefstroom	162 762	52 536
	NW403	City of Matlosana	Klerksdorp	398 676	120 442
Western Cape	WC023	Drakenstein	Paarl	251 262	59 773
	WC024	Stellenbosch	Stellenbosch	155 733	43 420
	WC044	George	George	193 672	53 551
Total				7 381 507	2 153 859

The aim of this assessment is to review the status of non-revenue water, water losses, water consumption and water use efficiency within the Secondary Cities. Calculations are based on the International Water Association (IWA) standard water balance model, as modified slightly for South African conditions in order to accommodate the “free basic water” component. Previous studies undertaken by the Water Research Commission (WRC) and DWA have provided significant detail on the methodology and terminology, which is not repeated in this review.

It should be noted that the work undertaken in this assessment is an update of the previous work undertaken by the WRC and DWA. This review is thus the most detailed study of its kind to date.

2 BACKGROUND INFORMATION

2.1 Water Balance Terminology

In many instances, the term Unaccounted for Water (UAW or UFW) has been used to indicate the level of leakage in a water distribution system and this has become the standard term adopted by most utilities around the world. This term, however is open to subjective judgement and can therefore be manipulated to some extent, based on the various assumptions used in the calculation. Numerous papers and presentations on the subject, presented at conferences around the world, have concluded **that the term UAW (or UFW) be replaced with the term water losses**. It has also been accepted that Non-Revenue Water (NRW) should be the preferred water loss indicator, as it cannot be manipulated to the same extent as water losses.

The South African standard water balance was modified slightly to accommodate the “free basic water” component, which is an important element of all water balances in South Africa. The water balance used in the assessments is shown in **Figure 2.1**, and described in the following paragraphs.

System Input Volume	Authorised Consumption	Billed Authorised Consumption	Billed Metered Consumption	Free basic Revenue Water	
		Unbilled Authorised Consumption	Billed Unmetered Consumption	Non Revenue Water	
	Water Losses	Apparent Losses	Unbilled Metered Consumption		Unbilled Unmetered Consumption
			Unauthorised Consumption		Customer Meter Inaccuracies
		Real Losses	Leakage on Transmission and Distribution Mains		Leakage and Overflows at Storage Tanks
			Leakage on Service Connections up to point of Customer Meter		

Figure 2.1: Modified IWA water balance

Apparent Losses

Apparent losses or commercial losses are made up from the unauthorised consumption (theft or illegal use), plus all technical and administrative inaccuracies associated with customer metering. While it should be noted that the apparent losses should not be a major component of the water balance in most developed countries, it can represent the major element of the total losses in many developing countries. A systematic estimate should be made from local knowledge of the system and an analysis of technical and administrative aspects of the customer metering system.

Authorised Consumption

Authorised consumption is the volume of metered (authorised metered) and/or unmetered (authorised unmetered) water taken by registered customers, the water supplier and others who are implicitly or explicitly authorised to do so by the water supplier, for residential, commercial and industrial purposes.

It should be noted that the authorised consumption also includes 'water exported' and, in some cases may include items such as fire-fighting and training, flushing of mains and sewers, street cleaning, watering of municipal gardens, public fountains, building water, etc. These may be billed or unbilled, metered or unmetered, according to local practice.

Billed Authorised Consumption

Billed authorised consumption is the volume of authorised consumption which is billed by the WSA and paid for by the customer. It is effectively the revenue water which, in turn, comprises:

- Billed Metered Consumption;
- Billed Unmetered Consumption.

Non-Revenue Water

NRW water is becoming the standard term replacing unaccounted-for water (UFW) in many water balance calculations and is the term recommended by the International Water Association in preference to UFW. It is a term that can be clearly defined, unlike the unaccounted-for water term which often represents different components to the various water suppliers. NRW incorporates the following items:

- Unbilled (metered or unmetered) Authorised Consumption;
- Apparent / Commercial Losses; and
- Real / Physical Losses.

Real Losses

Real losses are the physical water losses from the pressurised system, up to the point of measurement of customer use. In most cases, the real losses represent the unknown component in the overall water balance and the purpose of most water balance models is therefore to estimate the magnitude of the real losses so that the WSA can gauge whether or not it has a serious leakage problem. The real losses are generally calculated as the difference between the total losses and the estimated apparent losses.

System Input Volume

The system input volume (SIV) represents the potable volume input to the water supply system from the WSA's own sources, (measured at the water treatment works outlet), allowing for all known errors (i.e. errors on bulk water meters) as well as any water imported from other sources – also corrected for known bulk metering errors.

Unbilled Authorised Consumption

The unbilled authorised consumption is the volume of authorised consumption that is not billed or paid for. The level of unbilled authorised consumption will vary from WSA to WSA and in some areas, virtually all water is metered and billed in some manner with the result that the unbilled authorised consumption is zero.

Water Losses

Water losses are the sum of the real and apparent losses and are calculated from the difference between the SIV and the authorised consumption. In most countries, the water losses were also considered to be unaccounted-for water (UFW) although, the exact definition of the UFW can vary from country to country.

2.2 Key Performance Indicators

The IWA has developed various water loss key performance indicators to evaluate and compare different distribution systems. Calculating Key Performance Indicators (KPIs) depends on the availability of information.

Based on the availability of information, the following KPI's have been used in this report:

- **% NRW:** Although the use of percentages to define water losses is not recommended by the IWA, the term remains widely accepted and used in most parts of the world including the South African water industry and for this reason, it has been retained although it should be used with caution in the knowledge that it can sometimes be misleading. The % NRW is calculated as follows :

$$\% \text{ NRW} = \frac{\text{System Input Volume} - (\text{Billed Consumption} + \text{Free Basic Water})}{\text{System Input Volume}} \times 100$$

- **Litres / capita / day:** provides an indication of the gross volume of water used per capita (person) per day. Although the calculation is based on the total system input volume (m³/year) and not just the domestic component, it does provide a useful indicator. Care should be taken in areas where there is a large non-domestic component of water use and if necessary, it should be excluded from the calculation in order to derive a more realistic per capita consumption.

$$l/c/d = \frac{\text{System Input Volume} \times 1000 \div 365}{\text{Population}}$$

- The use of percentages as an indicator for real losses (physical leakage) should also be discouraged although it is again accepted that percentages will always remain in use since few Water Utility managers are prepared to discard percentages completely from their list of PI's. It is therefore important when using percentages to quantify physical leakage, to highlight the potential pitfalls and to ensure that other KPI's are also provided.
- Real loss indicators

litres/connection/day – metric units

This water loss indicator will be suitable for most systems where the density of connections is greater than 20 connections per km mains. In cases where the density of connections drops below 20 per km of mains, it is often appropriate to rather use the following indicator:

m³/km mains/day – metric units

- The Infrastructure Leakage Index is a useful indicator and can often be used to benchmark one system against another. ILI values range from 1, which would be world's best practice to 10,

which indicates that the physical leakage in a system is 10 times the likely minimum value. In South Africa, the average value for the country is approximately 7 and tends to range from approximately 2.0 to more than 20 in some areas.

$$\text{Infrastructure Leakage Index ILI} = \text{CARL/UARL}$$

Where:

- ILI = Infrastructure Leakage Index (non-dimensional)
- CARL = Current Annual Real Losses (litres per connection per day)
- UARL = Unavoidable Annual Real Losses (litres per connection per day)

2.3 Targets

2.3.1 Presidential target

His Excellency JG Zuma, President of the Republic of South Africa in his 2010 State of the Nation Address stated:

“We are not a water rich country. Yet we still lose a lot of water through leaking pipes and inadequate infrastructure. We will be putting in place measures to reduce our water loss by half by 2014”.

The exact background to this statement is unclear and there is also uncertainty regarding the following:

- There is currently no proper baseline against which water loss performance can be measured as the State of Non-revenue Water in South Africa (2012) (WRC, TT 522, Aug 2012); only provides a baseline until 2009/10 for 132 municipalities. The report highlighted that 55% of municipalities cannot provide a water balance and do not know the extent of their water losses.
- There is uncertainty whether the proposed savings apply to physical (real) and commercial (apparent) losses or only physical losses; (not all physical losses can be saved and there will always be a component of unavoidable annual real losses).
- The Presidential water loss reduction target focuses on the water loss (SIV less authorised consumption) component of the IWA water balance, but it makes no mention of reducing SIV or NRW.

2.3.2 Reconciliation strategy targets

Effective and efficient water supply requires long-term planning and strategies to source and supply water must be aligned to national development goals. Since the publication of the National Water Resource Strategy in 2004, the DWA has undertaken scientifically based 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 and villages 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 by DWA as a key intervention to reduce municipal water demand and reduce the need for additional new sources to be developed. However more than 50% of municipalities do not currently measure their water use properly and have a very limited knowledge

of their water use situation, not to mention their losses. Very often, municipalities want to solve the problem of water “scarcity” by developing additional resources, often at a very high cost, when their shortages are caused by high water losses.

The DWA water demand targets set in the various reconciliation strategies focus only on reducing the system input volume of the IWA water balance and do not specify water loss or NRW targets. Reducing the SIV, however, will result in reduced water losses and NRW. The input volume can only be reduced by increasing efficiency (by reducing authorised consumption) and reducing water losses (commercial and physical losses). In conclusion, NRW will only be reduced by increasing billed consumption and reducing unbilled consumption and water losses.

3 METHODOLOGY

3.1 Data sources

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

- The Metropolitan Municipality Non-Revenue / Water Loss Assessment (DWA, 2013).
- Data obtained directly from municipalities by DWA captured in templates designed specifically for this purpose.
- Input from the 2013 WC/WDM Provincial workshops.
- The DWA National Information System.
- National Treasury 2012/13 MTREF Benchmark Process.
- Compendium of Water Conservation and Demand Management Interventions and Measures at the Municipal Level in South Africa (WRC, TT519/12, 2012).
- The State of Non-revenue Water in South Africa (WRC, TT 522, Aug 2012).
- Water Balance Assessments (WRC 2002, 2005 and 2007).
- Regulatory Performance Measurement Systems (RPMS).
- Stats SA Census 2011.
- Reconciliation Strategy Studies
 - Crocodile West (DWA, 2012).
 - KwaZulu Natal (DWA, 2009).
 - Water Requirements and Availability for the Mbombela Municipal Area (DWA, 2013).
 - Olifants River (DWA, 2011).
 - Vaal River System Large Bulk Water Supply (DWA, 2007). This system serves about 20 million people and generates about 60% of the national economy.
 - Western Cape Water Supply System (DWA, Jun 2007). This system serves more than 3.2 million people and generates approximately 14% of the national economy.
- All Town Studies
 - Welkom area (Matjhabeng LM) (DWA, 2011).
 - Richards Bay (Umhlatuze LM) (DWA, 2012).
 - Newcastle (DWA, 2012).
 - George and surrounding towns, (DWA, 2011).
 - eMalahleni (DWA, 2010).
 - Nelspruit / White River (Mbombela LM) (DWA, 2011).
 - Middelburg (Steve Tshwete LM) (DWA, 2010).
 - Kimberley (Sol Plaatjie LM) (DWA, 2011).
 - Matlosana LM area (DWA, 2011).
 - Madibeng LM area (DWA, 2010).
 - Rustenburg Vaalkop BWS (DWA, 2011).
 - Stellenbosch (DWA, 2011).
 - Tlokwe LM (DWA, 2011)

3.2 Analysis approach

The water balance, trends and key performance indicators are based on 12 months of data from the previous municipal financial year (July to June).

In estimating the average values for KPIs, a weighted average has been used, (and where this is done, it is stated as such). For example, the impact on losses by a municipality with a large SIV will be greater than that of a municipality with a smaller SIV.

Each municipality usually has two targets. One is the 2014 Presidential target and the second is the target set through the DWA water resource reconciliation studies, which are regarded as being realistically achievable by the municipality. The reconciliation strategies have shown that a 1 to 2% reduction in annual water demand is realistically achievable. This means that the natural growth in water demand is often set off against the savings, which results in a zero growth in water demand. In cases where a target has not been set, it was therefore assumed that a zero growth from 2010 to 2014 is a realistic target. Municipalities, for example, Drakenstein, Mogale City and Stellenbosch have all shown a zero or negative growth in water demand over the past 5 to 10 years. Municipalities also have to increase their billed consumption by approximately 20% (5% per annum) to half their losses by 2014. The 2014 targets, (or last bar on the charts), shown graphically or in tabular form in this report, are the water resource reconciliation targets.

Where data received was clearly erroneous, it has not been included. In these cases alternate data sources were utilised if possible, and if not, values were extrapolated from previous years. This data has been underlined.

3.3 Data confidence levels

The data confidence level varies greatly from municipality to municipality. Most municipalities are able to provide water balance information but the completeness, plausibility and understanding thereof are of concern in some instances. Madibeng, Emalahleni and City of Matlosana can provide almost no credible information and very few municipalities can provide a 2014 target except where these targets were set by the various reconciliation strategies. Also of concern is that there is often a difference between figures supplied and those contained in the reconciliation studies and Blue Drop assessments.

Reasons for the poor data are varied, but typically are caused by a lack of meters and metering, broken meters and a lack of skills and capacity within municipalities to do a water balance calculation.

The discrepancies, in the manner in which data was interpreted, has been mentioned in the 2012 WRC and the 2013 Metro reports. These are:

- Whether exported water should be included in the SIV;
- Should "Free Basic Water" be recorded under Billed Authorised Consumption;
- What is considered to be "metered"?
- Where is the water used for fire hydrants, sewer flushing etc. recorded; and
- Where is intra-departmental use recorded?

4 WC/WDM STATUS

The following sections provide summarised municipal details with to regards water balances and related activities. NRW, water losses and ILI are for the 2011/12 financial year. Key performance indicators for the secondary cities are summarised in **Table 4.1** with the details of the water balance data and trends for each municipality provided in **Appendix A**.

Table 4.1: Secondary City KPI Summary

Municipal Code	Municipality	2011/12 SIV (m ³ /annum)	2011/12 NRW (m ³ /annum)	2011/12 WL (m ³ /annum)	2011/12 % NRW	2011/12 % Loss	2011/12 l/c/d	2011/12 ILI
FS184	Matjhabeng	38 220 207	18 483 302	18 483 302	48.4%	48.4%	255	7.8
GT421	Emfuleni	82 417 605	40 237 256	40 237 256	48.8%	48.8%	261	5.8
GT481	Mogale City	27 141 000	7 921 886	7 921 886	29.2%	29.2%	187	5.8
KZN225	Msunduzi	66 801 851	32 415 558	32 415 558	48.5%	48.5%	316	14.6
KZN252	Newcastle	35 114 370	15 827 681	13 728 190	45.1%	39.1%	295	11.9
KZN282	uMhlathuze	40 549 032	10 842 255	10 842 255	26.7%	26.7%	331	7.8
LIM354	Polokwane	34 688 649	15 313 816	15 313 816	44.1%	44.1%	196	4.8
MP307	Govan Mbeki	32 565 196	6 731 188	6 731 188	20.7%	20.7%	372	3.6
MP313	Steve Tshwete	15 966 634	4 929 923	4 929 923	30.9%	30.9%	267	4.2
MP322	Mbombela *	31 345 217	13 235 430	13 235 430	42.2%	42.2%	265	6.8
NC091	Sol Plaatjie	32 664 198	18 264 168	17 692 213	55.9%	54.2%	413	13.5
NW373	Rustenburg	43 171 796	19 902 647	19 674 047	46.1%	45.6%	271	5.2
NW402	Tlokwe	16 227 740	2 311 973	2 311 973	14.2%	14.2%	194	2.2
WC023	Drakenstein	17 444 334	1 950 594	1 915 706	11.2%	11.0%	207	1.3
WC024	Stellenbosch	12 746 753	2 729 557	2 704 063	21.4%	21.2%	248	2.7
WC044	George	9 973 584	445 471	425 523	4.5%	4.3%	149	0.3
	Total -	537 038 166	211 542 706	208 562 330	39.4%	38.8%	264	6.2

* Silulumanzi Concession Area Only

** All averages are weighted.

4.1 Matjhabeng

Estimated 2011/12 KPIs: NRW = 48.4%; Water Loss = 48.4%; ILI = 7.8; l/c/d = 255

Matjhabeng has a population of 406 461 people (Census 2011) in the Welkom, Thabong and surrounding areas. Their main water source is the Vaal River, with Sedibeng Water Company acting as bulk water service provider. Groundwater is also utilised. The 2011 All Town Study indicated that there were no WC/WDM activities and no active leakage control programme to repair leaks. NRW is estimated to be in the region of 48%. Record keeping and water balance information are poor. Fluctuating values and a lack of data make it difficult to determine trends with any confidence. The All Town Study stated that a water reduction target of 16% could be achieved over 5 years if WC/WDM measures were implemented.

Matjhabeng was unable to provide updated information for years ending Jun 2011 and Jun 2012. The figures shown in **Figure 4.1** are based on the Jun 2008 to Jun 2010 trend analysis. Matjhabeng experience high levels of leakage.

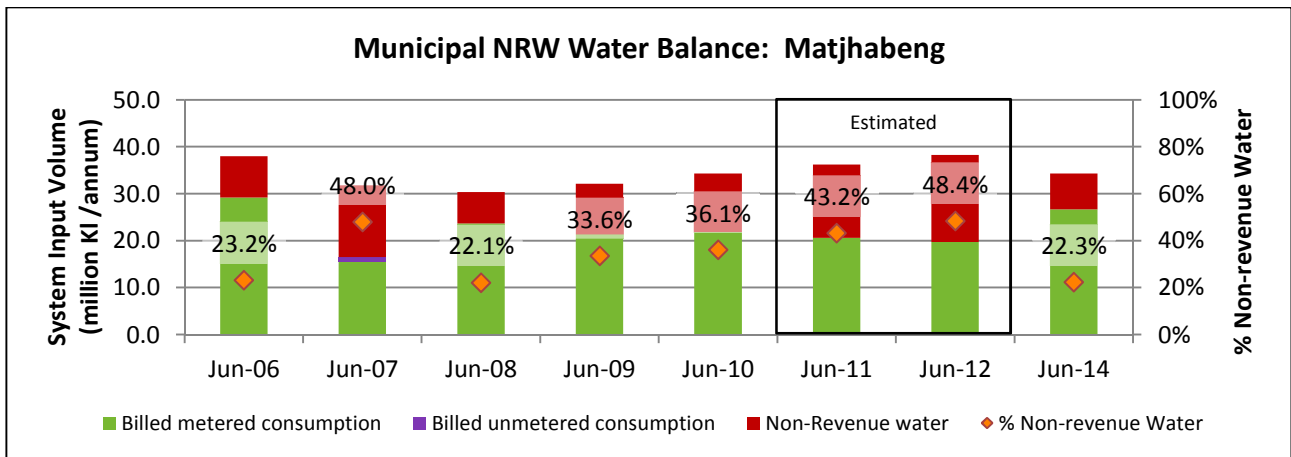


Figure 4.1: Matjhabeng NRW Trend

The 2014 target for Matjhabeng was set under the Vaal Reconciliation Strategy in 2005. Matjhabeng will not achieve their 2014 target if the trend analysis for the past two years is correct. The target, however, seems realistic and achievable should the municipality prioritise water loss and NRW reduction. The municipality will reduce their water losses by 38% if they achieve this target.

4.2 Emfuleni

2011/12 KPIs: NRW = 48.8%; Water Loss = 48.8%; ILI =5.8; l/c/d = 261

Emfuleni is the largest Secondary City and serves 721 633 people (Census 2011). The main demand centres are Vereeniging, Vanderbijlpark, Sharpeville, Evaton and Sebokeng of which Vereeniging and parts of Vanderbijlpark are highly industrialised. Over half of the population is indigent.

Emfuleni has high water losses of about 49%. Consumption per capita has shown only a marginal reduction over the past few years. The current consumption of 261 l/capita/day appears high; however, this is an area with much industry and to get a true reflection, the industrial usage needs to be measured and subtracted.

Emfuleni has entered into a public private partnership with Sasol and GiZ to address their high water losses. The programme focuses on the repair of all visible leaks on private properties and the reticulation network. Emfuleni has about 85 000 consumers that are billed a flat rate of 20 kℓ/connection/month.

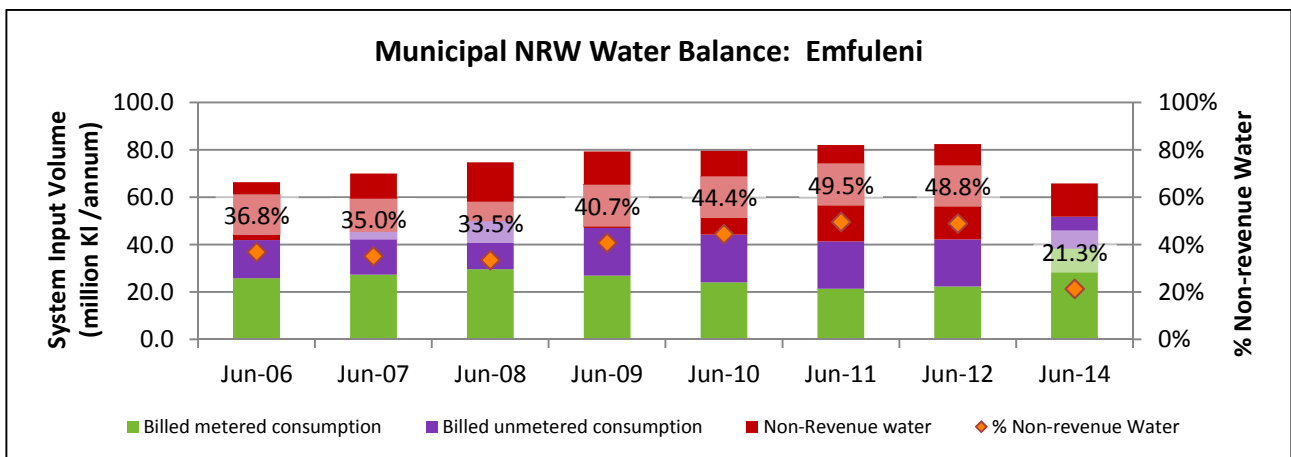


Figure 4.2: Emfuleni NRW Trend

Emfuleni will probably not achieve their 2014 target, set under the Vaal Reconciliation Strategy in 2005, as their current water demand programme is targeted at only 50% of the supply area and significant more funding and interventions are required to ensure the target is achieved. The municipality will reduce their water losses by 60% if can achieve the 2014 NRW target.

4.3 Mogale City

2011/12 KPIs: NRW =29.2%; Water Loss = 29.2%; ILI =5.8; ℓ/c/d = 187

Mogale City is located to the west of Gauteng and comprises urban, peri-urban and rural areas. Krugersdorp is the main urban area. Some 28% of the population of 362 422 people (Census 2011) are unemployed.

In 1996 only 10% of the Kagiso area’s consumers were paying for water. A large-scale prepayment metering programme that allowed for the dispensation of free basic water was thus commenced in 1998. Some 30 000 meters were installed. Payment in Kagiso rose from 10% to 95%, whilst its water consumption dropped by 500 Mℓ/month.

In 2005, the municipality identified the Munsieville area as having extremely high water losses on private properties. Although a poor area, average monthly consumption was 32 kℓ/household/month. Mogale City implemented a household leak repair project that involved repairing, retrofitting or replacing household plumbing fittings. By 2007 water losses had been reduced by over 30%. A saving of R352 000 per annum was realised and in the process jobs were created.

Mogale City has a low per capita consumption of 187 ℓ/capita/day and their NRW is below the national average of 36.8%.

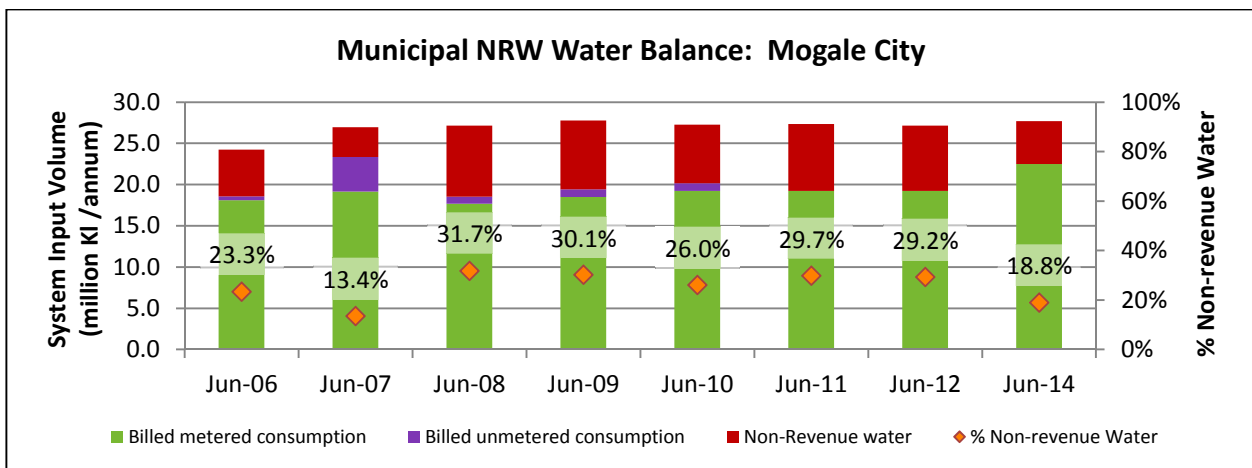


Figure 4.3: Mogale City NRW Trend

Mogale City should achieve their 2014 SIV target set under the Vaal Reconciliation Strategy in 2005 but not their NRW target. Their SIV has remained almost constant over the past 6 years which is highly commendable considering the considerable growth in some of their areas like Muldersdrift. The municipality will have reduced their water losses by 26% if they can achieve the 2014 NRW target.

