



2014

# NO DROP

**First Order Assessment**

the status of water loss, water use efficiency and non-revenue water in MUNICIPALITIES



**water & sanitation**

Department:  
Water and Sanitation  
**REPUBLIC OF SOUTH AFRICA**



# Foreword

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The National Development Plan-2030 sets out the priorities for water demand management and project the importance for a reduction in water demand by 2030. The Plan stresses that demand reductions on this scale will require **active programmes** to reduce water leakage in distribution networks, and increases the efficiency of water use by domestic and commercial water users.

Water and Sanitation Minister Nomvula Mokonyane signalled a “game-changer” shift in the government's management of water provision. The way forward was defined by given priority to “strengthen and work closely with local governments” on the provision of water and security of supply of this scarce resource.

The No Drop Report is a significant testimony to this undertaking by the Minister and her Department. This is the first No Drop Report since the inception of incentive-based regulation in 2008 and since the announcement of the No Drop initiative in 2013.

The purpose of this **First Order No Drop Assessment Report 2014** is to provide an overview of the status of municipalities as pertaining to their water losses, non-revenue water and water use efficiency, based on the 2012/13 financial year. The Report essentially evaluates what a municipality KNOWS about its water demand management and water use efficiency status.

**Water losses, water use efficiency and water security is everyone's business.** No Drop unites the sector in terms of the plans and programmes required to reduce non-revenue water and use water as efficiently as possible, thereby securing supply and access for all in a sustainable and equitable manner.

For the first time in the water history of South Africa, we now have a credible, accurate, measurable baseline on the status of water losses and non-revenue water in the country. The No Drop manages to establish the link between the volumes of water that is available and that water which is used and lost. The No Drop Report focus on measures to understand the reasons for these inefficiencies and measures to address, improve and rectify aspects related to water use.

It is with no surprise that the Department note and congratulate the excellent status and good practice that already exist in local government. These municipalities are applauded and encouraged to move their No Drop status to the highest levels possible. Municipalities who has not fared according to expectation, the message is to use these results to define your status and structure your plans and resources accordingly. Soon you too will join the ranks of the upper performers.

In pursuit of continued improvement and excellence in water services, the Minister has taken a further step by calling for partnership between private and public entities to ‘close the 2030 water gap’ by exploring partnerships between industry and municipalities. The Department acknowledge the role of the Strategy Water Partners Network as partner to develop and implement the No Drop programme. May this Report highlight the opportunities for partnerships and stewardships whereby private and public sector work together to meet shared water demand-supply objectives in specific water-stressed catchments.

The No Drop programme has been received with open arms and eager anticipation by the sector. We trust it will become the Accolade of water managers and professionals in- and- outside of this beautiful country.

# EXECUTIVE SUMMARY

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## BACKGROUND:

The National Development Plan-2030 sets out the priorities for water demand management by projecting an average reduction in water demand of *15% below baseline levels\* in urban areas by 2030*, where the *\*baseline is taken as year 2012*. The Plan acknowledges and refers to the detailed targets that have already been set for different catchments through the Reconciliation Strategies and All-Town Strategies. The Plan stresses that demand reductions on this scale will require *active programmes to reduce water leakage in distribution networks, and increases the efficiency of water use by domestic and commercial water users...*. The Plan furthermore requires targets to be in place for 2012 and 2017.

The No Drop Certification process has been introduced in 2014 by the Department of Water and Sanitation in partnership with the Strategic Water Partners Network. This process involves a comprehensive audit, which provides an inclusive view of the municipal water demand management business by assessing key performance areas in the fields of planning, finance, technical skills, performance, leak repair programmes, and others. The first round of No Drop assessment was done as part of the Blue Drop Water Services Audit, under Criteria 6: Water Use Efficiency. This process concluded end 2014. The purpose of this **First Order No Drop Assessment Report 2014** is to provide an overview of the status of municipalities as pertaining to their water losses, non-revenue water and water use efficiency, based on the 2012/13 financial year. The First Order Assessment essentially evaluates what a municipality KNOWS about its water demand management and water use efficiency status. A set of carefully selected KPAs prompt answers about planning, implementation and performance, which is then scored. A score of >90% repute a municipality as 'knowledgeable' regarding the status of its water losses, efficiency and non-revenue water, and having adequate strategies and plans to effect implementation.

**No Drop is about... supporting water security... sustainably**