4.4 Msunduzi

2011/12 KPIs: NRW =49 %; Water Loss = 48%; ILI = 14.6; ℓ/c/d = 316

Pietermaritzburg is the urban centre of Msunduzi municipality, which has a population of 618 536 people (Census 2011). The KZN Reconciliation Study identified the need to develop water resources and implement water conservation and demand management in order to meet current and expected future high growth rates. Rainwater harvesting and the use of treated effluent were also recommended.

The municipality embarked on a major NRW reduction programme in December 2010 which resulted in a 16% reduction in NRW from June 2010 to June 2011. Their NRW and ILI remains very high despite these interventions. Msunduzi intends reducing NRW to 32% by the end of 2013. Consumption of about 316 ℓ /capita/day is high and needs to be reduced.

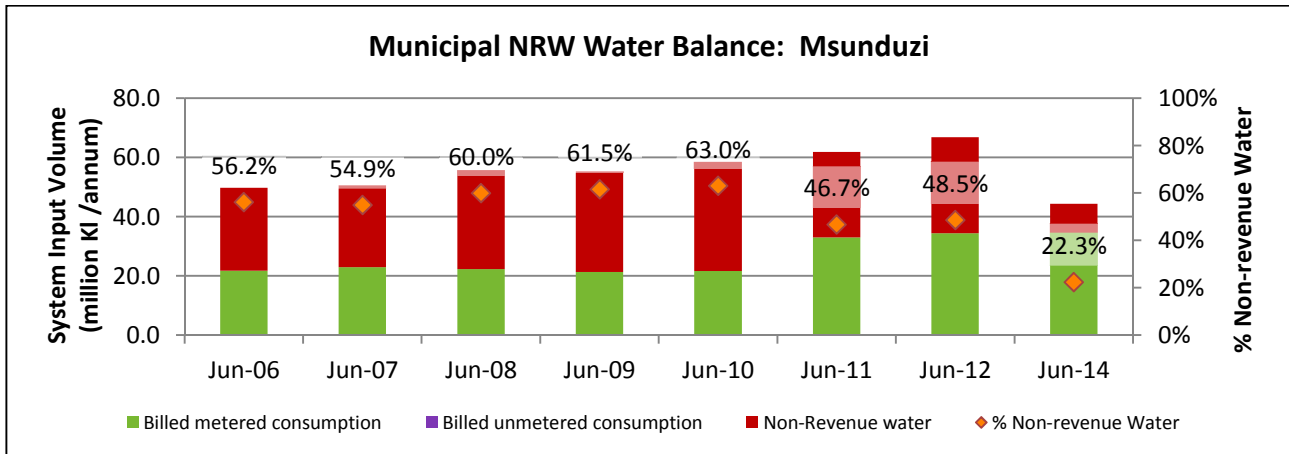


Figure 4.4: Msunduzi NRW Trend

Msunduzi will not achieve their 2014 target set under the KZN Reconciliation strategy. The municipality has embarked on an asset renewal / replacement programme but much more effort will be required to achieve the set target. Msunduzi and eThekweni supply areas are under major pressure to reduce their water losses to ensure water security in the area until the Spring Grove dam has been commissioned. The municipality might face water restrictions if they cannot reduce their total consumption and bring their water losses under control. The municipality will have reduced their water losses by 73% if they can achieve the 2014 NRW target.

4.5 Newcastle

2011/12 KPIs: NRW = 45%; Water Loss = 39%, ILI = 11.9; ℓ /c/d = 295

The Newcastle municipality has a population of 363 236 people (Census 2011). Ninety percent of the people reside in the town Newcastle. uThukela acts as bulk water services provider to Newcastle, who then act as a retail water services provider. Newcastle's system input volume is still below their total registered water use of 55 million m^3 /annum. The per capita usage is about 295 ℓ /capita/day, and includes an industrial component. The All Town Study gives a domestic consumption as about 170 ℓ /capita/day, which is acceptable, but found no formalised WC/WDM strategy and no targets for water loss reduction. It estimated that WC/WDM could reduce raw water consumption by about 13%. The All Town Study recommended meter replacement, a water balance assessment, an infrastructure asset management plan, a pressure management programme, consumer education and tariff review, as the WC/WDM actions required. NRW and the ILI for the municipality indicate high levels of leakage and inefficiency.

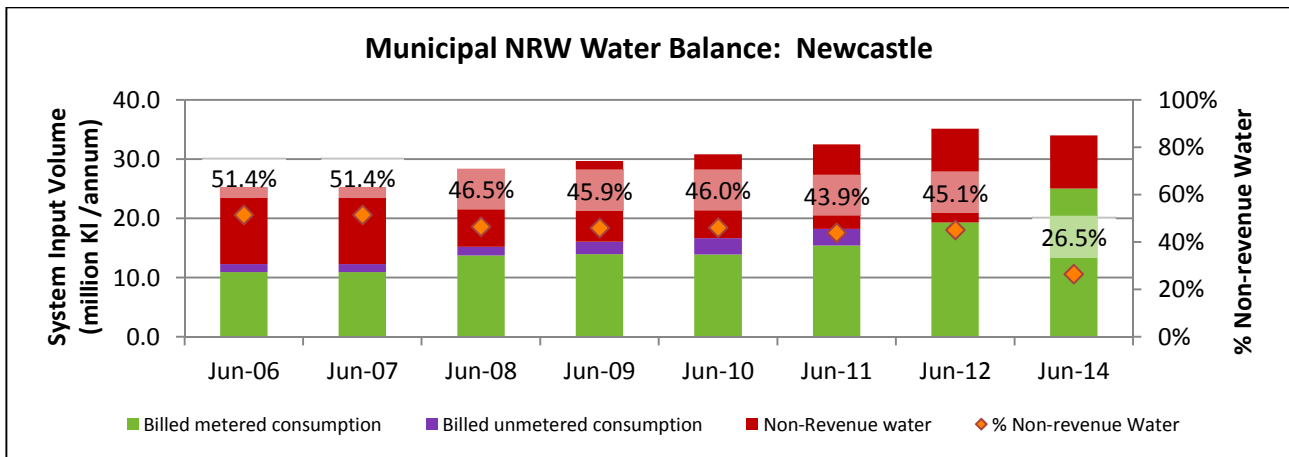


Figure 4.5: Newcastle NRW Trend

The 2014 target was provided by the municipality and does not seem to address water use efficiency, as there is almost no reduction in SIV. The municipality might achieve their 2014 SIV target but will not achieve their NRW target. The municipality will have reduced their water losses by 49% if they can achieve the 2014 NRW target.

4.6 uMhlatuze

2011/12 KPIs: NRW =27%; Water Loss = 27%; ILI = 7.8; $l/c/d = 331$

uMhlatuze municipality has a population of 334 459 people (Census 2011). Richards Bay, the urban centre of uMhlatuze, has well developed industries. The municipality acts as a Water Services Provider (WSP) in its area, as well as bulk provider to Kwanbonambi Municipality.

The municipality has implemented some WC/WDM measures in Richards Bay. This includes passive leakage detection and repair, consumer awareness and pressure reduction. The All Town Study estimated that a saving of 3.3 million m^3 /annum or about 7 % of the SIV could be realised through the extensive application of consumer metering, amendment of the block tariff structure, zonal metering, pressure and leak management. In the longer term, reuse of treated effluent and desalination were identified as options.

The municipality has very good data and has been recognised by National Treasury for their very high cost recovery. NRW at 26.7% is substantially lower than the national average of 36.8%, but the ILI and per capita consumption indicate high levels of leakage and inefficiency.

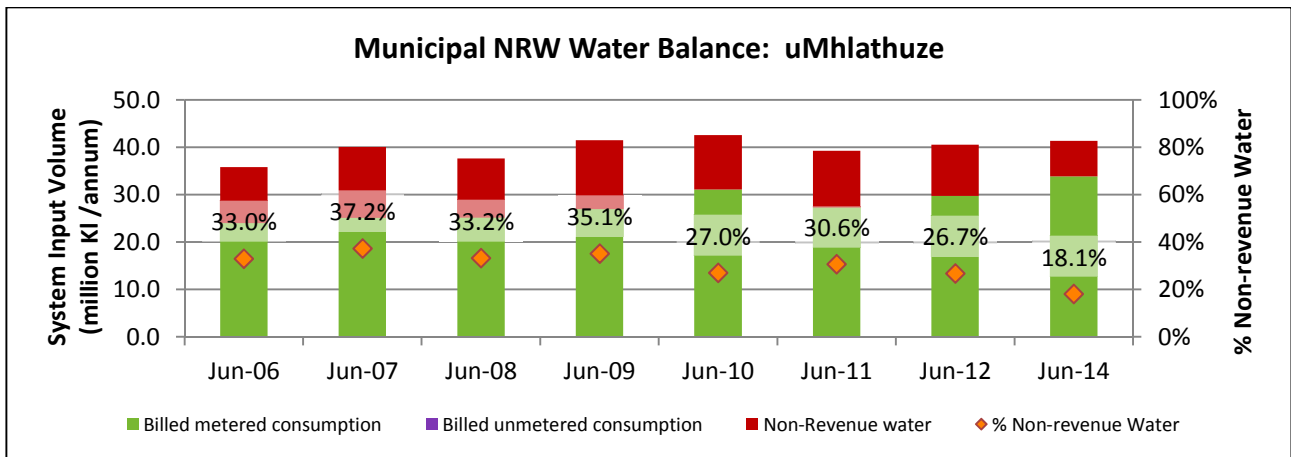


Figure 4.6: uMhlatuze NRW Trend

The 2014 target was provided by the municipality and they will probably achieve their SIV target but not their NRW target. The municipality has done very well the control their SIV with an almost zero present growth since 2007. The municipality will have reduced their water losses by 35% if they can achieve the 2014 NRW target.

4.7 Polokwane

2011/12 KPIs: NRW = 44%; Water Loss = 46%; ILI =4.8; l/c/d = 196

The municipality’s urban centre is the town of Polokwane, the largest town in Limpopo Province. It receives water from the Olifants River Water Supply System. This municipality has a population of 628 999 people (Census 2011). The Reconciliation Study indicated that at current trends, as from 2017 demand would exceed supply. It has been recommended that WC/WDM be implemented in all sectors as from 2013, and that unlawful water use be eliminated over 5 years as from 2015. It furthermore recommended the removal of alien plants, groundwater development and the reuse of treated effluent.

Polokwane has introduced several WC/WDM intervention programmes in the past few years to curb their growing SIV and to reduce their NRW. They have also improved their data.

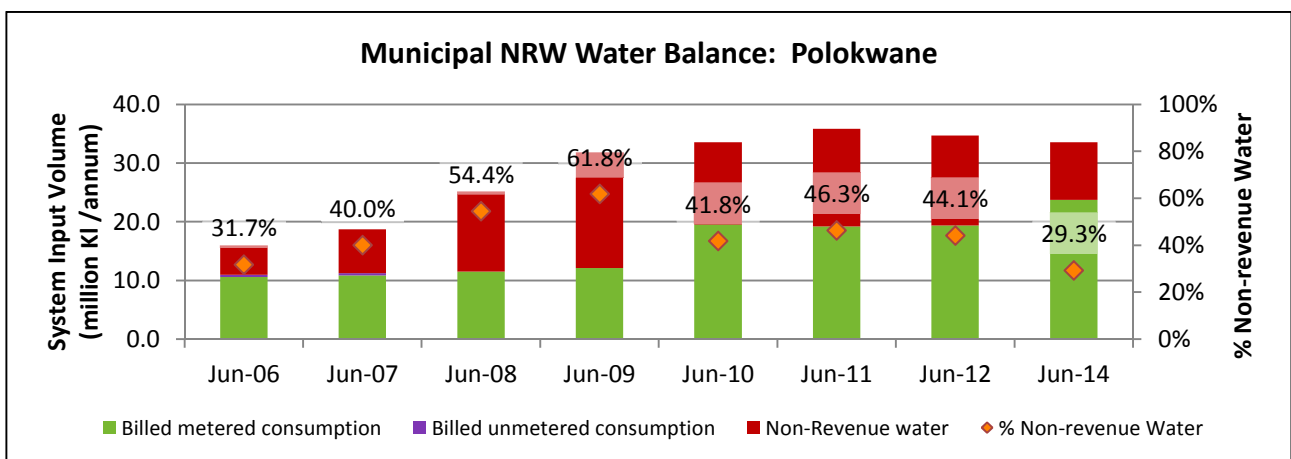


Figure 4.7: Polokwane NRW Trend

The municipality is unable to provide a 2014 target and the 2014 target shown is based on a zero present SIV growth from 2010 and increasing billed consumption by 5% per annum. The municipality should be able to achieve their 2014 SIV target if the current trend is followed but will probably not achieve their NRW target. The SIV has almost doubled from 2006 until 2011 and it is of utmost importance that the efficiency is improved to ensure water security. The municipality will have reduced their water losses by 30% if they can achieve the 2014 NRW target.

4.8 Govan Mbeki

2011/12 KPIs: NRW = 20.7%; Water Loss = 20.7%; ILI =3.6; l/c/d = 372

This municipality has a population of 294 538 people (Census 2011), with the town of Secunda as main urban centre. Govan Mbeki lies within the Upper Vaal Management Area. Rand Water is the bulk service provider. This is a coal mining area with a coal to oil refinery (Sasol). The refinery is supplied from Grootdraai Dam and Rand Water. The Vaal Reconciliation Strategy recommends that WC/WDM activities be implemented in the Upper Vaal area.

The large increase in SIV in 2011/12 is due to the inclusion of the supply to Sasol, which was previously billed directly between Rand Water and Sasol. The consumption of 372 l/capita/day includes the supply to Sasol. The previous 2010/11 value of 288 l/capita/day is more realistic but remains high. NRW and leakage levels seem to be reasonably under control in the municipality. The municipality has undertaken a small-scale water loss reduction programme with Sasol but considerable more effort will be required to reduce their water losses.

The 2014 target was set under the Vaal Reconciliation Strategy in 2005, adjusted to include the supply to Sasol. Considerable intervention programmes will be required if the municipality want to achieve their SIV target.

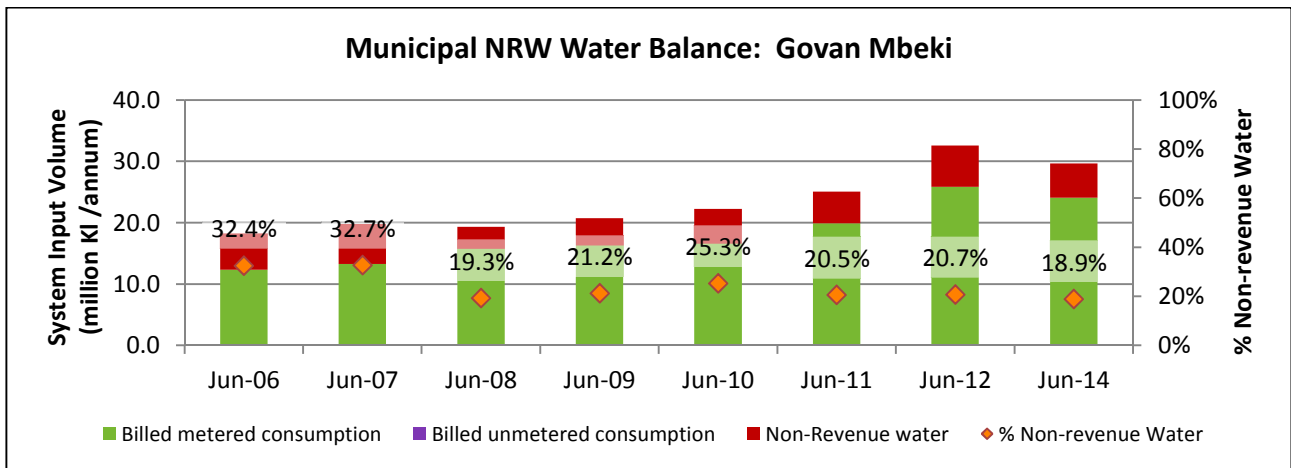


Figure 4.8: Govan Mbeki NRW Trend

4.9 Emalahleni

2009/10 KPIs: NRW = 53.1%; Water Loss =53.1 %; ILI =10.1; l/c/d = 404

The municipality has a population of 395 466 people (Census 2011). eMalahleni City (former Witbank) is its largest urban area. Coal mining and power stations are present. The All Town

Study estimated that as from 2017 there would be insufficient water. It recommended enforcement of the municipality’s WC/WDM plan, limiting of wasteful usage, groundwater development and the reuse of treated effluent. The Olifants Reconciliation Strategy recommends elimination of unlawful water use, WC/WDM implementation in all sectors, introduction of WUE devices, (especially in agriculture), treatment of acid mine drainage water for reuse, development of groundwater and reuse of treated water.

The municipality lacks consistent data records. The large fluctuation in NRW cannot be explained. According to the All Town Study, data confidence levels are low because of inefficient metering and illegal connections. NRW and water losses however seem to be close to 50% and the ILI is estimated to be 10.1. The consumption of about 404 l/capita/day is excessive and will remain so even if the industrial use is deducted. The Study set water reduction targets through WC/WDM measures, at 1% per annum from 2010 to 2013 and 2% per annum from 2013 to 2018. This indicates that the municipality does not understand or even have water balance data, without which effective WC/WDM measures cannot be implemented. Emalahleni had to be excluded from this report’s water balance analyses.

The municipality is unable to provide a 2014 target and the huge fluctuations in the water demand and excessive leakage makes it difficult to set a target. The municipality, however, should be able to reduce their 2010 SIV to 2009 levels and reduce their NRW to below 30% if they want to ensure water security and financial viability. To achieve this target, the municipality needs to increase their billed consumption by 2.5% per annum over 5 years. The municipality will have reduced their water losses by 60% if they can achieve the 2014 NRW target.

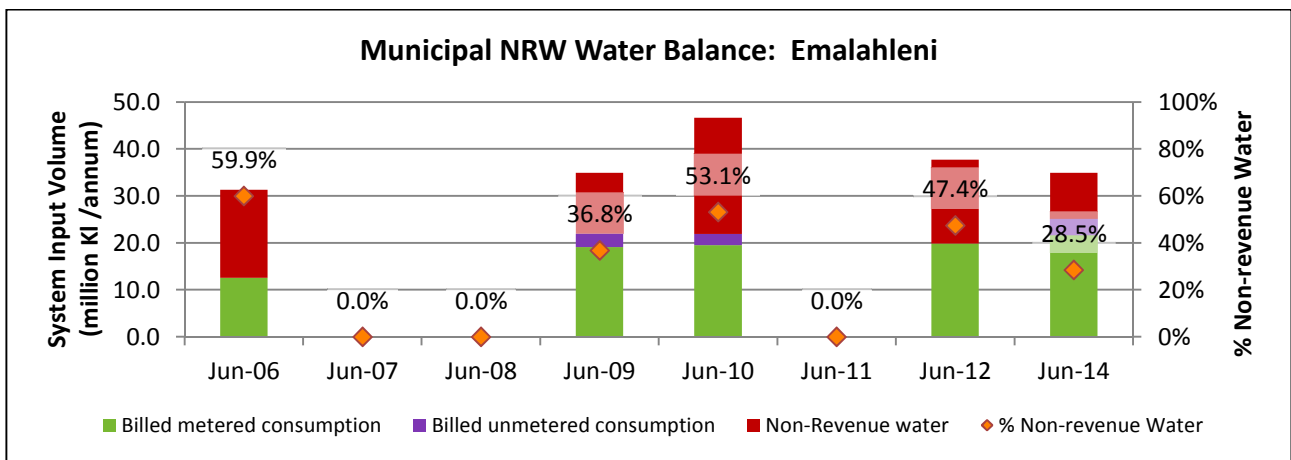


Figure 4.9: Emalahleni NRW Trend

4.10 Steve Tshwete

2011/12 KPIs: NRW = 30.9%; Water Loss = 30.9%; ILI = 4.2; l/c/d = 267

The major urban area of Steve Tshwete Municipality is the town of Middelburg. This is a coal mining area with a population of 229 831 people (Census 2011) and a strong industrial element. Water is supplied entirely from surface water resources, and there is little potential for groundwater due to mining pollution of aquifers. The All Town Study predicted that by 2012 domestic supplies would be inadequate without WC/WDM activities. Reuse of treated effluent and mine water was recommended. A 15% reduction of water losses was set as a target. The study also suggested

the development of a WC/WDM plan with clear targets. The per capita consumption of 267 ℓ/capita/day appears high but may not be so once industrial usage is deducted. NRW and leakage levels seem to be reasonably under control.

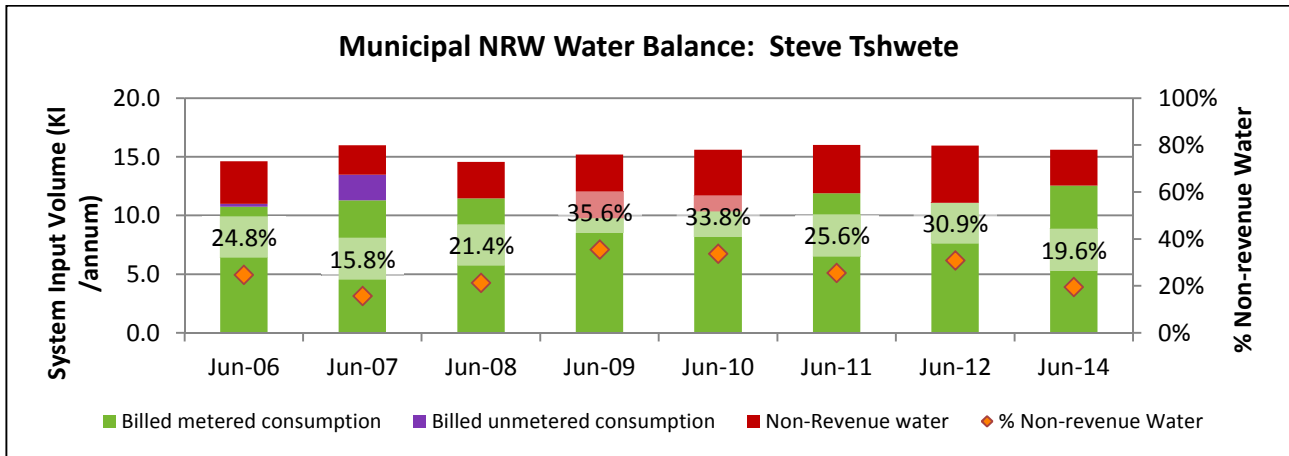


Figure 16: Steve Tshwete NRW Trend

The municipality is unable to provide a 2014 target and a zero present growth and 5% increase in billed consumption were used for this study. The municipality has done well the control their SIV from 2007 and have also reduced their NRW. They should be able to achieve their 2014 SIV target but will probably not achieve their NRW target. The municipality will have reduced their water losses by 42% if they can achieve the 2014 NRW target.

4.11 Mbombela

2011/12 KPIs: NRW =42.2%; Water Loss = 42.2%; ILI =6.81; ℓ/c/d = 265

Mbombela has a population of 588 794 people (Census 2011). This includes the urban centre of Nelspruit as well as other towns such as White River, Hazyview and Kanyamazane and numerous small villages. In 1999, the municipality engaged in a Private Public Partnership contract that set the reduction of NRW in Nelspruit at 15% and in other areas 35%, by 2009. Two pilot projects removed illegal connections and repaired household leaks, resulting in a saving of 30 Mℓ/month in the Matsulu area. Over 8 000 faulty meters were replaced and 15 000 new meters installed. Services were extended to the point where 94% of households had at least some level of water service. Despite these actions, 68% of households receive an intermittent supply and at the 2013 National Treasury audit, it was reported that 42% of residents lacked the basic level of water supply. Reasons for the disappointing performance are varied. The concessionaire renegotiated a new contract with reduced risk and responsibility, whilst the municipality has severe skill and resource shortages, which has been highlighted by the low expenditure in 2011/12 on water provision. Illegal connections remain a problem. With NRW and water losses of 42.2%, this is clearly a challenged municipality. A recent reconciliation study of the Mbombela area clearly identified WC/WDM as a key intervention strategy that can have a significant impact on future demand. The average consumption of about 265 ℓ/capita/day is high.

The municipality is unable to provide water balance information, and figures shown only cover the Sembcorp Silulumanzi (concession) area. Sembcorp Silulumanzi supplies approximately 60% of the population and water supplied. The system input volume and NRW for the whole area was estimated at 54.71 million m³/annum and 51% respectively

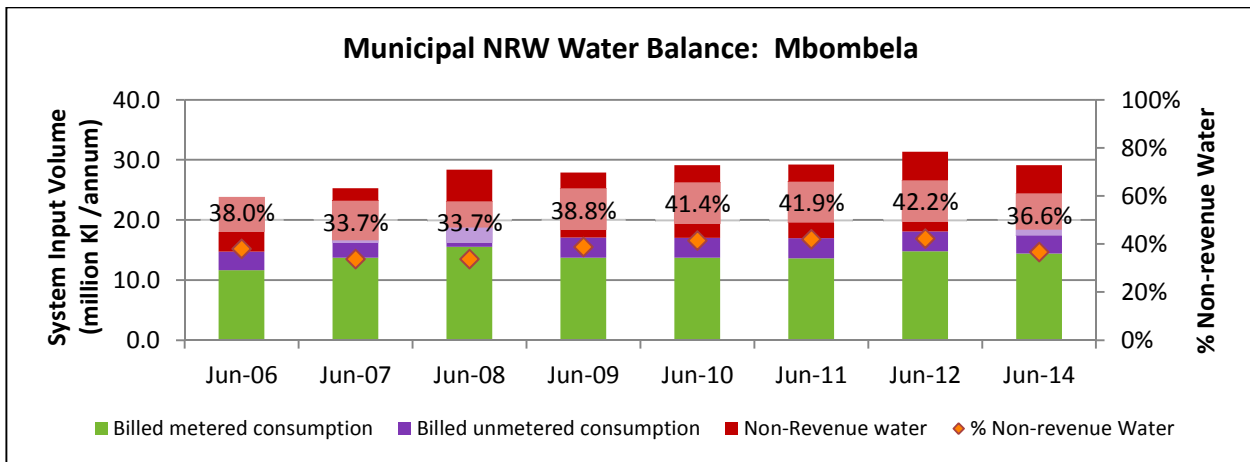


Figure 4.10: Mbombela Concession Area NRW Trend

The Mbombela reconciliation strategy set in 2013, targets a 15% reduction in total consumption with a NRW of 25% after 5 years. Resources in the area are already stressed and urgent intervention is required to ensure water security. The municipality should, with the current levels of leakage, be able to return to 2010 SIV by 2014 if sufficient action is taken. A 5% increase in billed consumption should also be possible over the next year which should reduce NRW to 36.6%. The municipality will have reduced their water losses by 12% if they can achieve the 2014 NRW target.

4.12 Sol Plaatjie

2011/12 KPIs: NRW = 55.9%; Water Loss = 54.2%; ILI = 13.5; $\ell/c/d$ = 413

Sol Plaatjie has a population of 248 041 people (Census 2011). The main urban centre is Kimberley. The area receives less than 200mm of rainfall per annum, yet if the data provided is to be believed, the average daily consumption has exceed 400 ℓ /capita/day over the last few years. This figure is questionable.

The municipality pioneered a project to reuse grey water for agricultural purposes at a low cost housing project. It was shown that wastewater passed through a sand filter was suitable for the watering of food gardens, and that this reduced water demand and the subsequent return flow to the wastewater treatment works. Community acceptance was disappointing. This was ascribed to the fact that, the community did not have a culture of food gardening and that they saw this as prejudicial practice because they were poor.

In 2009, Sol Plaatjie commenced with the implementation of a wastewater reuse project by upgrading Kimberley's Homevale wastewater treatment works. The plan was to divert treated effluent so that it can be used by commercial and emerging farmers. This is still in progress.

Sol Plaatjie has also piloted the implementation of a dry sanitation (Ecosan) system. This separated the urine and faeces, which were used as fertilizer and compost in gardens and agricultural plots. The community were however unhappy with this, mainly because of the smells.

Sol Plaatjie is committed to WC/WDM, but until as recently as 2010 has had NRW and water losses of 55.9%. In 2011, the municipality had severe water supply problems which resulted in a drop in demand. The All Town Study has set a water reduction target of 15% over 5 years, to be achieved through WC/WDM measures such as leakage reduction, consumer awareness, tariff

restructuring, rainwater harvesting and reuse. NRW and leakage levels are very high and not under control in the municipality.

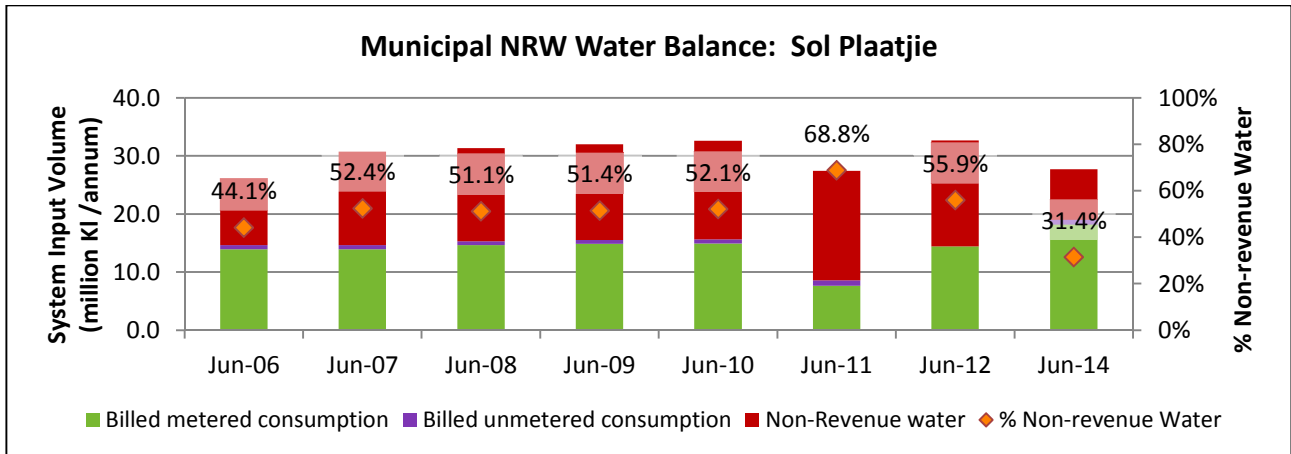


Figure 17: Sol Plaatjie NRW Trend

The municipality cannot provide a 2014 target. Efficiency levels are very low and the municipality have to reduce their 2010 SIV by 15% and increase their billed consumption by 20% in order to half their losses by 2014. This will bring the efficiency to 341 l/capita/day which is still high and NRW of 31.7%. The municipality will have reduced their water losses by 49% if they can achieve the 2014 NRW target.

4.13 Madibeng

2011/12 KPIs: NRW, Water Loss and ILI are unknown

Madibeng municipality has a population of 477 381 people (Census 2011). The urban hub is the town of Brits. No credible information could be obtained from this municipality and what was obtained in the past is clearly incorrect. The municipality does not have water balance data. No effective WC/WDM measures can be implemented without this information. Madibeng has thus had to be excluded from this report’s water balance analyses.

The All Town Study found a low confidence in available information, since there were no records of actual supply volumes. The DWA Rapid Response Unit estimates NRW 75%. The All Town Study found that there was sufficient water for current and future needs, but that water quality was problematic. It is recommended that the development of a WC/WDM plan with clear targets, with the installation of meters should be implemented.

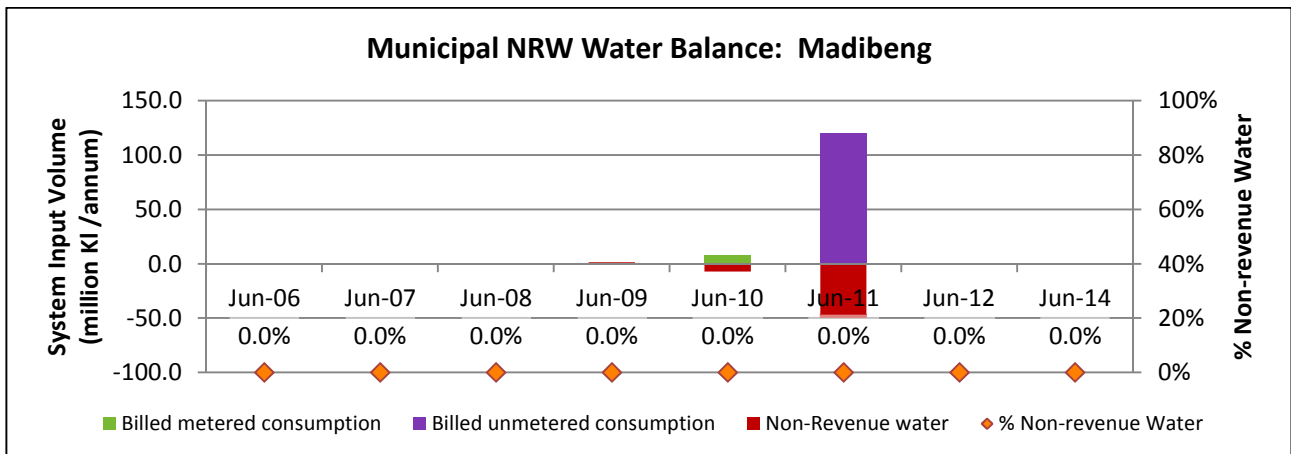


Figure 4.11: Madibeng NRW Trend

The municipality is unable to provide a 2014 target and with the lack of information, it is impossible to draw any conclusions.

4.14 City of Matlosana

2009/10 KPIs: 32.1% NRW, Water Loss = 32.1%, ILI = 3.12; $\ell/c/d$ = 194

The City of Matlosana municipality has a population of 398 676 people. Midvaal Water acts as the bulk service provider. Urban areas, of which Klerksdorp is the largest, receive water from the Vaal River, whilst rural areas are mainly supplied with groundwater. When considering the SIV trend the mining water requirements which have reduced in the last few years should be taken into account. The All Town Study estimated water losses of 24%. Figures provided through the latest NRW assessment suggest a higher figure of about 30%. The All Town Study gives a per capita consumption of 272 $\ell/capita/day$, versus the assessment's 194 $\ell/capita/day$. Although these levels are not that excessive, the Study found high levels of water wastage and that without the implementation of WC/WDM measures, there would not be adequate water in the long term. It set a water saving target of 6% through the implementation of WC/WDM activities. Activities recommended included leakage reduction, consumer education and reuse.

The municipality has a lack of credible recent data which makes it impossible to determine any meaningful trend and it has thus had to be excluded from this report's analyses.

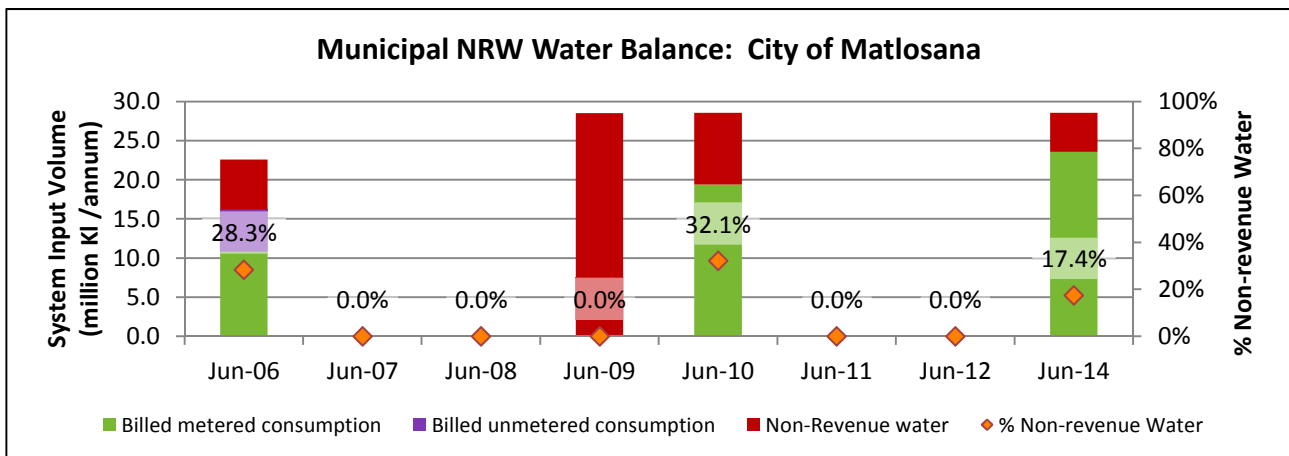


Figure 4.12: City of Matlosana NRW Trend

The municipality cannot provide a 2014 target. If the 2010 figures provided are accepted, very little further reduction in SIV is expected but the billed consumption has to increase by 20% in order to half their losses by 2014. The municipality is not likely to achieve this target.

4.15 Rustenburg

2011/12 KPIs: NRW = 46.1%; Water Loss = 45.6%; ILI = 5.21; $\ell/c/d$ = 271

The municipality has a population of 549 575 people (Census 2011), and receives water from both Magalies Water (from Vaalkop Dam) and Rand Water, the latter for its mines. The All Town Study, which excluded mining usage, estimated water losses to be 28%, substantially lower than the NRW assessment. It found that the Vaalkop Cluster area was already in a water deficit and that WC/WDM was urgently required. The study found that a metering programme was required to separate domestic, industrial and mining uses. An active leakage detection and repair system was

also recommended and illegal connections should be removed. It also recommended the exploration of groundwater supplementation. The consumption of 271 ℓ/capita/day is high, and leakage and NRW are not under control.

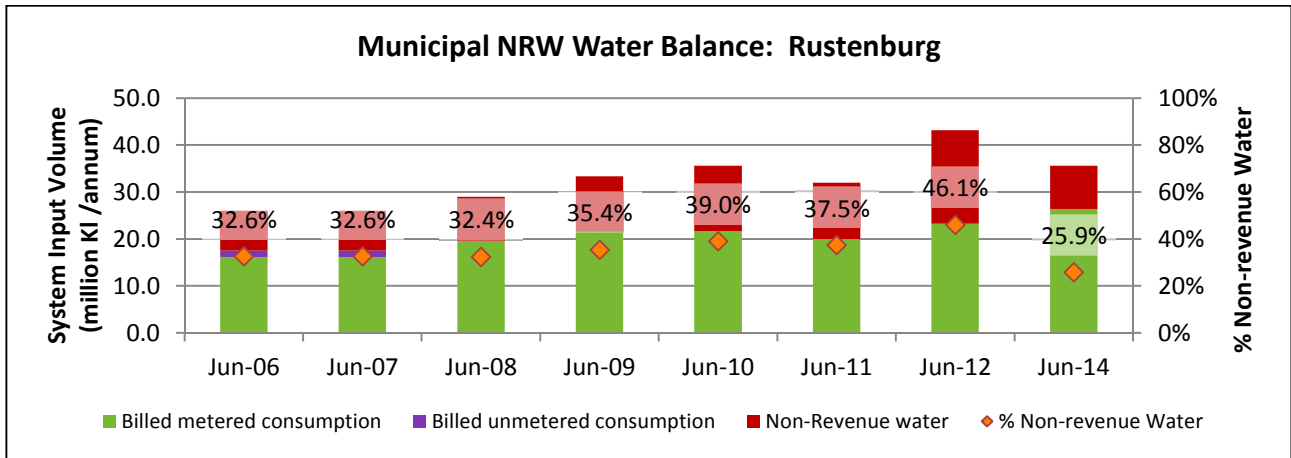


Figure 4.13: Rustenburg NRW Trend

The 2014 target for Rustenburg was set under the 2005 Vaal Reconciliation Strategy. The municipality should be able to achieve the 2014 target if WC/WDM is sufficiently prioritised. The municipality cannot explain the considerable increase in the 2012 water demand but might be as a result of improved data quality. The municipality will have reduced their water losses by 34% if they can achieve the 2014 NRW target.

4.16 Tlokwe

2011/12 KPIs: NRW = 14.2%; Water Loss = 14.2%; ILI = 2.2; ℓ/c/d = 194

Tlokwe’s has a population of 162 762 people and its largest urban centre is the town of Potchefstroom. The All Town Study indicated that there was high consumption of 368 ℓ/capita/day and that without WC/WDM measures, usage will exceed supply by 2015. It estimated NRW to be 27%. The municipality has been consistent in their provision of water balance data, but much of their NRW data seems to be too low and of questionable accuracy. Efficiency is within the expected target considering the low number of industries and high number of students. The study recommended an analysis of water use patterns, minimisation of inefficiencies and a reduction in per capita consumption. With the implementation of WC/WDM measures, it set a target water reduction of 14% over 5 years.

NRW and leakage levels seem to be well under control.

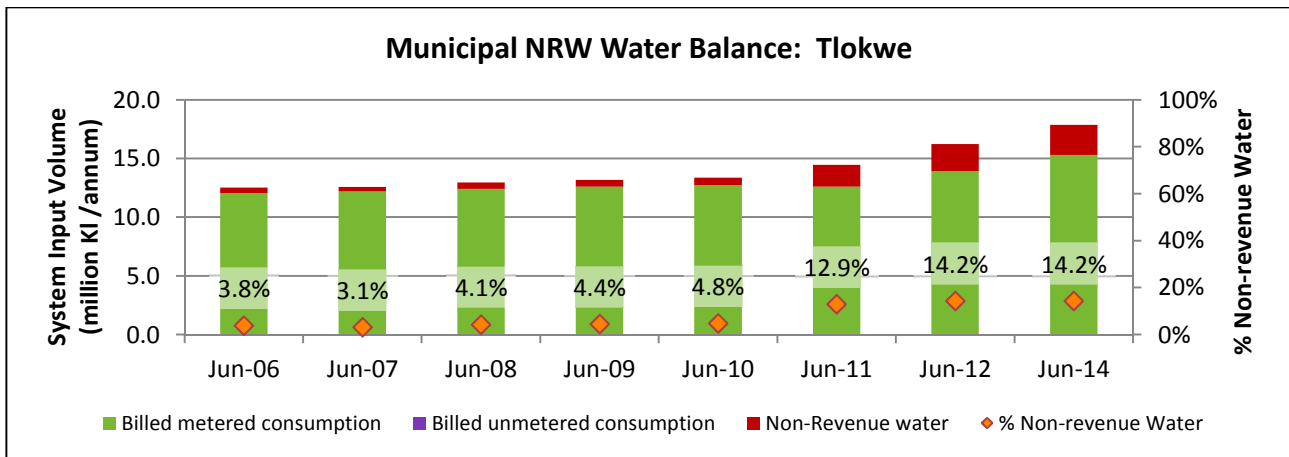


Figure 4.14: Tlokwe NRW Trend

The municipality provided the 2014 target and shows a considerable growth in water demand. It is recommended that the municipality should try to maintain their current SIV. There is little scope for further reduction in water loss and NRW if the figures provided by the municipality are correct. Further discussions are required as data sources are contradictory.

4.17 Drakenstein

2011/12 KPIs : NRW = 11.2%; Water Loss = 11.0%; ILI = 1.3; $\ell/c/d$ = 207

The Western Cape's Drakenstein municipality has a population of 251 262 people most of whom live in Paarl, Wellington and a number of smaller towns. It is one of South Africa's top performers in terms of NRW and is a good example of what can be achieved. During the 1990s, water demand was rising at 3.5% per annum and NRW reached 37% in 1999. Consequently, in 1997, Council approved a Water Demand Management Programme that incorporated the following actions.

- The introduction of a rising block tariff for residential water use;
- The development of a Master Plan with a computerised network model;
- Installation of district and zonal meters;
- The metering of unmetered connections;
- A public awareness campaign;
- Installation of water saving devices; and
- Pressure management.

Gradually this produced results, although it should be noted that NRW only started to diminish after 1999.

Apart from the above WC/WDM activities, the municipality identified, through logging of its water supply networks, that the Saron area had a high minimum night flow. More than 50% of homes were found to have defective, leaking plumbing. A project was implemented to repair plumbing fixtures in indigent households was undertaken and the minimum night flow was almost halved.

Currently NRW seems to have stabilised at about 11%. Consumption has dropped from 294 $\ell/capita/day$ in 1995/96, to 188 $\ell/capita/day$ in 2006/07, a remarkable achievement. Drakenstein has good data and records and seemingly has the fastest leak response time of any municipality in

South Africa. NRW and leakage levels compare to best international standards and are well under control.

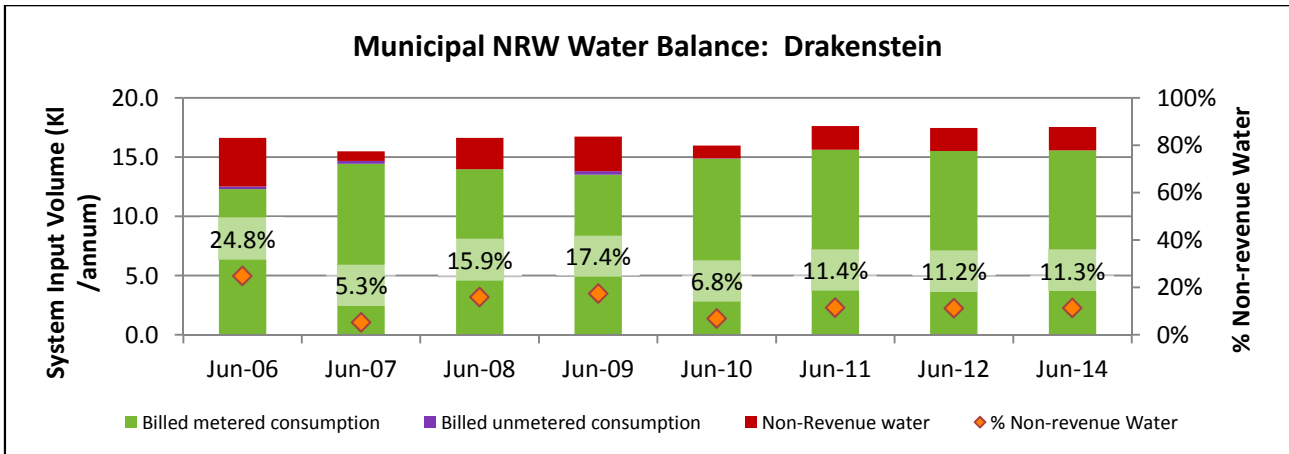


Figure 4.15: Drakenstein NRW Trend

The municipality has not provided a 2014 target but if they can maintain their SIV of the past two years they will be doing very well. This municipality has already halved their water losses.

4.18 Stellenbosch

2011/12 KPIs : NRW = 21.4%; Water Loss = 21.2%; ILI =2.7; $\ell/c/d$ = 248

Stellenbosch municipality has a population of 155 733 (Census 2011). It is an agricultural town with a large university. The NRW assessment shows that water losses have substantially reduced since 2006/07. The All Town Study estimate of 26% is close to that of the NRW assessment. The consumption of 248 $\ell/capita/day$ is somewhat higher than that of the All Town Study, at 170 $\ell/capita/day$.

The All Town Study indicates that water shortfalls are anticipated for both the medium and high growth scenarios by 2020. It recommended that a WC/WDM programme be implemented to reduce losses and demand, that water reuse be introduced and that the Stellenbosch "leiwater" system be better controlled. The Study set a target of reducing water usage by 15 to 20% over a 10 year period.

The municipality's NRW and ILI are good and in line with well managed systems. There is, however, scope for improved efficiency.

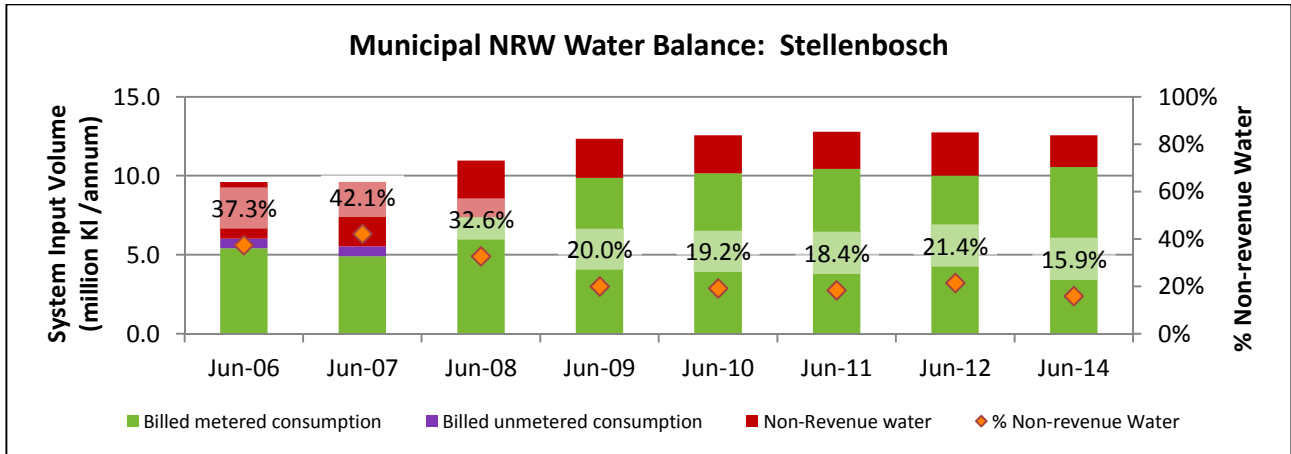


Figure 4.16: Stellenbosch NRW Trend

The municipality has not provided a 2014 target but they have done well to maintain their SIV at the same level over the past 4 years. The 2010, SIV has been used for the 2014 target and seems achievable. A 4% (1% per annum from 2010) increase in billed consumption will reduce their NRW to 15.9%. The municipality has already halved their 2007 water losses.

4.19 George

2011/12 KPIs: NRW = 4.5%; Water Loss = 4.3%; ILI = 0.3; l/c/d = 149

George Municipality has a population of 193 672 people (Census 2011) and is an economic hub in the Southern Cape. Their SIV has remained remarkably constant over the last 8 years, despite a substantial population growth. This can be attributed to a recent drought, which saw severe water restrictions and a substantial drop in consumption, with per capita consumption falling below 150 l/capita/day by 2010/11. George has also implemented a water reuse project. Despite this, the All Town Study predicts a water deficit by 2011, 2012 or 2017, for low, medium and high growth scenarios. The study estimated George’s NRW at 12%, a figure that is more realistic than the NRW assessment’s 4.5% and the calculated impossibly low ILI of 0.3. The fluctuation in NRW over the 8 year period cannot be explained.

The study recommends that no new developments should proceed until the availability of water resources is improved. WC/WDM measures such as water reuse, groundwater development, regional augmentation, rainwater harvesting and desalination should be implemented. A possible water demand reduction of 5% has been suggested.

The municipality did not provide a 2014 target and maintaining the 2010 SIV was used, although this might be unrealistic and uneconomically, considering the drought conditions during this period. Water losses and NRW seem to be well under control and limited further reduction is anticipated. NRW and the ILI for the municipality are in line with very well managed systems, but also seem unrealistically low and should be further investigated to ensure it is a true reflection.

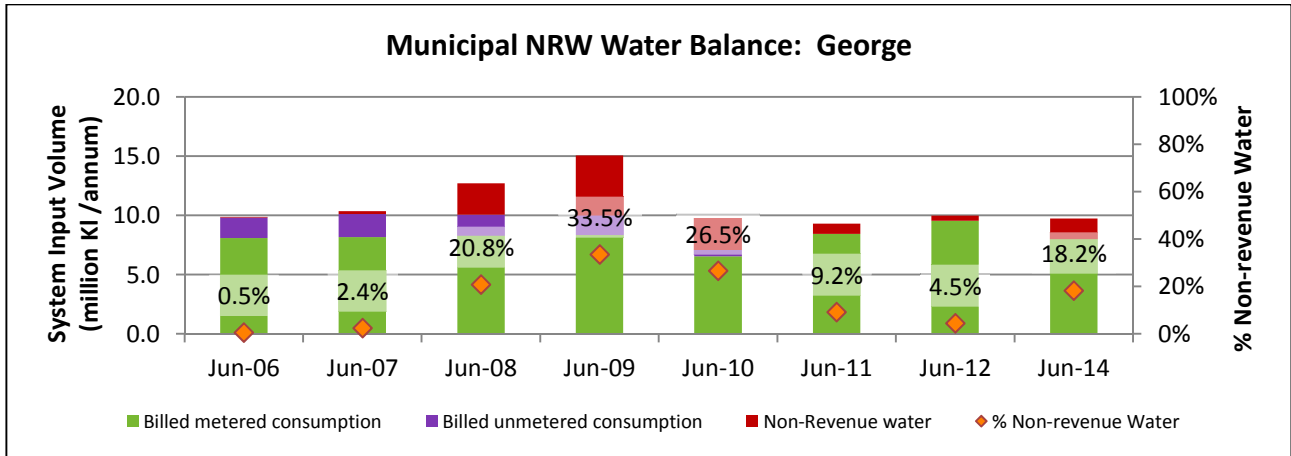


Figure 4.17: George NRW Trend

5 RESULTS

5.1 Key performance indicators

Various KPIs and trends are presented graphically in this chapter. It is evident from this analysis that the 2014 political targets will not be achieved. In most instances, the funding required to implement the various WC/WDM measures is simply not available in municipalities or is not prioritised by councils. This problem is further compounded by the fact that such interventions require significant technical expertise if they are to be implemented in a proper and sustainable manner and such interventions will take time to implement and the savings realized will only appear over years and not months. In conclusion, the political target of halving water losses by 2014 is unrealistic.

The DWA reconciliation targets, where they have been set, are more achievable. It would appear however that many of the Secondary Cities have not yet commenced with any of the strategies to achieve these. Municipalities should be looking towards a 10 year implementation plan horizon involving large budgets if their target savings are ever to be achieved. In the case of Drakenstein and George where the water losses are already close to what can reasonably be expected, further significant reductions are unlikely. Drakenstein at least, has reached its target. George through a re-demarcation process has recently absorbed a problematic area and this may have a negative impact on their water loss reduction programme.

System Input Volume = 537.038	Authorised consumption = 328.476	Billed authorised = 325.495	Billed metered = 302.235	Revenue water = 325.495
	Water losses = 208.562	Apparent losses = 41.712	Apparent losses = 41.712	Non-revenue water = 211.543
		Real Losses = 166.850	Real Losses = 166.850	
		Billed unmetered = 23.260		

Figure 5.1: Water balance (2011/12); for 16 Secondary Cities

From the above water balance calculation it can be seen that for the 16 Secondary Cities for which information was available, the NRW and water losses are 211.5 million m³/annum (39.4%) and 208.5 million m³/annum (38.8%) respectively, whilst their SIV is 537.0 million m³/annum. NRW and water losses for the Secondary Cities will be well above 40% if the remaining three municipalities are included in the analyses.

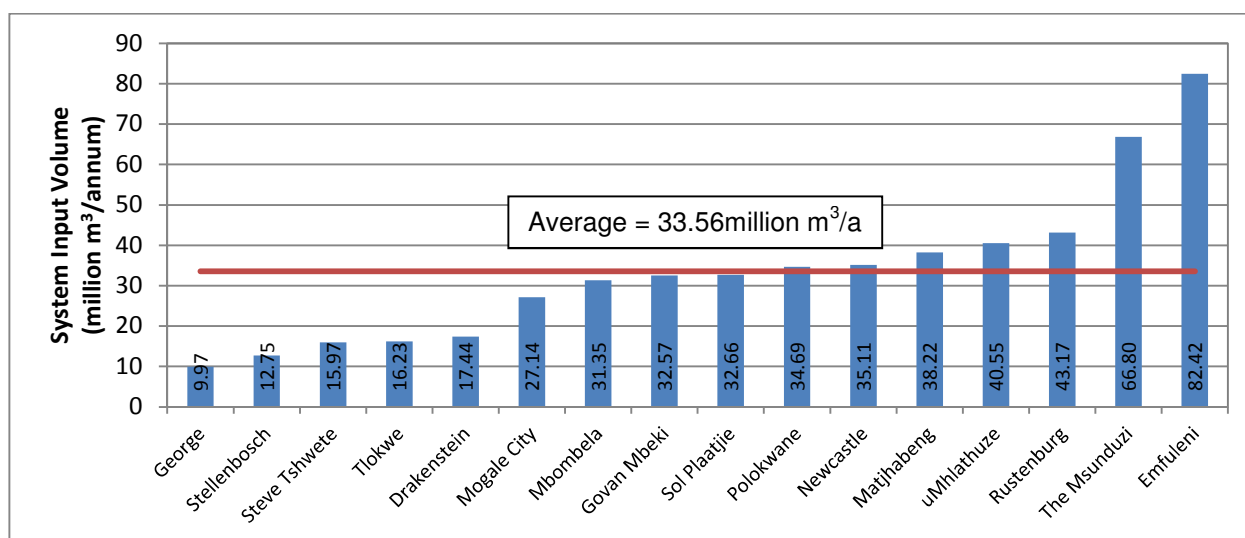
Table 5.1 provides a comparison of the Secondary Cities with the Metros for Dec 2012 and the National NRW assessment for Jun 2010.

Table 5.1: KPI comparison

KPI	Unit	Metros (Dec 2012)	National (Jun 2010)	Secondary Cities (Jun 2012)
SIV	million m ³ /a	2085.0	3190.2	537.0
NRW	million m ³ /a	683.4	1174.7	211.5
% NRW	%	33.8	36.8	39.4
Water Loss	million m ³ /a	612	1014.5	208.6
% Water loss	%	29.7	31.8	38.8
SIV Unit consumption	ℓ / capita / day	274	235	264
Billed Unit consumption	ℓ / capita / day	190	149	160
ILI	-	5.7	6.8	6.2

The Secondary Cities are performing significantly worse than the Metros and national average figures. The reason for this is assumed to be staff and technical skills problems, exacerbated by a lack of budget allocation and prioritisation. If a typical production cost for water of R5.00/m³ is used as a guide, the financial cost to the sixteen Secondary Cities for their Non-Revenue Water is in the order of R 2.685 billion per annum. Since there will always be an element of NRW, at best only 50% of this R2.685 billion can realistically be saved.

Key performance indicators for the secondary cities are summarised in **Figure 5.2** to **Figure 5.6**.

**Figure 5.2: System input volume distribution**

Emfuleni and Msunduzi are the two largest water consumers, while George and Stellenbosch are the smallest. The water consumption in the Secondary Cities is, on average, about a factor ten less than for the metros.

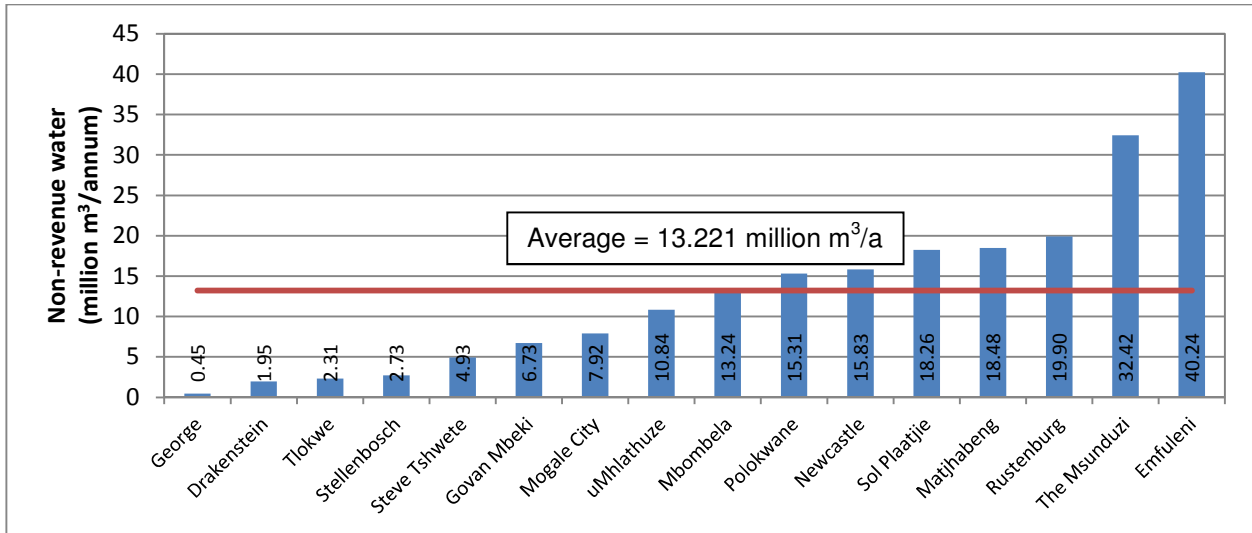


Figure 5.3: Volume NRW distribution

Msunduzi and Emfuleni have the largest potential for water loss reduction while George and Drakenstein have the least potential.

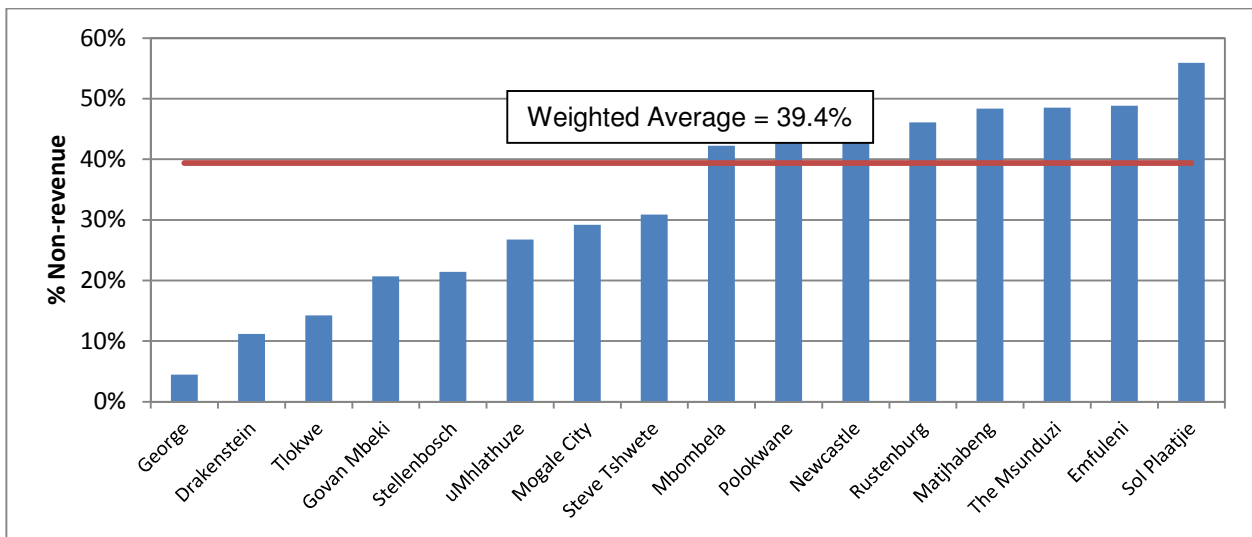


Figure 5.4: % NRW distribution

Eleven of the 19 municipalities have NRW figures above the national average of 36.8% and metros of 33.8%. NRW does not only influence water losses and efficiency but also on the financial viability of the municipalities.

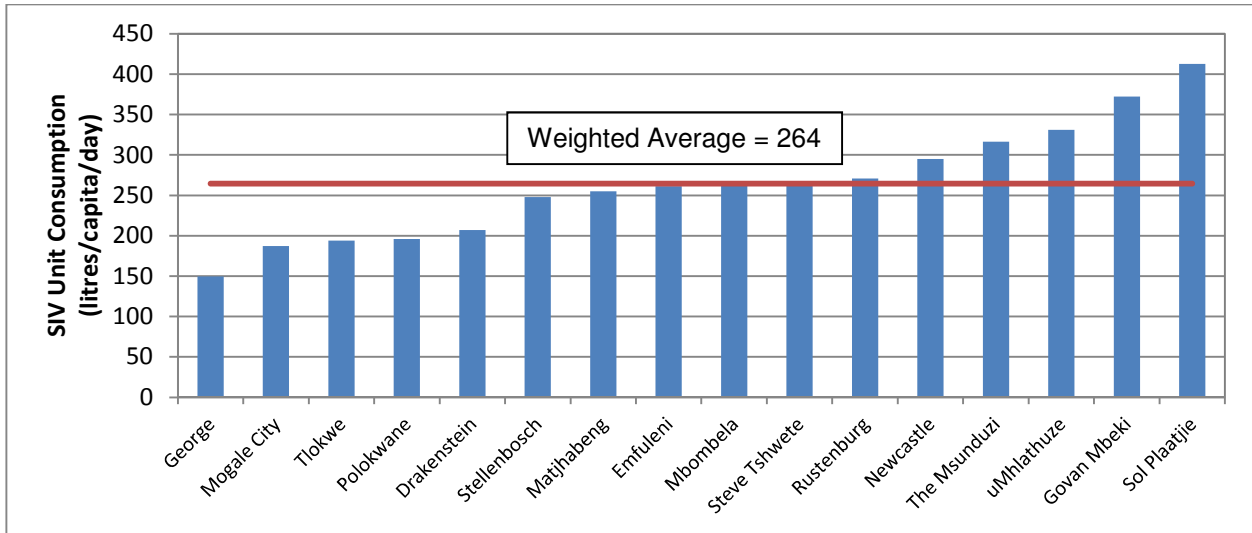


Figure 5.5: Efficiency distribution

Sol Plaatjie is the most inefficient municipality followed by Govan Mbeki while George and Mogale City are the most efficient. The Secondary City average is above the national average of 238 ℓ/capita/day but below the metro average of 274 ℓ/capita/day.

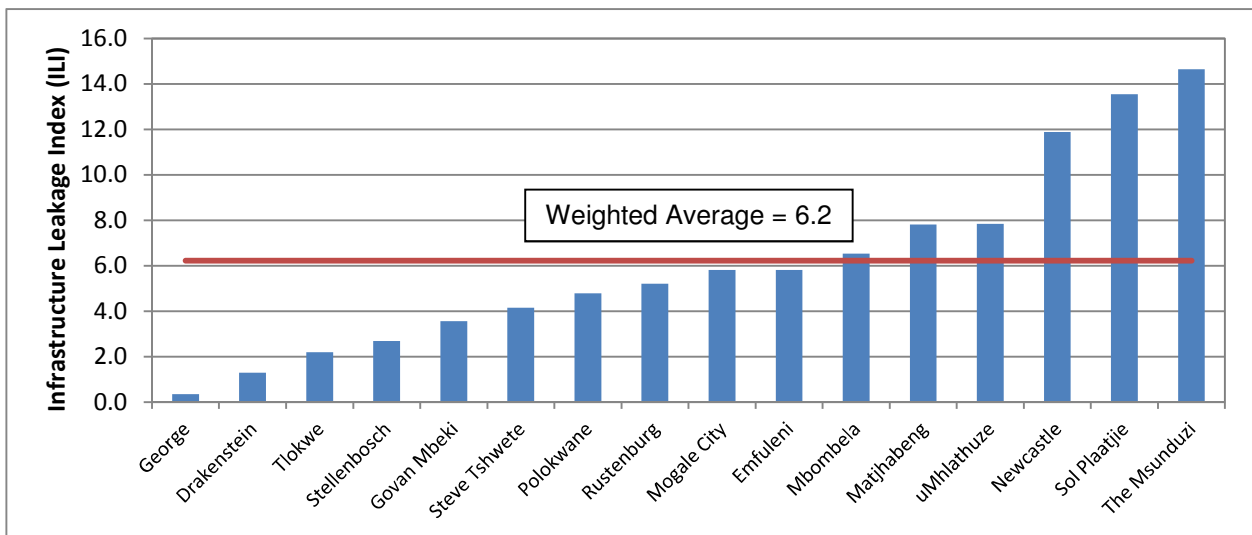


Figure 5.6: Infrastructure leakage index distribution

Newcastle, Sol Plaatjie and Msunduzi have the highest ILIs, while Drakenstein and George have the lowest.

5.2 Trend Analysis

The trends for various key performance indicators for sixteen of the nineteen Secondary Cities over seven years are summarised in the following section.

Not every Secondary City has a reconciliation strategy target for water reduction and in some instances there are phased targets. Targets are depicted as the last bar of the graph and are given relative to the 2014 financial year. Considering the consistent growth in water demand over the past 7 years the secondary cities will not achieve the 2014 target. .

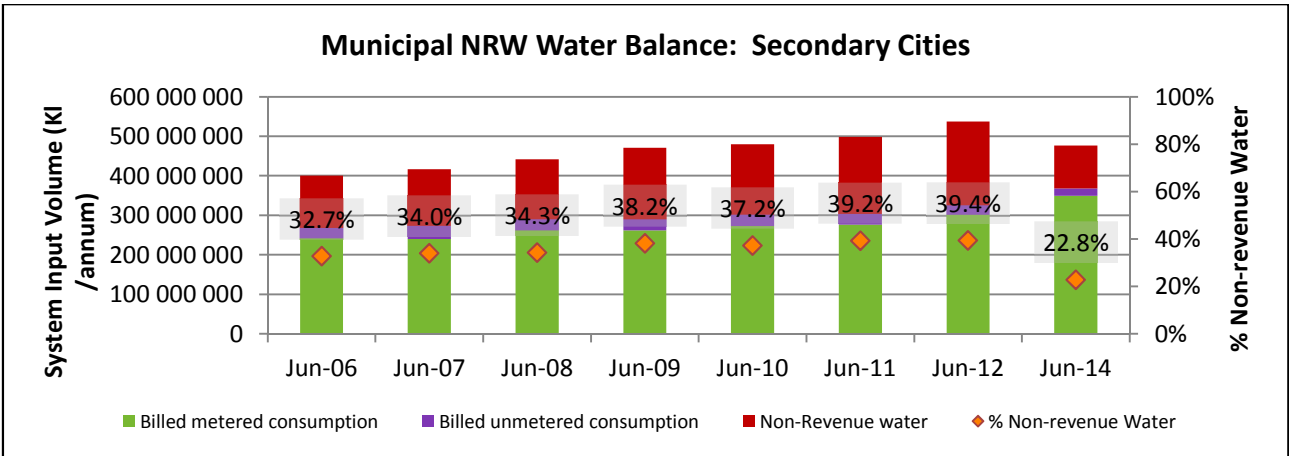


Figure 5.7: Non-revenue water trend

Non-revenue water has been consistently increasing over the past 7 years from 130.1 million m³/annum in 2006 to 211.5 million m³/annum in 2012. Water losses have increased from 130.1 million m³/annum to 208.5 million m³/annum over the same period.

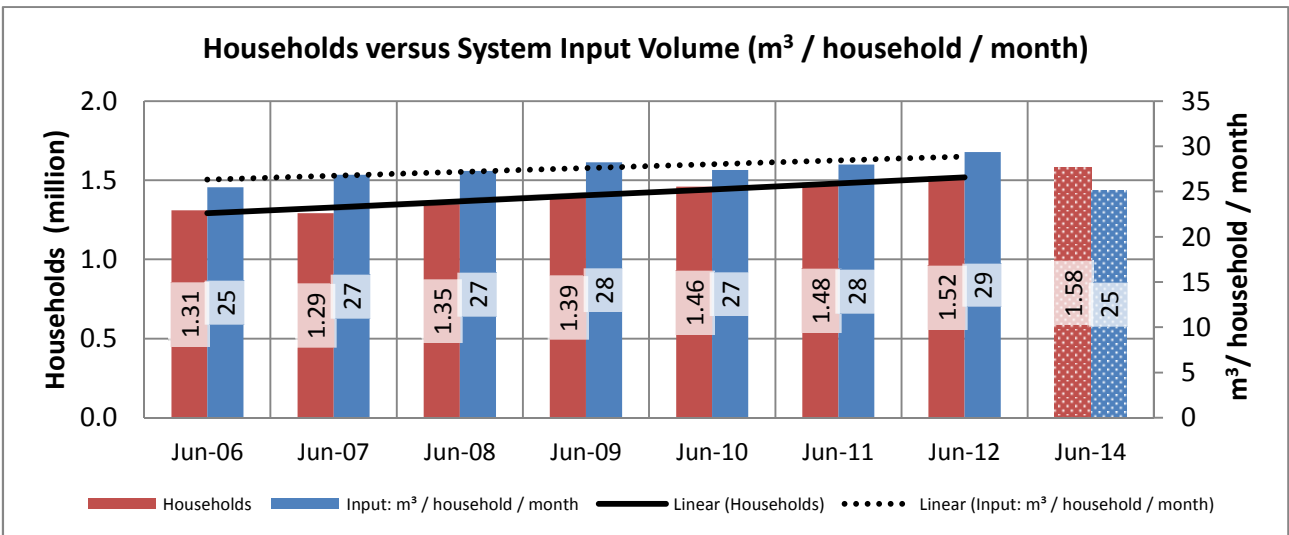


Figure 5.8: Consumption per household trend (m³/household/month)

Consumption per household based on the SIV has increased by 16% over the past 7 years from 25 m³/household/month to 29 m³/household/month. Households are therefore becoming less efficient but could also be an indication of deteriorating billing systems. Metering and billing is not properly performed which is confirmed by the high NRW figures, resulting in decreased efficiency.

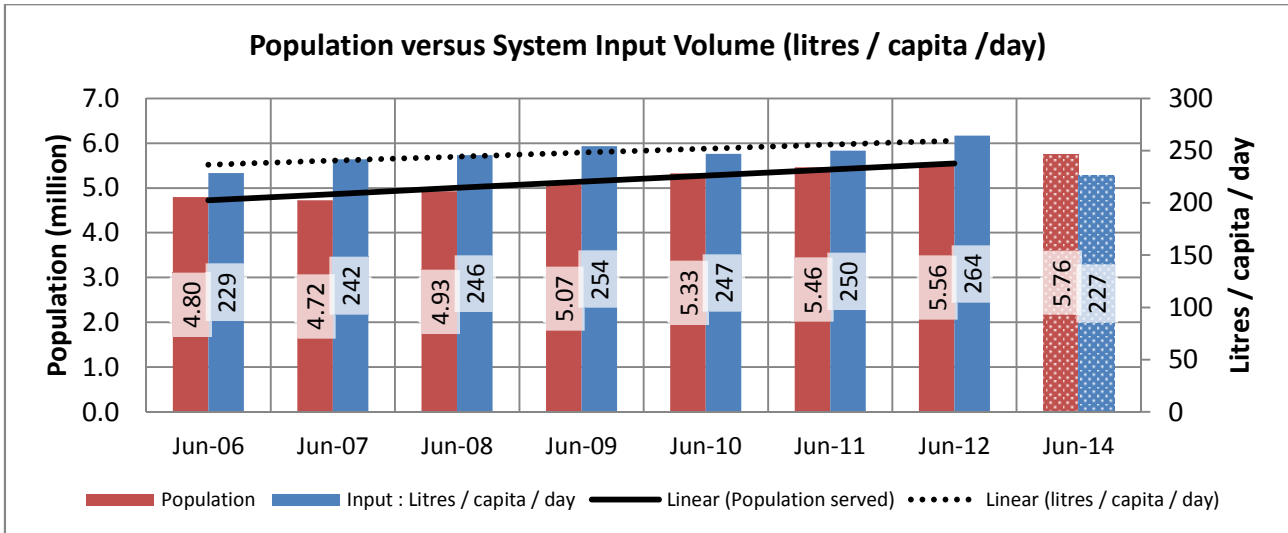


Figure 5.9: Population and water demand growth trend

Growth in water demand has been 5.0% per annum in the past 7 years while the population has grown by only 2.5% over the same period. Water use efficiency is therefore reducing and must be urgently addressed. The population and household unit consumption trends are the same and confirm increased water losses, NRW and inefficiency.

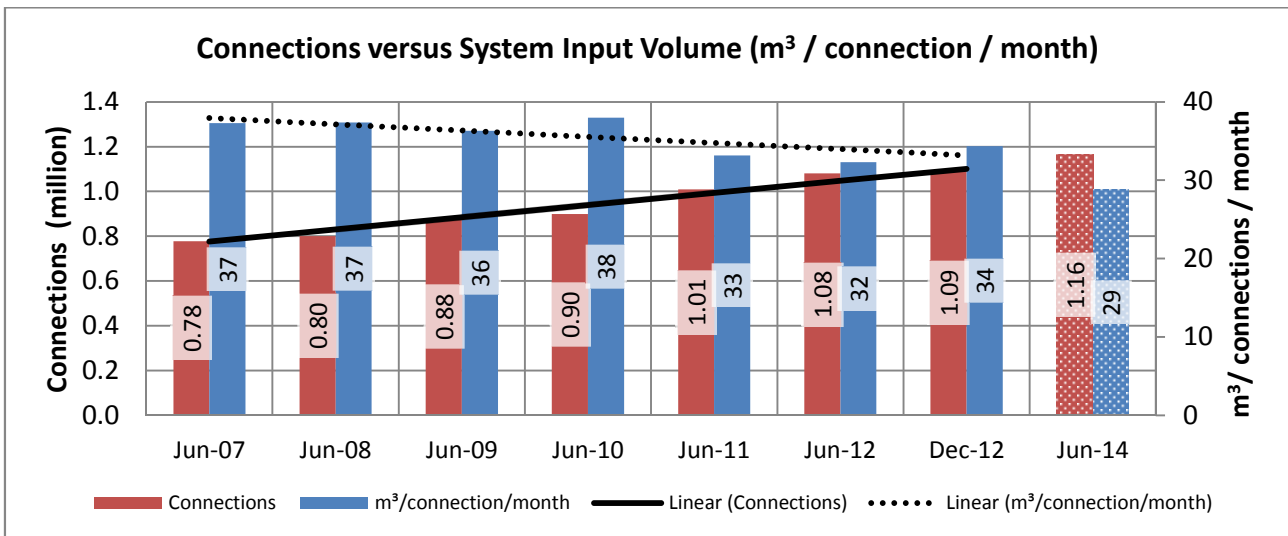


Figure 5.10: SIV consumption per connection trend (m³ / connection / month)

The consumption per connection has reduced from 37 m³/connection/month to 34 m³/connection/month over the past 7 years. The reason for this could be that the municipalities have fallen behind with authorised connections which contribute to their high NRW.

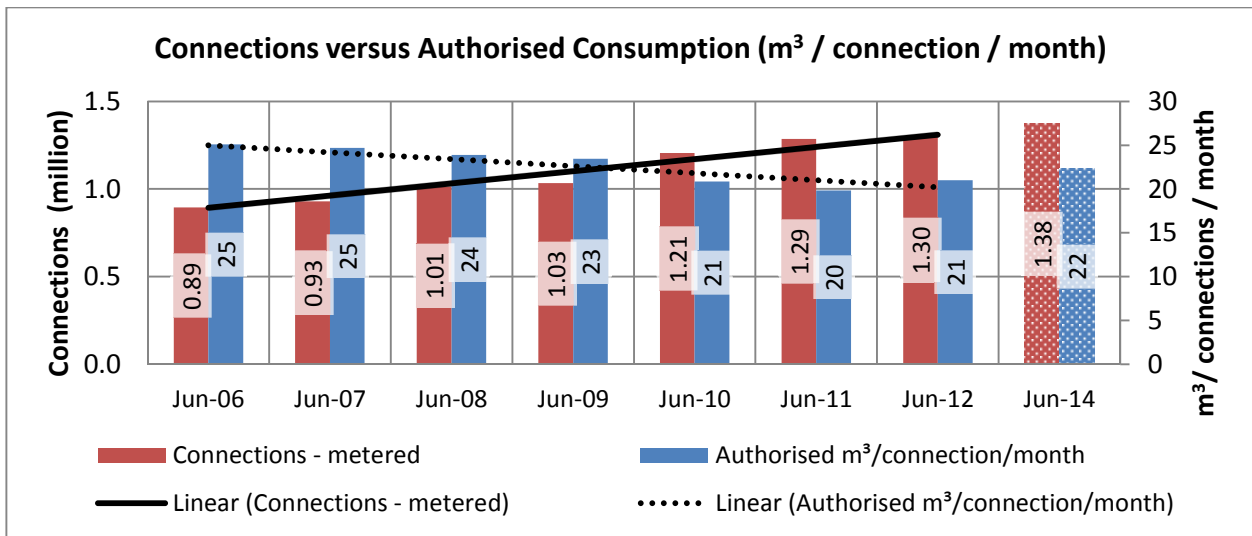


Figure 5.11: Authorised Consumption per connection trend (m³ / connection / month)

Authorised consumption has reduced over the past 7 years, which could indicate deteriorating metering and billing systems, possibly because these municipalities have also experienced high growth and are unable to cope with demand for services.

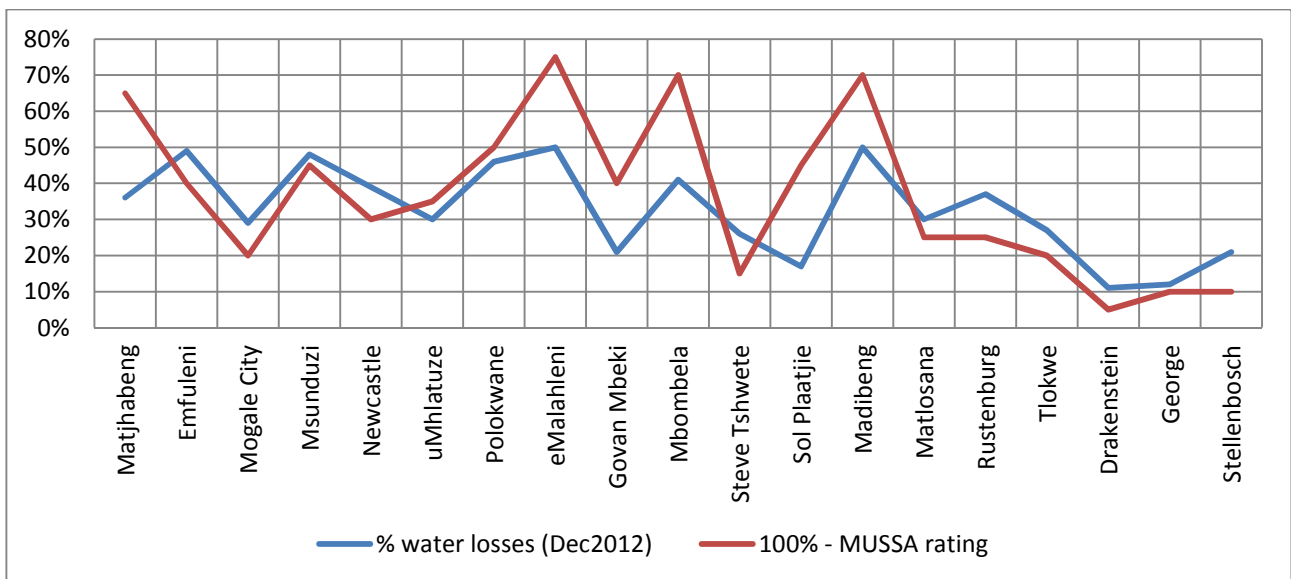


Figure 5.12: Infrastructure Leakage Index / MUSSA WC/WDM correlation

The above graph determines whether the DWA Municipal Strategic Self Assessment gives a true reflection of actual performance on the ground. It can be clearly seen that there is a strong correlation between the two graphs, which shows that in the case of the Secondary Cities, municipal perceptions of WC/WDM performance are generally accurate.

Without buy-in from the Secondary Cities and obtaining their agreement to the baseline figures and performance indicators, it will not be possible to monitor performance in a meaningful manner. It would appear, however, that most of the Secondary Cities are not on track to meet their original reconciliation targets.

6 STRATEGIC ISSUES

6.1 Budget Constraints and Supply Chain Management

Budget constraints remain one of the key reasons given for lack of progress made with the implementation of WC/WDM. A contributing factor is the poor cooperation in municipalities between the financial and technical departments. Another is the lack of awareness of councillors regarding the importance of WC/WDM or an unwillingness by politicians to prioritise an activity that will not be visible as a sign of service delivery.

6.2 Water Security

Water reconciliation strategies have been developed for all the Secondary Cities where these WC/WDM measures have been recommended. In some instances target reductions have been set, but few Secondary Cities are actually achieving these targets or in fact implementing the recommended WC/WDM measures.

6.3 Capacity

With the possible exception of the Western Cape Secondary Cities, a lack of capacity and skilled staff, as well as a lack of institutional knowledge can be blamed for the lack of WC/WDM progress.

6.4 Metering and Billing

Metering and billing remain a major challenge in all municipalities. The lack of a bulk meter makes keeping a water balance almost impossible. Likewise, the lack of zonal meters makes identification of priority areas difficult. Aging, under-reading meters and illegal connections all serve to exacerbate the situation.

6.5 Revenue and expenditure

National Treasury's 2012/13 Medium Term Revenue Expenditure Framework National Benchmark Engagement found that Secondary Cities had a collection rate of 87% in 2012/13, but that in the majority of cases their tariff structuring is not cost reflective. George, Sol Plaatjie, Rustenburg and Mbombela are exceptions, although Mbombela has a declining block tariff which is not conducive to water conservation.

Whilst about 75% of municipal income should come from own revenue raised, poor credit control and billing reduce this. To worsen matters, the revised equitable share formula will see Secondary Cities in future getting less money from the fiscus.

Despite continual complaints about a lack of funding, National Treasury refers to the continual under-expenditure by municipalities. Mbombela is an example; where in the 2012/13 very little was actually spent on water supply. Supply Chain Management is often given as a reason for under-expenditure, but National Treasury lays the blame on a lack of longer term procurement planning.

7 CONCLUSIONS

The following conclusions have been made:

- The Secondary Cities are of high economic significance and reducing water losses and non-revenue water in Secondary Cities is of utmost importance.
- This study, based on 7 years of data, is the most detailed assessment of non-revenue water/water losses.
- Secondary Cities account for approximately 12% of the total urban consumption. This is almost 25% of the metro consumption.
- NRW in Secondary Cities is 39.4% which is higher than the metro NRW of 33.8% (Dec 2012) and the (2009/10) National average of 36.8%.
- NRW for Secondary Cities has consistently been increasing over the past 7 years, which is of concern.
- Population growth for Secondary Cities has been 2.5% over the past 7 years while water demand has grown by 5.0%. This is an indication of deteriorating water services and municipalities are not able not keep up with the demand.
- Unit consumption per capita per day based on the system input volume has increased from 229 ℓ /capita/day in 2006 to 264 ℓ /capita/day in 2012. The per capita consumption is slightly below the average metro consumption of 274 ℓ /capita/day.
- Unit consumption per household based on the system input volume has increased from 25 m^3 /household/month in 2006 to 29 m^3 /household/month in 2012.
- Authorised consumption has reduced from 25 m^3 /connection/month to 21 m^3 /connection/month.
- Water losses (38.8%) and NRW (39.4%) for Secondary Cities are higher than for Metros although metro systems are significantly bigger.
- The potential for water savings is the greatest in Emfuleni and Sol Plaatjie municipalities.
- The average ILI for the Secondary Cities is 6.2. The average ILI is higher than the Metro ILI of 5.6.
- Most Secondary Cities do not have a 2014 target and do not take cognisance of the targets set under the various DWA Reconciliation Strategies.
- Most Secondary Cities will not half their water losses by 2014 and in most cases water losses have increased over the past 3 years.
- Most municipalities are able to provide water balance information but the completeness, plausibility and understanding thereof are of concern in some instances.

It appears that the importance of demand management is slowly being appreciated by some Secondary Cities, but not by others. With the exception of a few municipalities, most of the Secondary Cities are in in crisis and require urgent intervention to ensure water security and sustainability.

8 RECOMMENDATIONS

Based on the results the following recommendations are made :

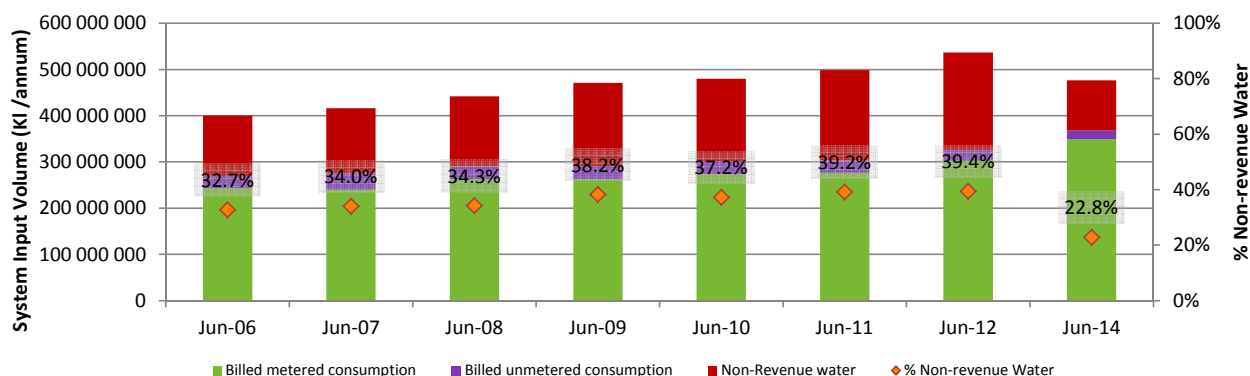
- On-going monitoring and reporting of Secondary City NRW performance by DWA against determined targets and baselines is critical;
- On-going provision of mentorship to municipalities and DWA Regional Offices is critical;
- Secondary Cities should increase their efforts to achieve the targets set under the various Water Reconciliation Strategies (WRSs) to ensure water security.
- WRS targets need to be reviewed on a regular basis;
- Secondary Cities should increase their efforts to reduce water losses in line with WRS targets in order to reduce their negative impact on water security;
- Secondary Cities 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;
- Secondary Cities should, through on-going awareness programmes, encourage the consumer to appreciate the value of water and enforce the user pays principal;
- Secondary Cities should increase payment levels, encourage consumer fixing of leaks, and prosecution of illegal water connections and reduce theft of water;
- Secondary Cities asset management needs to be improved to ensure greater sustainability of water supply services;
- Water management reform need to be considered by Secondary Cities in order to attract increased levels of private sector finance to Secondary Cities' WC/WDM initiatives.
- Urgent intervention is required in Madibeng, Emalahleni and City of Matlosana as these municipalities can provide no credible information.

Appendix A : Category B1
Water Balance data for Secondary Cities

National NRW Assessment

Province		Gauteng							WSA	
Municipal Code										
District Municipality									Category	
Municipality										
Settlements									Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	4 798 462	4 721 703	4 928 412	5 074 636	5 327 235	5 464 401	5 562 796	5 760 399	
	Households	1 309 477	1 292 173	1 349 413	1 389 119	1 459 610	1 484 686	1 524 452	1 581 319	
	Connections - metered	777 959	800 894	878 865	899 008	1 008 562	1 080 936	1 094 806	1 164 122	
	Connections - Unmetered	116 802	127 826	134 889	134 225	196 807	205 575	207 665	211 308	
	Length of mains (km)	16 457	17 994	18 635	20 045	21 974	23 392	23 707	24 732	
	System input volume	k/annum	400 231 488	416 601 531	441 953 384	470 753 334	479 921 461	498 798 204	537 038 166	476 239 421
	Billed metered consumption	k/annum	243 035 864	240 027 012	262 364 942	261 662 511	272 969 206	276 178 748	302 235 372	349 218 633
	Billed unmetered consumption	k/annum	26 198 022	34 976 876	28 199 264	29 129 265	28 486 428	27 075 095	23 260 089	18 449 205
	Unbilled metered consumption	k/annum	0	0	0	0	0	2 497 330	169 248	7 935
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	651 356	2 811 127	1 737 218
Water Balance Calculat	Revenue water	k/annum	269 233 886	275 003 888	290 564 206	290 791 776	301 455 634	303 253 843	325 495 460	367 667 838
	Non-Revenue water	k/annum	130 997 602	141 597 643	151 389 178	179 961 558	178 465 827	195 544 361	211 542 706	108 571 583
	Water Losses	k/annum	130 997 602	141 597 643	151 389 178	179 961 558	178 465 827	192 395 675	208 562 330	106 826 430
	% Non-revenue water		32.7%	34.0%	34.3%	38.2%	37.2%	39.2%	39.4%	22.8%
	% Water Losses		32.7%	34.0%	34.3%	38.2%	37.2%	38.6%	38.8%	22.4%
Key performance indicators	Input : Litres / capita / day		229	242	246	254	247	250	264	227
	Input : m ³ / household / month		25	27	27	28	27	28	29	25
	Billed : Litres / capita / day		154	160	162	157	155	152	160	175
	Billed : m ³ / household / month		17	18	18	17	17	17	18	19
	% Population growth		2.72%	-1.60%	4.38%	2.97%	4.98%	2.57%	1.80%	
	% Water demand growth		-1.07%	4.09%	6.09%	6.52%	1.95%	3.93%	7.67%	
	UARL		18 469 590	19 470 420	20 922 375	21 670 015	24 816 886	26 467 381	26 803 979	28 205 730
	CARL		114 815 479	123 337 340	131 471 248	154 514 905	153 465 123	153 916 540	166 849 864	85 461 144
	Infrastructure Leakage Index		6.22	6.33	6.28	7.13	6.18	5.82	6.22	3.03
Source of information										

Municipal NRW Water Balance: Secondary Cities

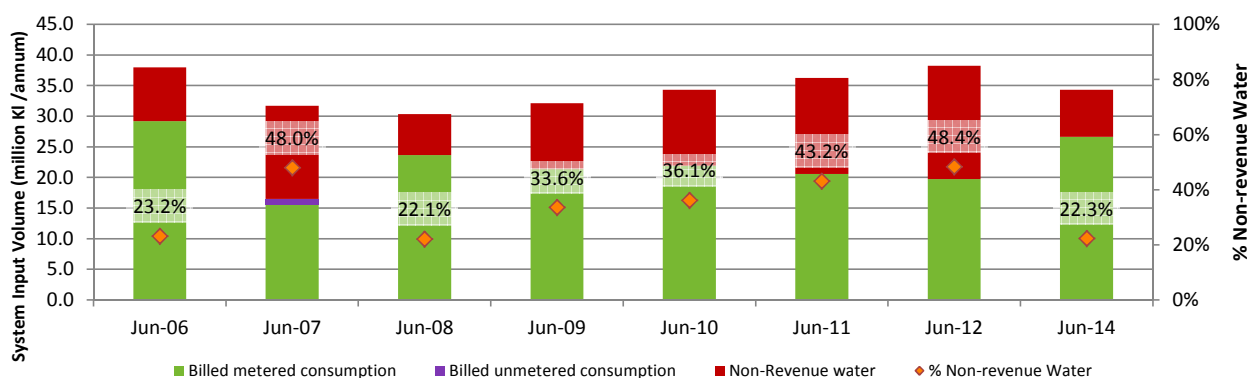


Comments

National NRW Assessment

Province		Free State							WSA	
Municipal Code		FS184							Yes	
District Municipality		Lejweleputswa							Category	
Municipality		Matjhabeng							B1	
Settlements		BRONVILLE, SANDRIVER, KUTLWANONG, MELODING, WELKOM							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	345 655	363 544	387 277	401 093	407 800	407 800	410 654	416 422	
	Households	106 949	112 480	119 824	124 100	126 175	126 175	129 960	131 785	
	Connections - metered	67 245	68 341	69 116	72 093	72 225	73 674	74 944	75 996	
	Connections - Unmetered	27 027	25 931	25 156	22 188	22 054	20 607	19 339	19 611	
	Length of mains (km)	1 571	1 571	1 571	1 571	1 570	1 571	1 571	1 593	
	System input volume	k/annum	38 000 000	31 700 976	30 334 071	32 136 497	34 304 919	36 229 344	38 220 207	34 304 919
	Billed metered consumption	k/annum	29 200 000	15 596 016	23 638 049	21 353 277	21 926 844	20 594 852	19 736 905	26 652 216
	Billed unmetered consumption	k/annum	0	902 569	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0	
Water Balance Calculat	Revenue water	k/annum	29 200 000	16 498 585	23 638 049	21 353 277	21 926 844	20 594 852	19 736 905	26 652 216
	Non-Revenue water	k/annum	8 800 000	15 202 391	6 696 022	10 783 220	12 378 075	15 634 492	18 483 302	7 652 703
	Water Losses	k/annum	8 800 000	15 202 391	6 696 022	10 783 220	12 378 075	15 634 492	18 483 302	7 652 703
	% Non-revenue water		23.2%	48.0%	22.1%	33.6%	36.1%	43.2%	48.4%	22.3%
	% Water Losses		23.2%	48.0%	22.1%	33.6%	36.1%	43.2%	48.4%	22.3%
Key performance indicators	Input : Litres / capita / day		301	239	215	220	230	243	255	226
	Input : m ³ / household / month		30	23	21	22	23	24	25	22
	Billed : Litres / capita / day		231	124	167	146	147	138	132	175
	Billed : m ³ / household / month		23	12	16	14	14	14	13	17
	% Population growth		5.46%	5.18%	6.53%	3.57%	1.67%	0.00%	0.70%	
	% Water demand growth		22.05%	-16.58%	-4.31%	5.94%	6.75%	5.61%	5.50%	
	UARL		1 892 510	1 892 510	1 892 510	1 892 691	1 892 371	1 892 502	1 892 497	1 919 079
	CARL		7 040 000	12 161 913	5 356 818	8 626 576	9 902 460	12 507 594	14 786 642	6 122 162
	Infrastructure Leakage Index		3.72	6.43	2.83	4.56	5.23	6.61	7.81	3.19
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS	DWA NIS StatsSA NFC	DWA NIS	DWA NIS Estimated	DWA NIS Estimated	DWA NIS Estimated	

Municipal NRW Water Balance: Matjhabeng

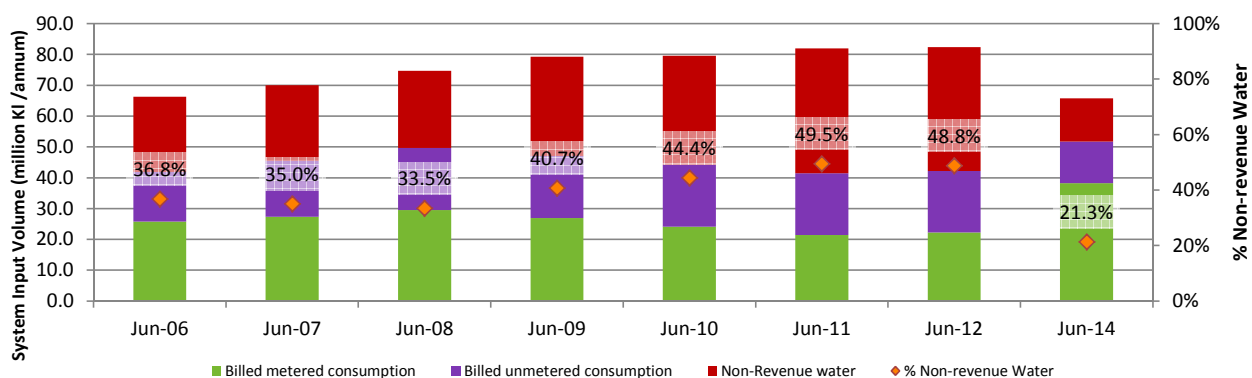


Comments

National NRW Assessment

Province		Gauteng							WSA	
Municipal Code		GT421							Yes	
District Municipality		Sedibeng							Category	
Municipality		Emfuleni							B1	
Settlements		BEDWORTH PARK, EVATON, SEBOKENG, SHARPEVILLE, VEREENIGING							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	711 834	723 000	743 185	752 991	846 525	855 976	864 122	880 647	
	Households	212 292	215 618	221 642	224 563	252 451	255 274	263 592	268 633	
	Connections - metered	206 607	209 847	215 706	218 552	245 700	248 443	250 807	255 604	
	Connections - Unmetered	8 775	8 913	9 162	9 283	10 436	10 552	10 896	11 104	
	Length of mains (km)	4 308	4 375	4 497	4 557	5 123	5 180	5 234	5 334	
	System input volume	kl/annum	66 267 621	69 983 719	74 677 044	79 315 608	79 559 382	82 015 756	82 417 605	65 753 404
	Billed metered consumption	kl/annum	25 757 658	27 356 795	29 541 740	26 920 469	24 120 973	21 400 269	22 262 898	38 218 127
	Billed unmetered consumption	kl/annum	16 102 272	18 115 056	20 127 840	20 127 840	20 127 840	20 016 111	19 917 451	13 546 726
	Unbilled metered consumption	kl/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	kl/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	kl/annum	41 859 930	45 471 851	49 669 580	47 048 309	44 248 813	41 416 380	42 180 349	51 764 853
	Non-Revenue water	kl/annum	24 407 691	24 511 868	25 007 464	32 267 299	35 310 569	40 599 376	40 237 256	13 988 551
	Water Losses	kl/annum	24 407 691	24 511 868	25 007 464	32 267 299	35 310 569	40 599 376	40 237 256	13 988 551
	% Non-revenue water		36.8%	35.0%	33.5%	40.7%	44.4%	49.5%	48.8%	21.3%
	% Water Losses		36.8%	35.0%	33.5%	40.7%	44.4%	49.5%	48.8%	21.3%
Key performance indicators	Input : Litres / capita / day		255	265	275	289	257	263	261	205
	Input : m ³ / household / month		26	27	28	29	26	27	26	20
	Billed : Litres / capita / day		161	172	183	171	143	133	134	161
	Billed : m ³ / household / month		16	18	19	17	15	14	13	16
	% Population growth		1.53%	1.57%	2.79%	1.32%	12.42%	1.12%	0.95%	
	% Water demand growth		-9.73%	5.61%	6.71%	6.21%	0.31%	3.09%	0.49%	
	UARL		4 559 637	4 631 157	4 760 456	4 823 265	5 422 389	5 482 931	5 540 263	5 646 214
	CARL		19 526 153	19 609 494	20 005 971	25 813 839	28 248 455	32 479 501	32 189 805	11 190 841
	Infrastructure Leakage Index		4.28	4.23	4.20	5.35	5.21	5.92	5.81	1.98
Source of information		DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	0	0	0	

Municipal NRW Water Balance: Emfuleni

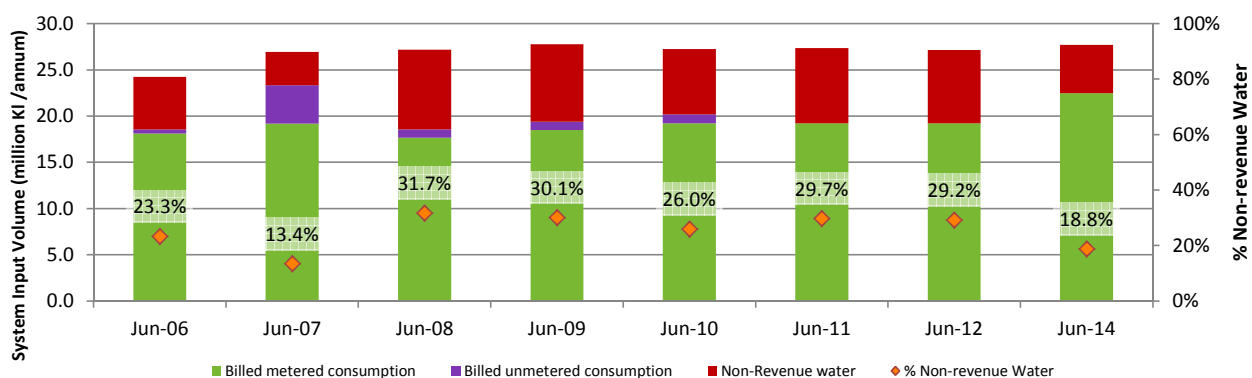


Comments

National NRW Assessment

Province		Gauteng							WSA	
Municipal Code		GT481							Yes	
District Municipality		West Rand							Category	
Municipality		Mogale City							B1	
Settlements		KAGISO, KRUGERSDORP, RIETVALLEI							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	327 412	334 622	346 441	352 258	397 302	401 130	397 216	405 005	
	Households	103 732	105 942	109 525	111 307	124 949	126 108	122 974	125 386	
	Connections - metered	49 023	50 608	51 608	56 609	57 609	58 143	56 698	57 810	
	Connections - Unmetered	2 451	2 530	2 580	2 830	2 880	2 907	2 835	2 891	
	Length of mains (km)	671	675	677	680	685	694	677	690	
	System input volume	k/annum	24 229 135	26 944 534	27 168 486	27 762 410	27 257 044	27 353 686	27 141 000	27 694 416
	Billed metered consumption	k/annum	18 110 119	19 172 414	17 667 857	18 484 451	19 219 114	19 219 114	19 219 114	22 483 645
	Billed unmetered consumption	k/annum	468 000	4 156 992	883 392	924 223	960 956	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	18 578 119	23 329 406	18 551 249	19 408 674	20 180 070	19 219 114	19 219 114	22 483 645
	Non-Revenue water	k/annum	5 651 016	3 615 128	8 617 237	8 353 736	7 076 974	8 134 572	7 921 886	5 210 771
	Water Losses	k/annum	5 651 016	3 615 128	8 617 237	8 353 736	7 076 974	8 134 572	7 921 886	5 210 771
	% Non-revenue water		23.3%	13.4%	31.7%	30.1%	26.0%	29.7%	29.2%	18.8%
	% Water Losses		23.3%	13.4%	31.7%	30.1%	26.0%	29.7%	29.2%	18.8%
Key performance indicators	Input : Litres / capita / day		203	221	215	216	188	187	187	187
	Input: m ³ / household / month		19	21	21	21	18	18	18	18
	Billed : Litres / capita / day		155	191	147	151	139	131	133	152
	Billed : m ³ / household / month		15	18	14	15	13	13	13	15
	% Population growth		3.21%	2.20%	3.53%	1.68%	12.79%	0.96%	-0.98%	
	% Water demand growth		4.60%	11.21%	0.83%	2.19%	-1.82%	0.35%	-0.78%	
	UARL		971 946	997 558	1 013 545	1 091 196	1 108 168	1 119 237	1 091 422	1 112 825
	CARL		4 520 813	2 892 102	6 893 790	6 682 989	5 661 579	6 507 658	6 337 509	4 168 617
	Infrastructure Leakage Index		4.65	2.90	6.80	6.12	5.11	5.81	5.81	3.75
Source of information		DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	0	0	0	

Municipal NRW Water Balance: Mogale City

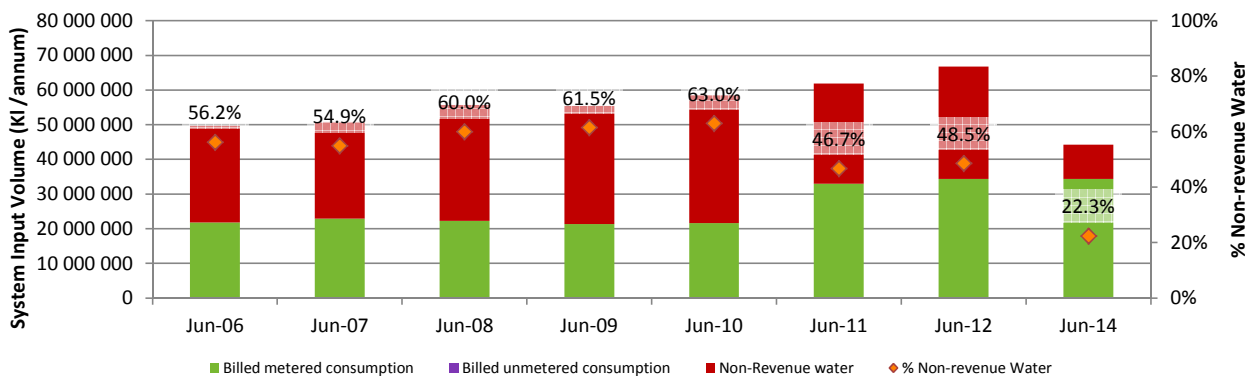


Comments

National NRW Assessment

Province		KwaZulu Natal							WSA	
Municipal Code		KZN225							Yes	
District Municipality		Umgungundlovu							Category	
Municipality		The Msunduzi							B1	
Settlements		EDENDALE, PIETERMARITZBURG, NEW HANOVER, IMBALI							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	464 073	483 207	500 863	519 115	543 853	567 115	578 894	603 191	
	Households	114 814	119 552	123 912	128 447	134 560	140 319	146 491	152 639	
	Connections - metered	72 919	75 101	75 414	79 439	79 719	81 897	83 694	87 207	
	Connections - Unmetered	0	0	0	0	0	0	0	0	
	Length of mains (km)	1 458	1 502	1 508	1 589	1 594	1 638	1 674	1 744	
	System input volume	k/annum	49 713 147	50 772 272	55 690 118	55 426 244	58 492 009	61 850 000	66 801 851	44 278 030
	Billed metered consumption	k/annum	21 787 977	22 898 360	22 302 063	21 353 506	21 653 346	32 940 000	34 386 293	34 382 904
	Billed unmetered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	21 787 977	22 898 360	22 302 063	21 353 506	21 653 346	32 940 000	34 386 293	34 382 904
	Non-Revenue water	k/annum	27 925 170	27 873 912	33 388 055	34 072 738	36 838 663	28 910 000	32 415 558	9 895 126
	Water Losses	k/annum	27 925 170	27 873 912	33 388 055	34 072 738	36 838 663	28 910 000	32 415 558	9 895 126
	% Non-revenue water		56.2%	54.9%	60.0%	61.5%	63.0%	46.7%	48.5%	22.3%
	% Water Losses		56.2%	54.9%	60.0%	61.5%	63.0%	46.7%	48.5%	22.3%
Key performance indicators	Input : Litres / capita / day		293	288	305	293	295	299	316	201
	Input: m ³ / household / month		36	35	37	36	36	37	38	24
	Billed : Litres / capita / day		129	130	122	113	109	159	163	156
	Billed : m ³ / household / month		16	16	15	14	13	20	20	19
	% Population growth		3.08%	4.12%	3.65%	3.64%	4.77%	4.28%	2.08%	
	% Water demand growth		5.06%	2.13%	9.69%	-0.47%	5.53%	5.74%	8.01%	
	UARL		1 543 695	1 589 888	1 596 514	1 681 724	1 687 651	1 733 760	1 771 806	1 846 171
	CARL		22 340 136	22 299 130	26 710 444	27 258 190	29 470 930	23 128 000	25 932 446	7 916 101
	Infrastructure Leakage Index		14.47	14.03	16.73	16.21	17.46	13.34	14.64	4.29
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS KZN Recon	

Municipal NRW Water Balance: The Msunduzi

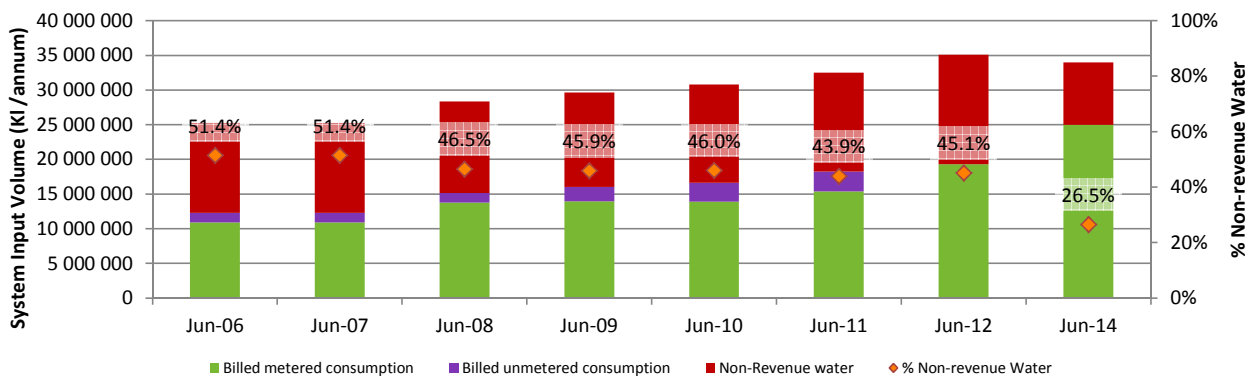


Comments

National NRW Assessment

Province		KwaZulu Natal							WSA	
Municipal Code		KZN252							Yes	
District Municipality		Amajuba							Category	
Municipality		Newcastle							B1	
Settlements		BUHLEBOMZINYATHI, MADADENI, NEWCASTLE, OSIZWENI							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	267 369	279 337	288 382	299 567	308 442	318 749	326 122	341 384	
	Households	59 983	62 673	64 706	67 199	69 193	71 514	74 994	78 504	
	Connections - metered	0	0	0	39 607	39 607	40 034	40 460	60 000	
	Connections - Unmetered	0	0	0	7 393	7 393	7 422	7 450	3 500	
	Length of mains (km)	0	0	0	671	671	678	684	716	
	System input volume	kl/annum	25 275 589	25 275 589	28 333 333	29 642 833	30 807 095	32 494 306	35 114 370	34 000 000
	Billed metered consumption	kl/annum	10 926 025	10 926 025	13 750 000	13 957 320	13 906 446	15 390 260	19 286 689	25 000 000
	Billed unmetered consumption	kl/annum	1 347 624	1 347 624	1 416 666	2 083 333	2 736 026	2 839 383	0	0
	Unbilled metered consumption	kl/annum	0	0	0	0	0	0	169 248	7 935
	Unbilled unmetered consumption	kl/annum	0	0	0	0	0	0	1 930 243	1 737 218
Water Balance Calculat	Revenue water	kl/annum	12 273 649	12 273 649	15 166 666	16 040 653	16 642 472	18 229 642	19 286 689	25 000 000
	Non-Revenue water	kl/annum	13 001 940	13 001 940	13 166 667	13 602 180	14 164 623	14 264 664	15 827 681	9 000 000
	Water Losses	kl/annum	13 001 940	13 001 940	13 166 667	13 602 180	14 164 623	14 264 664	13 728 190	7 254 847
	% Non-revenue water		51.4%	51.4%	46.5%	45.9%	46.0%	43.9%	45.1%	26.5%
	% Water Losses		51.4%	51.4%	46.5%	45.9%	46.0%	43.9%	39.1%	21.3%
Key performance indicators	Input : Litres / capita / day		259	248	269	271	274	279	295	273
	Input: m ³ / household / month		35	34	36	37	37	38	39	36
	Billed : Litres / capita / day		126	120	144	147	148	157	162	201
	Billed : m ³ / household / month		17	16	20	20	20	21	21	27
	% Population growth		3.16%	4.48%	3.24%	3.88%	2.96%	3.34%	2.31%	
	% Water demand growth		8.77%	0.00%	12.10%	4.62%	3.93%	5.48%	8.06%	
	UARL		0	0	0	906 764	906 764	915 543	924 321	1 162 456
	CARL		10 401 552	10 401 552	10 533 334	10 881 744	11 331 698	11 411 731	10 982 552	5 803 878
	Infrastructure Leakage Index		#DIV/0!	#DIV/0!	#DIV/0!	12.00	12.50	12.46	11.88	4.99
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Estimated	DWA NIS Municipality	DWA NIS Municipality	

Municipal NRW Water Balance: Newcastle

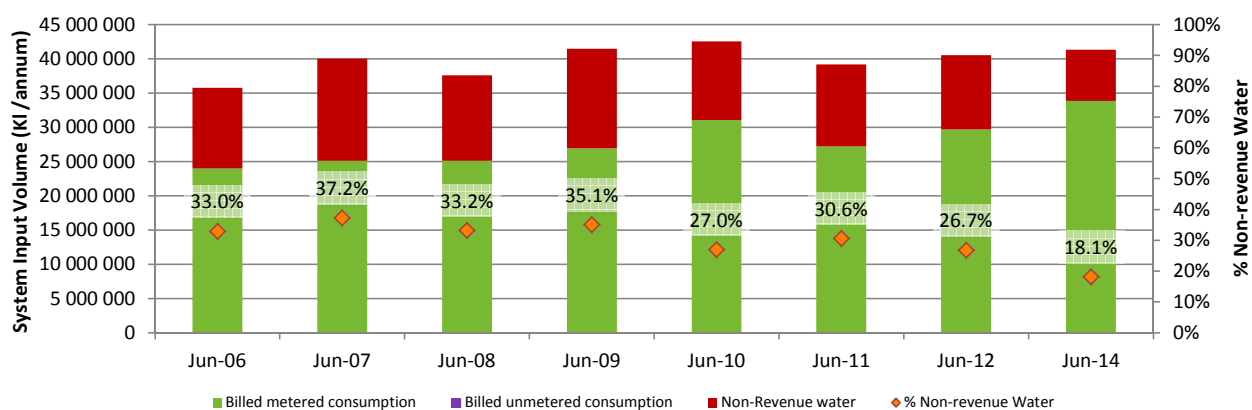


Comments

National NRW Assessment

Province		KwaZulu Natal							WSA	
Municipal Code		KZN282							Yes	
District Municipality		Uthungulu							Category	
Municipality		uMhlathuze							B1	
Settlements		DONDOLO, EMPANGENI, RICHARDS BAY, ESIKHAWINI							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	296 904	312 051	333 150	340 323	333 485	333 485	335 820	340 539	
	Households	72 286	75 979	81 118	82 867	81 203	81 203	83 641	84 816	
	Connections - metered	22 000	22 300	23 635	23 800	24 213	40 010	40 010	46 012	
	Connections - Unmetered	0	0	0	0	0	0	0	0	
	Length of mains (km)	124	1 235	1 235	1 450	1 450	1 589	1 589	1 611	
	System input volume	k/annum	35 786 323	40 035 518	37 618 269	41 463 656	42 557 901	39 210 951	40 549 032	41 360 013
	Billed metered consumption	k/annum	23 993 374	25 129 778	25 119 463	26 918 445	31 059 590	27 224 595	29 706 777	33 865 726
	Billed unmetered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	23 993 374	25 129 778	25 119 463	26 918 445	31 059 590	27 224 595	29 706 777	33 865 726
	Non-Revenue water	k/annum	11 792 949	14 905 740	12 498 806	14 545 211	11 498 311	11 986 356	10 842 255	7 494 287
	Water Losses	k/annum	11 792 949	14 905 740	12 498 806	14 545 211	11 498 311	11 986 356	10 842 255	7 494 287
	% Non-revenue water		33.0%	37.2%	33.2%	35.1%	27.0%	30.6%	26.7%	18.1%
	% Water Losses		33.0%	37.2%	33.2%	35.1%	27.0%	30.6%	26.7%	18.1%
Key performance indicators	Input : Litres / capita / day		330	352	309	334	350	322	331	333
	Input: m ³ / household / month		41	44	39	42	44	40	40	41
	Billed : Litres / capita / day		221	221	207	217	255	224	242	272
	Billed : m ³ / household / month		28	28	26	27	32	28	30	33
	% Population growth		4.26%	5.10%	6.76%	2.15%	-2.01%	0.00%	0.70%	
	% Water demand growth		1.42%	11.87%	-6.04%	10.22%	2.64%	-7.86%	3.41%	
	UARL		361 770	731 278	750 769	823 805	829 835	1 106 114	1 106 114	1 201 071
	CARL		9 434 359	11 924 592	9 999 045	11 636 169	9 198 649	9 589 085	8 673 804	5 995 429
	Infrastructure Leakage Index		26.08	16.31	13.32	14.12	11.08	8.67	7.84	4.99
Source of information		DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	

Municipal NRW Water Balance: uMhlathuze

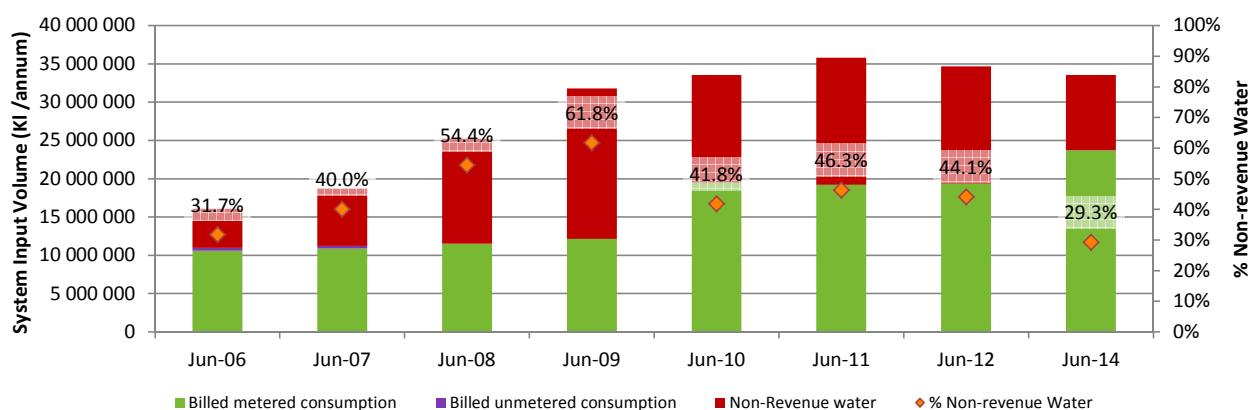


Comments

National NRW Assessment

Province		Limpopo							WSA	
Municipal Code		LIM354							Yes	
District Municipality		Capricorn							Category	
Municipality		Polokwane							B1	
Settlements		DIKGALE, POLOKWANE, PERSKEBULT							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	545 816	333 719	356 369	396 124	445 390	478 347	484 962	498 468	
	Households	140 899	86 144	91 998	102 259	114 960	123 475	125 195	128 682	
	Connections - metered	0	0	0	0	74 012	79 494	80 601	82 846	
	Connections - Unmetered	0	0	0	0	56 349	60 523	61 366	63 075	
	Length of mains (km)	0	0	0	0	1 363	1 474	1 494	1 536	
	System input volume	k/annum	16 064 072	18 728 695	25 251 093	31 773 490	33 555 165	35 822 132	34 688 649	33 555 165
	Billed metered consumption	k/annum	10 604 708	10 875 001	11 508 689	12 142 377	19 523 972	19 225 693	19 374 833	23 731 510
	Billed unmetered consumption	k/annum	360 000	360 000	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	10 964 708	11 235 001	11 508 689	12 142 377	19 523 972	19 225 693	19 374 833	23 731 510
	Non-Revenue water	k/annum	5 099 364	7 493 694	13 742 404	19 631 113	14 031 193	16 596 439	15 313 816	9 823 655
	Water Losses	k/annum	5 099 364	7 493 694	13 742 404	19 631 113	14 031 193	16 596 439	15 313 816	9 823 655
	% Non-revenue water		31.7%	40.0%	54.4%	61.8%	41.8%	46.3%	44.1%	29.3%
	% Water Losses		31.7%	40.0%	54.4%	61.8%	41.8%	46.3%	44.1%	29.3%
Key performance indicators	Input : Litres / capita / day		81	154	194	220	206	205	196	184
	Input: m ³ / household / month		10	18	23	26	24	24	23	22
	Billed : Litres / capita / day		55	92	88	84	120	110	109	130
	Billed : m ³ / household / month		6	11	10	10	14	13	13	15
	% Population growth		0.23%	-38.86%	6.79%	11.16%	12.44%	7.40%	1.38%	
	% Water demand growth		-4.62%	16.59%	34.83%	25.83%	5.61%	6.76%	-3.16%	
	UARL		0	0	0	0	2 351 016	2 528 408	2 563 628	2 635 023
	CARL		4 079 491	5 994 955	10 993 923	15 704 890	11 224 954	13 277 151	12 251 053	7 858 924
	Infrastructure Leakage Index		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4.77	5.25	4.78	2.98
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS Estimated	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Estimated	DWA NIS Estimated	

Municipal NRW Water Balance: Polokwane

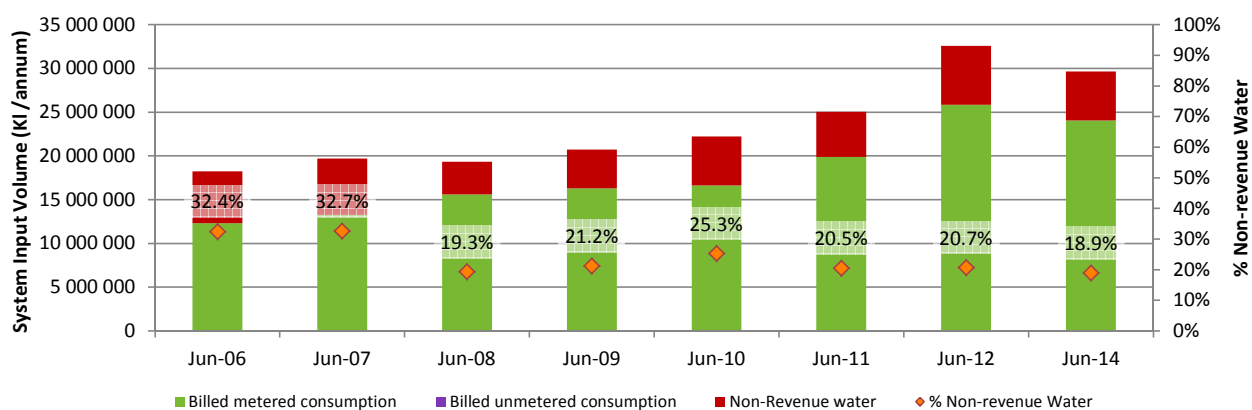


Comments

National NRW Assessment

Province		Mpumalanga							WSA	
Municipal Code		MP307							Yes	
District Municipality		Gert Sibande							Category	
Municipality		Govan Mbeki							B1	
Settlements		BETHAL NU, EMBALENHLE, LEANDRA, SECUNDA							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	222 158	229 122	240 355	244 123	237 957	237 957	239 623	242 990	
	Households	64 914	66 952	70 231	71 335	69 537	69 537	71 621	72 627	
	Connections - metered	55 075	56 801	59 586	60 520	58 992	58 992	59 405	60 239	
	Connections - Unmetered	10 863	11 204	11 753	11 938	11 637	11 637	11 986	12 154	
	Length of mains (km)	1 319	1 360	1 427	1 449	1 413	1 413	1 428	1 448	
	System input volume	k/annum	18 229 811	19 710 369	19 338 099	20 706 704	22 240 419	25 042 578	32 565 196	29 652 765
	Billed metered consumption	k/annum	12 315 116	13 273 924	15 605 494	16 306 939	16 617 156	19 898 350	25 834 008	24 048 000
	Billed unmetered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculated	Revenue water	k/annum	12 315 116	13 273 924	15 605 494	16 306 939	16 617 156	19 898 350	25 834 008	24 048 000
	Non-Revenue water	k/annum	5 914 695	6 436 445	3 732 605	4 399 765	5 623 263	5 144 228	6 731 188	5 604 765
	Water Losses	k/annum	5 914 695	6 436 445	3 732 605	4 399 765	5 623 263	5 144 228	6 731 188	5 604 765
	% Non-revenue water		32.4%	32.7%	19.3%	21.2%	25.3%	20.5%	20.7%	18.9%
	% Water Losses		32.4%	32.7%	19.3%	21.2%	25.3%	20.5%	20.7%	18.9%
Key performance indicators	Input : Litres / capita / day		225	236	220	232	256	288	372	334
	Input: m ³ / household / month		23	25	23	24	27	30	38	34
	Billed : Litres / capita / day		152	159	178	183	191	229	295	271
	Billed : m ³ / household / month		16	17	19	19	20	24	30	28
	% Population growth		2.77%	3.13%	4.90%	1.57%	-2.53%	0.00%	0.70%	
	% Water demand growth		2.99%	8.12%	-1.89%	7.08%	7.41%	12.60%	30.04%	
	UARL		1 395 908	1 439 677	1 510 247	1 533 933	1 495 203	1 495 203	1 511 329	1 532 566
	CARL		4 731 756	5 149 156	2 986 084	3 519 812	4 498 610	4 115 382	5 384 950	4 483 812
	Infrastructure Leakage Index		3.39	3.58	1.98	2.29	3.01	2.75	3.56	2.93
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	Vaal Recon Strategy	

Municipal NRW Water Balance: Govan Mbeki

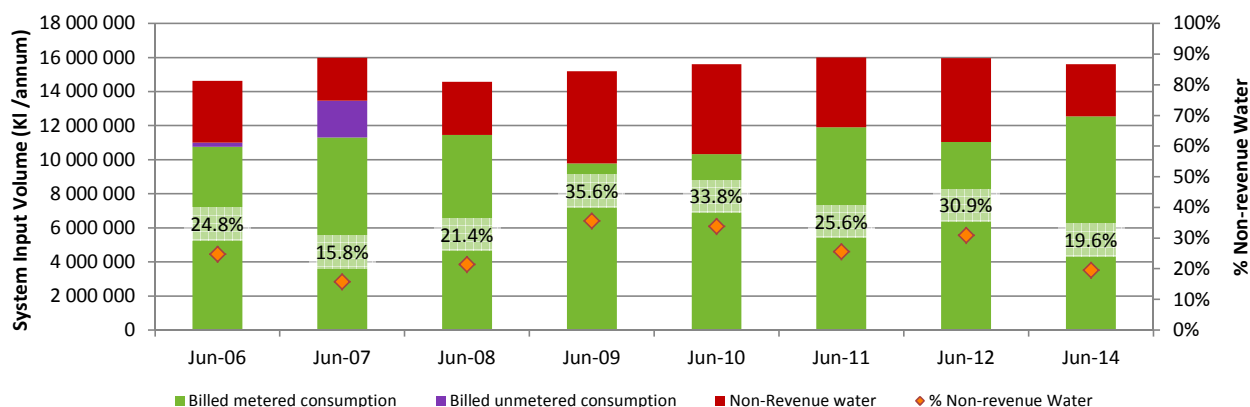


Comments

National NRW Assessment

Province		Mpumalanga							WSA	
Municipal Code		MP313							Yes	
District Municipality		Nkangala							Category	
Municipality		Steve Tshwete							B1	
Settlements		KWAZAMOKHULE, MIDDLEBURG, MHLUZI							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	140 448	144 269	150 166	153 170	159 500	161 760	163 810	167 988	
	Households	37 398	38 422	39 990	40 787	42 474	43 076	44 617	45 755	
	Connections - metered	33 112	34 013	35 403	36 111	37 604	38 136	38 620	39 605	
	Connections - Unmetered	5 227	5 370	5 589	5 700	5 936	6 020	6 236	6 395	
	Length of mains (km)	767	788	820	836	717	883	897	920	
	System input volume	k/annum	14 627 492	15 989 056	14 577 468	15 198 044	15 602 431	16 003 000	15 966 634	15 602 431
	Billed metered consumption	k/annum	10 755 840	11 299 605	11 460 590	9 790 515	10 325 501	11 903 000	11 036 711	12 550 711
	Billed unmetered consumption	k/annum	245 887	2 168 950	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	11 001 727	13 468 555	11 460 590	9 790 515	10 325 501	11 903 000	11 036 711	12 550 711
	Non-Revenue water	k/annum	3 625 765	2 520 501	3 116 878	5 407 529	5 276 930	4 100 000	4 929 923	3 051 720
	Water Losses	k/annum	3 625 765	2 520 501	3 116 878	5 407 529	5 276 930	4 100 000	4 929 923	3 051 720
	% Non-revenue water		24.8%	15.8%	21.4%	35.6%	33.8%	25.6%	30.9%	19.6%
	% Water Losses		24.8%	15.8%	21.4%	35.6%	33.8%	25.6%	30.9%	19.6%
Key performance indicators	Input : Litres / capita / day		285	304	266	272	268	271	267	254
	Input: m ³ / household / month		33	35	30	31	31	31	30	28
	Billed : Litres / capita / day		215	256	209	175	177	202	185	205
	Billed : m ³ / household / month		25	29	24	20	20	23	21	23
	% Population growth		2.53%	2.72%	4.09%	2.00%	4.13%	1.42%	1.27%	
	% Water demand growth		-4.14%	9.31%	-8.83%	4.26%	2.66%	2.57%	-0.23%	
	UARL		811 629	833 729	867 801	885 152	871 215	934 797	949 588	973 809
	CARL		2 900 612	2 016 401	2 493 503	4 326 023	4 221 544	3 280 000	3 943 939	2 441 376
	Infrastructure Leakage Index		3.57	2.42	2.87	4.89	4.85	3.51	4.15	2.51
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Estimated	DWA NIS Estimated	

Municipal NRW Water Balance: Steve Tshwete

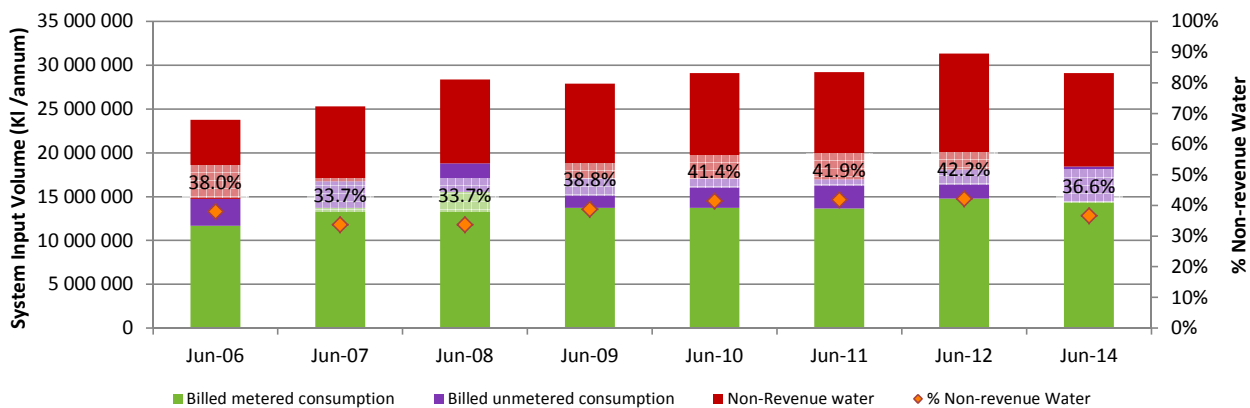


Comments

National NRW Assessment

Province		Mpumalanga							WSA	
Municipal Code		MP322							Yes	
District Municipality		Ehlanzeni							Category	
Municipality		Mbombela (Silulumanzi Concession Area Only)							B1	
Settlements		DAANTJIE, KANYAMAZANE, LUNDI, ZWELITSHA, MSOGWABA, NELSPRUIT							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	313 144	315 023	319 330	321 247	318 934	322 067	324 322	328 879	
	Households	77 890	78 359	79 426	79 901	79 349	80 121	82 522	83 682	
	Connections - metered	31 300	33 291	35 793	39 440	39 775	40 162	41 366	41 947	
	Connections - Unmetered	28 700	38 196	39 585	35 123	40 101	40 491	41 705	42 291	
	Length of mains (km)	751	762	834	989	1 005	1 008	1 038	1 053	
	System input volume	k/annum	23 757 308	25 307 348	28 382 422	27 894 313	29 099 341	29 203 244	31 345 217	29 099 341
	Billed metered consumption	k/annum	11 663 659	13 732 258	15 540 400	13 710 700	13 715 396	13 640 518	14 767 149	14 401 166
	Billed unmetered consumption	k/annum	3 069 830	3 038 532	3 274 951	3 373 200	3 328 997	3 325 716	3 342 638	4 046 416
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	14 733 489	16 770 790	18 815 351	17 083 900	17 044 393	16 966 234	18 109 787	18 447 582
	Non-Revenue water	k/annum	9 023 819	8 536 558	9 567 071	10 810 413	12 054 948	12 237 010	13 235 430	10 651 759
	Water Losses	k/annum	9 023 819	8 536 558	9 567 071	10 810 413	12 054 948	12 237 010	13 235 430	10 651 759
	% Non-revenue water		38.0%	33.7%	33.7%	38.8%	41.4%	41.9%	42.2%	36.6%
	% Water Losses		38.0%	33.7%	33.7%	38.8%	41.4%	41.9%	42.2%	36.6%
Key performance indicators	Input : Litres / capita / day		208	220	244	238	250	248	265	242
	Input: m ³ / household / month		25	27	30	29	31	30	32	29
	Billed : Litres / capita / day		129	146	161	146	146	144	153	154
	Billed : m ³ / household / month		16	18	20	18	18	18	18	18
	% Population growth		1.02%	0.60%	1.37%	0.60%	-0.72%	0.98%	0.70%	
	% Water demand growth		6.15%	6.52%	12.15%	-1.72%	4.32%	0.36%	7.33%	
	UARL		1 122 814	1 294 167	1 374 484	1 413 553	1 496 399	1 508 721	1 553 937	1 575 772
	CARL		7 219 055	6 829 247	7 653 656	8 648 330	9 643 959	9 789 608	10 588 344	8 521 407
	Infrastructure Leakage Index		6.43	5.28	5.57	6.12	6.44	6.49	6.81	5.41
Source of information		Sembcorp Silulumanzi	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Mbombela Recon	

Municipal NRW Water Balance: Mbombela

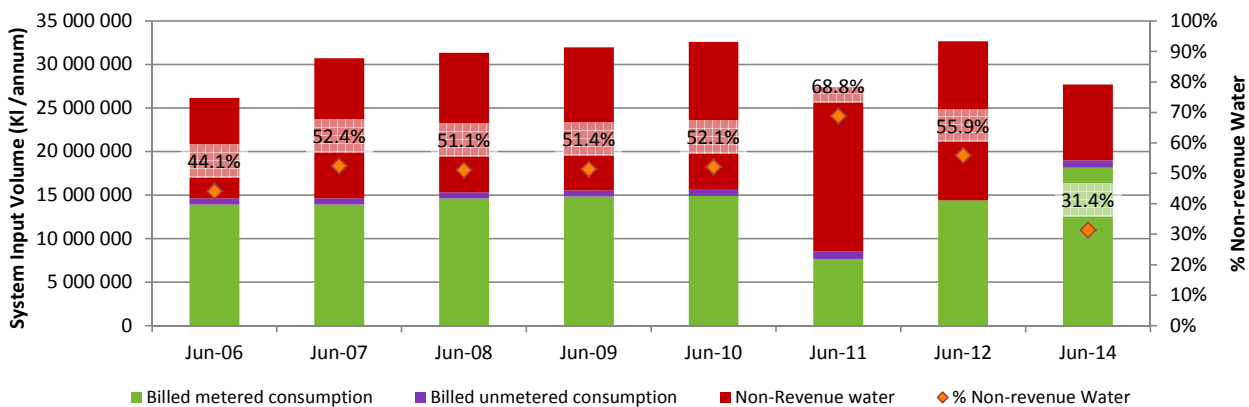


Comments

National NRW Assessment

Province		Northern Cape							WSA	
Postal Code		NC091							Yes	
Municipality		Frances Baard							Category	
Municipality		Sol Plaatjie							B1	
Municipal Elements		KIMBERLEY							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	200 088	201 289	203 535	204 756	211 828	214 370	216 942	222 180	
	Households	52 355	52 668	53 256	53 576	55 426	56 091	56 764	58 135	
	Connections - metered	2 830	2 847	50 484	2 944	3 008	40 315	42 170	46 140	
	Connections - Unmetered	142	143	2 962	148	151	8 860	8 860	8 860	
	Length of mains (km)	59	60	61	62	63	875	912	990	
	System input volume	k/annum	26 175 663	30 721 607	31 336 039	31 962 760	32 602 015	27 412 960	32 664 198	27 690 409
	Billed metered consumption	k/annum	13 929 946	13 929 946	14 626 443	14 830 708	14 920 435	7 661 715	14 400 030	18 135 882
	Billed unmetered consumption	k/annum	690 408	690 408	697 312	697 312	704 285	893 885	0	856 063
	Unbilled metered consumption	k/annum	0	0	0	0	0	2 497 330	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	571 955	571 955	0
Water Balance Calculat	Revenue water	k/annum	14 620 354	14 620 354	15 323 755	15 528 020	15 624 720	8 555 600	14 400 030	18 991 945
	Non-Revenue water	k/annum	11 555 309	16 101 253	16 012 284	16 434 740	16 977 295	18 857 360	18 264 168	8 698 464
	Water Losses	k/annum	11 555 309	16 101 253	16 012 284	16 434 740	16 977 295	15 788 075	17 692 213	8 698 464
	% Non-revenue water		44.1%	52.4%	51.1%	51.4%	52.1%	68.8%	55.9%	31.4%
	% Water Losses		44.1%	52.4%	51.1%	51.4%	52.1%	57.6%	54.2%	31.4%
Key performance indicators	Input : Litres / capita / day		358	418	422	428	422	350	413	341
	Input: m ³ / household / month		42	49	49	50	49	41	48	40
	Billed : Litres / capita / day		200	199	206	208	202	109	182	234
	Billed : m ³ / household / month		23	23	24	24	23	13	21	27
	% Population growth		0.64%	0.60%	1.12%	0.60%	3.45%	1.20%	1.20%	
	% Water demand growth		7.69%	17.37%	2.00%	2.00%	2.00%	-15.92%	19.16%	
	UARL		62 773	63 364	800 350	65 510	66 817	1 005 475	1 044 630	1 128 279
	CARL		9 244 247	12 881 002	12 809 827	13 147 792	13 581 836	12 630 460	14 153 770	6 958 772
	Infrastructure Leakage Index		147.27	203.29	16.01	200.70	203.27	12.56	13.55	6.17
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	0	0	0	

Municipal NRW Water Balance: Sol Plaatjie

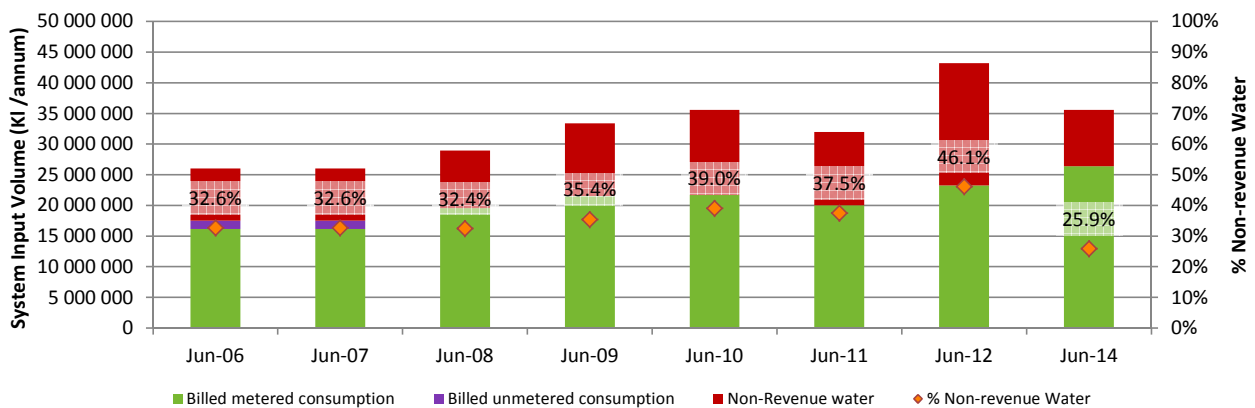


Comments

National NRW Assessment

Province		North West							WSA	
Municipal Code		NW373							Yes	
District Municipality		Bojanala Platinum							Category	
Municipality		Rustenburg							B1	
Settlements		BETHANIE, RUSTENBURG, BOITEKONG, MARIKANA, THLABANE							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	355 849	381 994	416 524	437 727	433 701	433 701	436 735	500 018	
	Households	110 125	118 229	128 907	135 476	134 239	134 239	138 266	158 301	
	Connections - metered	92 897	99 723	108 737	114 272	113 221	113 221	114 013	130 534	
	Connections - Unmetered	22 869	24 552	26 769	28 133	27 876	27 876	28 713	32 873	
	Length of mains (km)	2 315	2 485	2 710	2 848	2 822	2 822	2 855	3 268	
	System input volume	k/annum	26 028 358	26 028 358	28 965 414	33 370 837	35 581 439	32 000 000	43 171 796	35 581 439
	Billed metered consumption	k/annum	16 166 633	16 166 633	19 571 958	21 544 401	21 697 394	20 000 000	23 269 149	26 373 318
	Billed unmetered consumption	k/annum	1 367 313	1 367 313	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	228 600	0	
Water Balance Calculat	Revenue water	k/annum	17 533 946	17 533 946	19 571 958	21 544 401	21 697 394	20 000 000	23 269 149	26 373 318
	Non-Revenue water	k/annum	8 494 412	8 494 412	9 393 456	11 826 436	13 884 045	12 000 000	19 902 647	9 208 121
	Water Losses	k/annum	8 494 412	8 494 412	9 393 456	11 826 436	13 884 045	12 000 000	19 674 047	9 208 121
	% Non-revenue water		32.6%	32.6%	32.4%	35.4%	39.0%	37.5%	46.1%	25.9%
	% Water Losses		32.6%	32.6%	32.4%	35.4%	39.0%	37.5%	45.6%	25.9%
Key performance indicators	Input : Litres / capita / day		200	187	191	209	225	202	271	195
	Input: m ³ / household / month		20	18	19	21	22	20	26	19
	Billed : Litres / capita / day		135	126	129	135	137	126	146	145
	Billed : m ³ / household / month		13	12	13	13	13	12	14	14
	% Population growth		6.77%	7.35%	9.04%	5.09%	-0.92%	0.00%	0.70%	
	% Water demand growth		-2.05%	0.00%	11.28%	15.21%	6.62%	-10.07%	34.91%	
	UARL		2 450 766	2 630 886	2 868 662	3 014 721	2 987 033	2 987 033	3 021 504	3 459 320
	CARL		6 795 530	6 795 530	7 514 765	9 461 148	11 107 236	9 600 000	15 739 238	7 366 497
	Infrastructure Leakage Index		2.77	2.58	2.62	3.14	3.72	3.21	5.21	2.13
Source of information		DWA NIS StatsSA NFC	DWA NIS StatsSA NFC	DWA NIS	DWA NIS Municipality	DWA NIS RPMS	0	0	Vaal Recon Strategy	

Municipal NRW Water Balance: Rustenburg

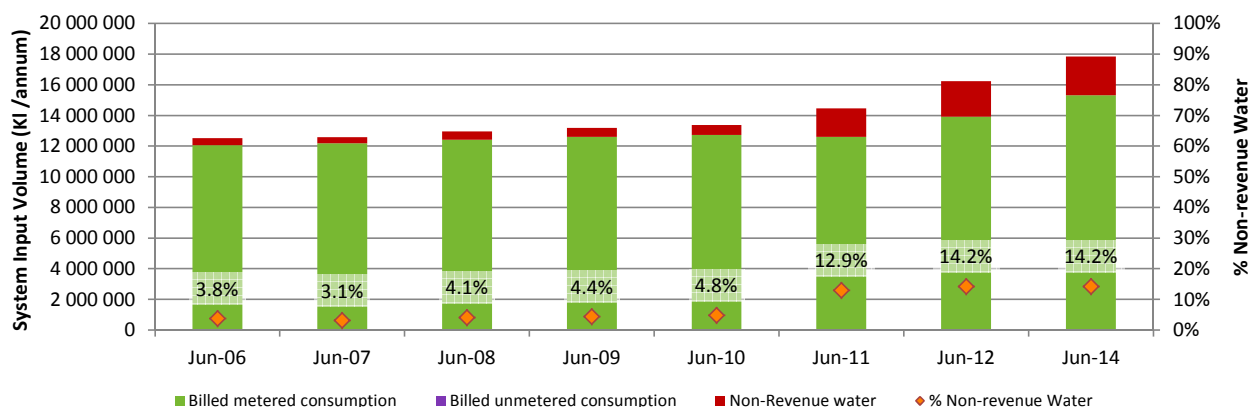


Comments

National NRW Assessment

Province		North West							WSA	
Municipal Code		NW402							Yes	
District Municipality		Dr Kenneth Kaunda							Category	
Municipality		Tlokwe							B1	
Settlements		BOSKOP, CACHET, HARTEBESPOORT, NEW MACHAVIE, POTCHEFSTROOM							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	134 225	137 297	138 042	138 871	143 201	186 200	229 214	240 674	
	Households	35 179	35 984	36 180	36 398	37 530	38 345	39 159	43 075	
	Connections - metered	31 525	32 247	32 422	32 617	33 634	37 630	39 159	43 075	
	Connections - Unmetered	3 866	3 954	3 976	4 000	4 124	715	0	0	
	Length of mains (km)	708	724	728	732	755	793	832	915	
	System input volume	k/annum	12 521 747	12 574 032	12 949 882	13 182 074	13 365 577	14 459 652	16 227 740	17 850 510
	Billed metered consumption	k/annum	12 049 489	12 185 722	12 415 162	12 599 870	12 729 005	12 593 292	13 915 767	15 307 344
	Billed unmetered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	12 049 489	12 185 722	12 415 162	12 599 870	12 729 005	12 593 292	13 915 767	15 307 344
	Non-Revenue water	k/annum	472 258	388 310	534 720	582 204	636 572	1 866 360	2 311 973	2 543 166
	Water Losses	k/annum	472 258	388 310	534 720	582 204	636 572	1 866 360	2 311 973	2 543 166
	% Non-revenue water		3.8%	3.1%	4.1%	4.4%	4.8%	12.9%	14.2%	14.2%
	% Water Losses		3.8%	3.1%	4.1%	4.4%	4.8%	12.9%	14.2%	14.2%
Key performance indicators	Input : Litres / capita / day		256	251	257	260	256	213	194	203
	Input: m ³ / household / month		30	29	30	30	30	31	35	35
	Billed : Litres / capita / day		246	243	246	249	244	185	166	174
	Billed : m ³ / household / month		29	28	29	29	28	27	30	30
	% Population growth		2.32%	2.29%	0.54%	0.60%	3.12%	30.03%	23.10%	
	% Water demand growth		3.27%	0.42%	2.99%	1.79%	1.39%	8.19%	12.23%	
	UARL		749 238	766 385	770 546	775 175	799 338	820 338	845 033	929 473
	CARL		377 806	310 648	427 776	465 763	509 258	1 493 088	1 849 578	2 034 533
	Infrastructure Leakage Index		0.50	0.41	0.56	0.60	0.64	1.82	2.19	2.19
Source of information		DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	DWA NIS StatsSA NFC	DWA NIS RPMS	DWA NIS Municipality	DWA NIS Municipality	DWA NIS Municipality	

Municipal NRW Water Balance: Tlokwe

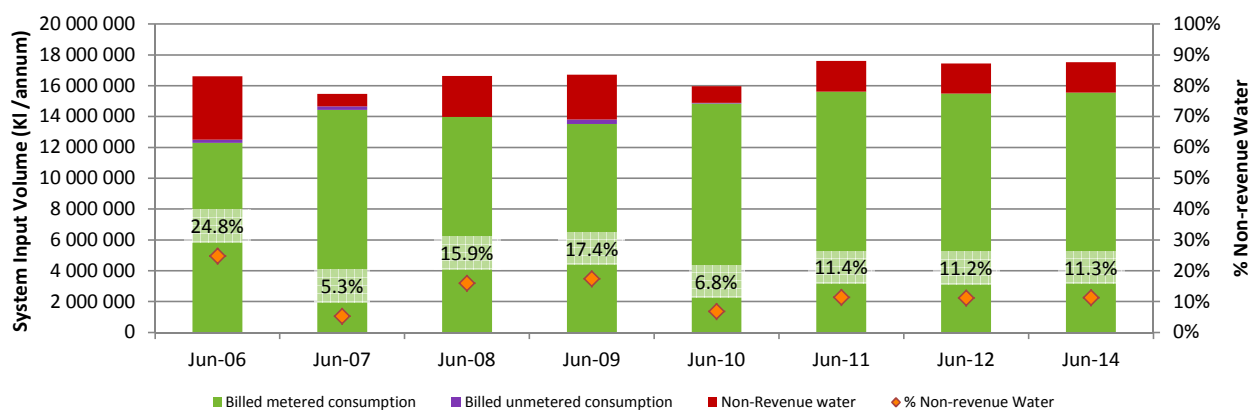


Comments

National NRW Assessment

Province		Western Cape							WSA	
Municipal Code		WC023							Yes	
District Municipality		Cape Winelands							Category	
Municipality		Drakenstein							B1	
Settlements		Blouvllei, Goedeheoop, Gouda, Hermon, Paarl, Soetendal, Suider Paarl, Voëlvlei, Wellington, Windmill							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	200 766	203 747	211 343	213 982	225 029	227 766	230 656	236 546	
	Households	48 138	48 854	50 678	51 311	53 959	54 618	56 575	58 020	
	Connections - metered	46 693	47 386	49 153	49 767	52 336	52 973	53 645	55 015	
	Connections - Unmetered	2 145	2 177	2 258	2 286	2 404	2 434	2 521	2 585	
	Length of mains (km)	977	991	1 028	1 041	1 095	1 108	1 123	1 152	
	System input volume	k/annum	16 617 409	15 473 966	16 624 094	16 714 593	15 975 000	17 614 223	17 444 334	17 529 279
	Billed metered consumption	k/annum	12 283 938	14 433 204	13 973 743	13 514 281	14 852 000	15 603 742	15 493 740	15 548 741
	Billed unmetered consumption	k/annum	218 208	227 784	0	284 343	32 000	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	35 228	34 889	0
Water Balance Calculat	Revenue water	k/annum	12 502 146	14 660 988	13 973 743	13 798 624	14 884 000	15 603 742	15 493 740	15 548 741
	Non-Revenue water	k/annum	4 115 263	812 978	2 650 351	2 915 969	1 091 000	2 010 481	1 950 594	1 980 538
	Water Losses	k/annum	4 115 263	812 978	2 650 351	2 915 969	1 091 000	1 975 252	1 915 706	1 980 538
	% Non-revenue water		24.8%	5.3%	15.9%	17.4%	6.8%	11.4%	11.2%	11.3%
	% Water Losses		24.8%	5.3%	15.9%	17.4%	6.8%	11.2%	11.0%	11.3%
Key performance indicators	Input : Litres / capita / day		227	208	216	214	194	212	207	203
	Input : m ³ / household / month		29	26	27	27	25	27	26	25
	Billed : Litres / capita / day		171	197	181	177	181	188	184	180
	Billed : m ³ / household / month		22	25	23	22	23	24	23	22
	% Population growth		2.52%	1.48%	3.73%	1.25%	5.16%	1.22%	1.27%	
	% Water demand growth		16.02%	-6.88%	7.43%	0.54%	-4.42%	10.26%	-0.96%	
	UARL		1 033 898	1 049 251	1 088 371	1 101 961	1 158 850	1 172 948	1 189 023	1 219 388
	CARL		3 292 210	650 382	2 120 281	2 332 775	872 800	1 580 202	1 532 565	1 584 430
	Infrastructure Leakage Index		3.18	0.62	1.95	2.12	0.75	1.35	1.29	1.30
Source of information		DWA NIS StatsSA	DWA NIS StatsSA	DWA NIS	DWA NIS StatsSA	DWA NIS Municipality	DWA NIS DWA RO	DWA NIS DWA RO	0	

Municipal NRW Water Balance: Drakenstein

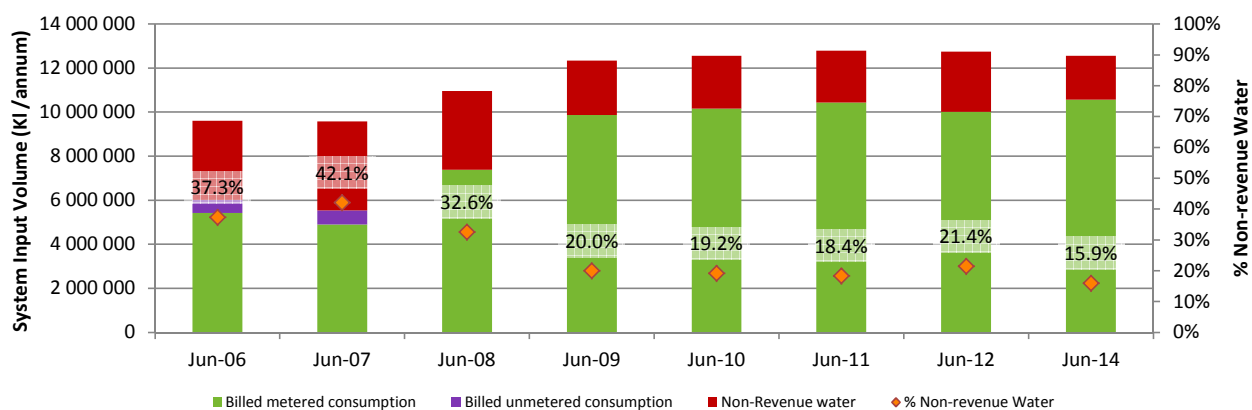


Comments

National NRW Assessment

Province		Western Cape							WSA	
Municipal Code		WC024							Yes	
District Municipality		Cape Winelands							Category	
Municipality		Stellenbosch							B1	
Settlements		Franschhoek, Jamestown, Klapmuts, Kyamandi, Lynedoch, Kylemore, Pniel, Simondium, Stellenbosch, Vlo							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	117 852	120 985	127 294	129 911	136 514	138 315	140 862	146 098	
	Households	30 211	31 017	32 631	33 305	34 998	35 463	36 942	38 315	
	Connections - metered	29 234	30 011	31 576	32 225	33 863	34 310	34 942	36 240	
	Connections - Unmetered	2 461	2 527	2 658	2 713	2 851	2 889	3 009	3 121	
	Length of mains (km)	634	651	685	699	734	744	759	787	
	System input volume	k/annum	9 608 843	9 571 524	10 953 435	12 335 345	12 562 201	12 789 057	12 746 753	12 562 201
	Billed metered consumption	k/annum	5 418 214	4 898 480	7 382 692	9 866 904	10 153 956	10 441 008	10 017 196	10 560 114
	Billed unmetered consumption	k/annum	604 728	642 456	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	25 578	25 494	0
Water Balance Calculat	Revenue water	k/annum	6 022 942	5 540 936	7 382 692	9 866 904	10 153 956	10 441 008	10 017 196	10 560 114
	Non-Revenue water	k/annum	3 585 901	4 030 588	3 570 743	2 468 441	2 408 245	2 348 049	2 729 557	2 002 087
	Water Losses	k/annum	3 585 901	4 030 588	3 570 743	2 468 441	2 408 245	2 322 470	2 704 063	2 002 087
	% Non-revenue water		37.3%	42.1%	32.6%	20.0%	19.2%	18.4%	21.4%	15.9%
	% Water Losses		37.3%	42.1%	32.6%	20.0%	19.2%	18.2%	21.2%	15.9%
Key performance indicators	Input : Litres / capita / day		223	217	236	260	252	253	248	236
	Input : m ³ / household / month		27	26	28	31	30	30	29	27
	Billed : Litres / capita / day		140	125	159	208	204	207	195	198
	Billed : m ³ / household / month		17	15	19	25	24	25	23	23
	% Population growth		3.20%	2.66%	5.21%	2.06%	5.08%	1.32%	1.84%	
	% Water demand growth		-19.46%	-0.39%	14.44%	12.62%	1.84%	1.81%	-0.33%	
	UARL		670 978	688 820	724 734	739 639	777 233	787 492	803 418	833 279
	CARL		2 868 721	3 224 470	2 856 594	1 974 753	1 926 596	1 857 976	2 163 251	1 601 669
	Infrastructure Leakage Index		4.28	4.68	3.94	2.67	2.48	2.36	2.69	1.92
Source of information		DWA NIS StatsSA	DWA NIS StatsSA	DWA NIS	DWA NIS StatsSA	DWA NIS	DWA NIS DWA RO	DWA NIS DWA RO	0	

Municipal NRW Water Balance: Stellenbosch

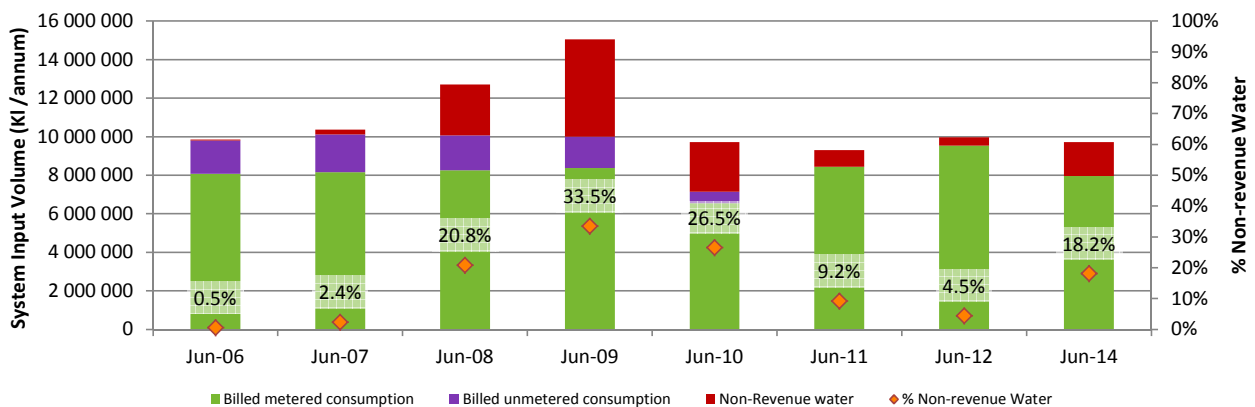


Comments

National NRW Assessment

Province		Western Cape							WSA	
Municipal Code		WC044							Yes	
District Municipality		Eden							Category	
Municipality		George							B1	
Settlements		CONVILLE, GEORGE, THEMBALETHU							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	154 869	158 497	166 156	169 378	177 774	179 663	182 842	189 370	
	Households	42 312	43 300	45 389	46 288	48 607	49 128	51 139	52 965	
	Connections - metered	37 499	38 377	40 232	41 012	43 045	43 503	44 272	45 853	
	Connections - Unmetered	2 276	2 329	2 441	2 489	2 614	2 642	2 750	2 848	
	Length of mains (km)	795	814	853	870	913	923	940	974	
	System input volume	k/annum	9 850 717	10 358 000	12 704 000	15 050 000	9 725 100	9 297 316	9 973 584	9 725 100
	Billed metered consumption	k/annum	8 073 168	8 152 851	8 260 600	8 368 348	6 548 078	8 442 341	9 528 113	7 959 230
	Billed unmetered consumption	k/annum	1 723 752	1 959 192	1 799 103	1 639 014	596 324	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	18 595	19 947	0
Water Balance Calculat	Revenue water	k/annum	9 796 920	10 112 043	10 059 703	10 007 362	7 144 402	8 442 341	9 528 113	7 959 230
	Non-Revenue water	k/annum	53 797	245 957	2 644 298	5 042 638	2 580 698	854 975	445 471	1 765 870
	Water Losses	k/annum	53 797	245 957	2 644 298	5 042 638	2 580 698	836 381	425 523	1 765 870
	% Non-revenue water		0.5%	2.4%	20.8%	33.5%	26.5%	9.2%	4.5%	18.2%
	% Water Losses		0.5%	2.4%	20.8%	33.5%	26.5%	9.0%	4.3%	18.2%
Key performance indicators	Input : Litres / capita / day		174	179	209	243	150	142	149	141
	Input : m ³ / household / month		19	20	23	27	17	16	16	15
	Billed : Litres / capita / day		173	175	166	162	110	129	143	115
	Billed : m ³ / household / month		19	19	18	18	12	14	16	13
	% Population growth		3.31%	2.34%	4.83%	1.94%	4.96%	1.06%	1.77%	
	% Water demand growth		2.92%	5.15%	22.65%	18.47%	-35.38%	-4.40%	7.27%	
	UARL		842 027	861 749	903 387	920 927	966 605	976 881	995 466	1 031 006
	CARL		43 038	196 766	2 115 438	4 034 110	2 064 558	669 104	340 419	1 412 696
	Infrastructure Leakage Index		0.05	0.23	2.34	4.38	2.14	0.68	0.34	1.37
Source of information		DWA NIS StatsSA	DWA NIS StatsSA	DWA NIS	DWA NIS StatsSA	DWA NIS	0	0	0	

Municipal NRW Water Balance: George

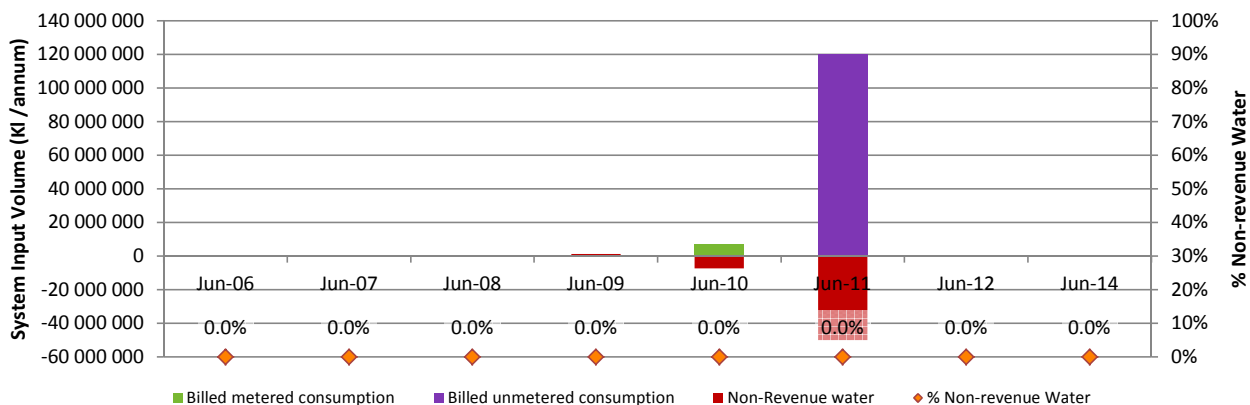


Comments

National NRW Assessment

Province		North West							WSA	
Municipal Code		NW372							Yes	
District Municipality		Bojanala Platinum							Category	
Municipality		Madibeng							B1	
Settlements		Brits							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	272 360	296 362	328 362	350 690	355 436	359 133	362 266	0	
	Households	77 941	84 811	93 979	100 363	101 709	102 774	106 043	0	
	Connections - metered	65 542	71 318	79 019	84 392	85 534	0	0	0	
	Connections - Unmetered	14 262	15 519	17 197	18 365	18 611	0	0	0	
	Length of mains (km)	1 596	1 737	1 924	2 055	2 083	0	0	0	
	System input volume	k/annum	0	0	0	1 225 200	0	70 000 000	0	0
	Billed metered consumption	k/annum	0	0	0	0	7 230 000	0	0	0
	Billed unmetered consumption	k/annum	0	0	0	0	0	120 000 000	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculated	Revenue water	k/annum	0	0	0	0	7 230 000	120 000 000	0	0
	Non-Revenue water	k/annum	0	0	0	1 225 200	-7 230 000	-50 000 000	0	0
	Water Losses	k/annum	0	0	0	1 225 200	-7 230 000	-50 000 000	0	0
	% Non-revenue water		No data	No data	No data	No data	No data	Check data	No data	No data
	% Water Losses		No data	No data	No data	100.0%	No data	Check data	No data	No data
Key performance indicators	Input : Litres / capita / day		No data	No data	No data	10	No data	534	No data	No data
	Input: m ³ / household / month		No data	No data	No data	1	No data	57	No data	No data
	Billed : Litres / capita / day		No data	No data	No data	No data	56	915	No data	No data
	Billed : m ³ / household / month		No data	No data	No data	No data	6	97	No data	No data
	% Population growth		8.11%	8.81%	10.80%	6.80%	1.35%	1.04%	0.87%	
	% Water demand growth					#DIV/0!		#DIV/0!		
	UARL		1 689 463	1 838 354	2 036 893	2 175 373	2 204 765	0	0	0
	CARL		0	0	0	980 160	-5 784 000	-40 000 000	0	0
	Infrastructure Leakage Index		0.00	0.00	0.00	0.45	-2.62	#DIV/0!	#DIV/0!	#DIV/0!
Source of information		DWA NIS	DWA NIS	DWA NIS	DWA NIS StatsSA NFC	DWA NIS RPMS	0	0	0	

Municipal NRW Water Balance: Madibeng

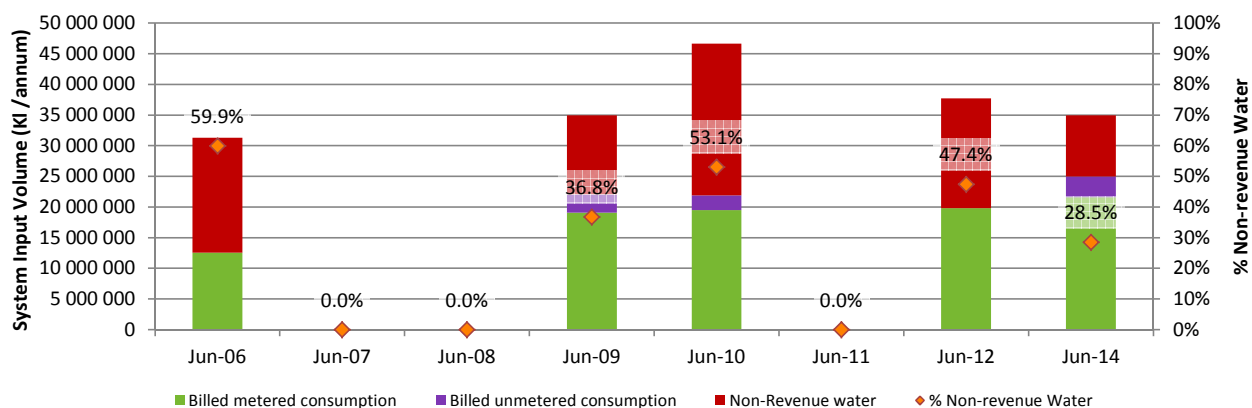


Comments

National NRW Assessment

Province		Mpumalanga							WSA	
Municipal Code		MP312							Yes	
District Municipality		Nkangala							Category	
Municipality		Emalahleni							B1	
Settlements		KWAGUGA, LYNVILLE, WITBANK							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	273 724	284 567	301 306	309 708	315 931	315 931	318 141	364 240	
	Households	77 882	80 973	85 725	88 121	89 895	89 895	92 591	106 007	
	Connections - metered	70 039	72 814	77 097	79 247	80 839	80 839	81 405	93 200	
	Connections - Unmetered	10 105	10 506	11 123	11 434	11 664	11 664	12 014	13 755	
	Length of mains (km)	1 603	1 666	1 764	1 814	1 850	1 850	1 868	2 139	
	System input volume	k/annum	31 308 034	0	0	34 925 000	46 620 000	0	37 713 116	34 925 000
	Billed metered consumption	k/annum	12 544 070	0	0	19 067 000	19 510 000	0	19 822 596	21 572 560
	Billed unmetered consumption	k/annum	0	0	0	3 004 000	2 370 000	0	0	3 398 750
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	5 606 000	0
Water Balance Calculat	Revenue water	k/annum	12 544 070	0	0	22 071 000	21 880 000	0	19 822 596	24 971 311
	Non-Revenue water	k/annum	18 763 964	0	0	12 854 000	24 740 000	0	17 890 520	9 953 689
	Water Losses	k/annum	18 763 964	0	0	12 854 000	24 740 000	0	12 284 520	9 953 689
	% Non-revenue water		59.9%	No data	No data	36.8%	53.1%	No data	47.4%	28.5%
	% Water Losses		59.9%	No data	No data	36.8%	53.1%	No data	32.6%	28.5%
Key performance indicators	Input : Litres / capita / day		313	No data	No data	309	404	No data	325	263
	Input: m ³ / household / month		33	No data	No data	33	43	No data	34	27
	Billed : Litres / capita / day		126	No data	No data	195	190	No data	171	188
	Billed : m ³ / household / month		13	No data	No data	21	20	No data	18	20
	% Population growth		3.69%	3.96%	5.88%	2.79%	2.01%	0.00%	0.70%	
	% Water demand growth		#DIV/0!			#DIV/0!	33.49%		#DIV/0!	
	UARL		1 696 665	1 763 891	1 867 617	1 919 712	1 958 294	1 958 294	1 977 671	2 264 235
	CARL		15 011 171	0	0	10 283 200	19 792 000	0	9 827 616	7 962 951
	Infrastructure Leakage Index		8.85	0.00	0.00	5.36	10.11	0.00	4.97	3.52
Source of information		DWA NIS StatsSA NFC	DWA NIS	DWA NIS	DWA NIS RPMS	DWA NIS RPMS	0	0	0	

Municipal NRW Water Balance: Emalahleni

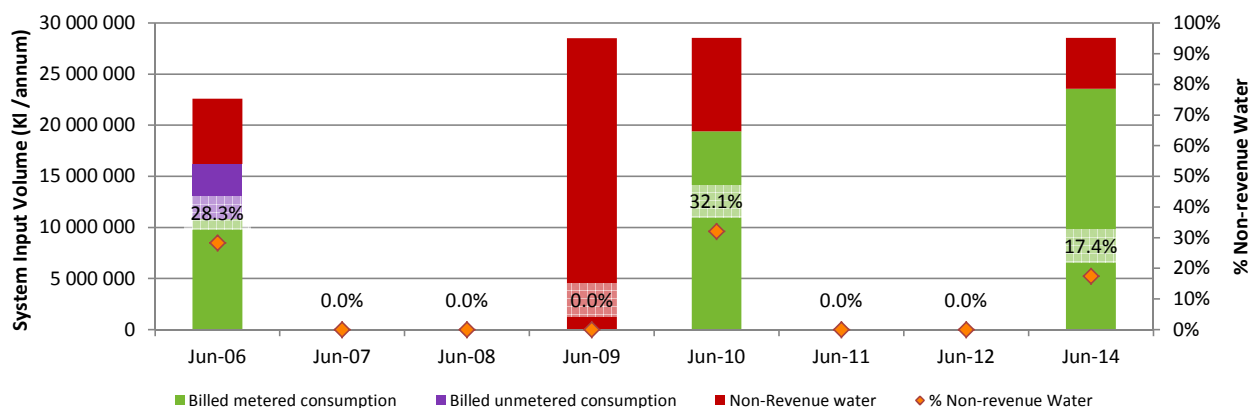


Comments

National NRW Assessment

Province		North West							WSA	
Municipal Code		NW403							Yes	
District Municipality		Dr Kenneth Kaunda							Category	
Municipality		Matlosana							B1	
Settlements		JOUBERTON, KANANA, KLERKSDORP, STILFONTEIN, KHUMA							Target	
Year ending		Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-14	
Input Data	Population	367 072	376 329	387 936	390 859	403 681	403 681	405 697	0	
	Households	100 135	102 659	105 826	106 621	110 123	110 123	113 424	0	
	Connections - metered	92 903	95 245	98 183	98 923	102 168	0	0	0	
	Connections - Unmetered	7 988	8 189	8 442	8 505	8 785	0	0	0	
	Length of mains (km)	2 018	2 069	2 124	2 149	2 219	0	0	0	
	System input volume	k/annum	22 594 000	0	0	28 504 803	28 550 000	0	0	28 550 000
	Billed metered consumption	k/annum	10 926 248	0	0	0	19 390 000	0	0	23 568 666
	Billed unmetered consumption	k/annum	5 278 752	0	0	0	0	0	0	0
	Unbilled metered consumption	k/annum	0	0	0	0	0	0	0	0
	Unbilled unmetered consumption	k/annum	0	0	0	0	0	0	0	0
Water Balance Calculat	Revenue water	k/annum	16 205 000	0	0	0	19 390 000	0	0	23 568 666
	Non-Revenue water	k/annum	6 389 000	0	0	28 504 803	9 160 000	0	0	4 981 334
	Water Losses	k/annum	6 389 000	0	0	28 504 803	9 160 000	0	0	4 981 334
	% Non-revenue water		28.3%	No data	No data	No data	32.1%	No data	No data	17.4%
	% Water Losses		28.3%	No data	No data	100.0%	32.1%	No data	No data	17.4%
Key performance indicators	Input : Litres / capita / day		169	No data	No data	200	194	No data	No data	#DIV/0!
	Input: m ³ / household / month		19	No data	No data	22	22	No data	No data	#DIV/0!
	Billed : Litres / capita / day		121	No data	No data	No data	132	No data	No data	#DIV/0!
	Billed : m ³ / household / month		13	No data	No data	No data	15	No data	No data	#DIV/0!
	% Population growth		2.46%	2.52%	3.08%	0.75%	3.28%	0.00%	0.50%	
	% Water demand growth		#DIV/0!			#DIV/0!	0.16%			
	UARL		2 135 853	2 189 713	2 254 345	2 274 255	2 348 869	0	0	0
	CARL		5 111 200	0	0	22 803 842	7 328 000	0	0	3 985 067
	Infrastructure Leakage Index		2.39	0.00	0.00	10.03	3.12	#DIV/0!	#DIV/0!	#DIV/0!
Source of information		DWA NIS StatsSA NFC	DWA NIS	DWA NIS	DWA NIS StatsSA NFC	DWA NIS RPMS	0	0	0	

Municipal NRW Water Balance: Matlosana



Comments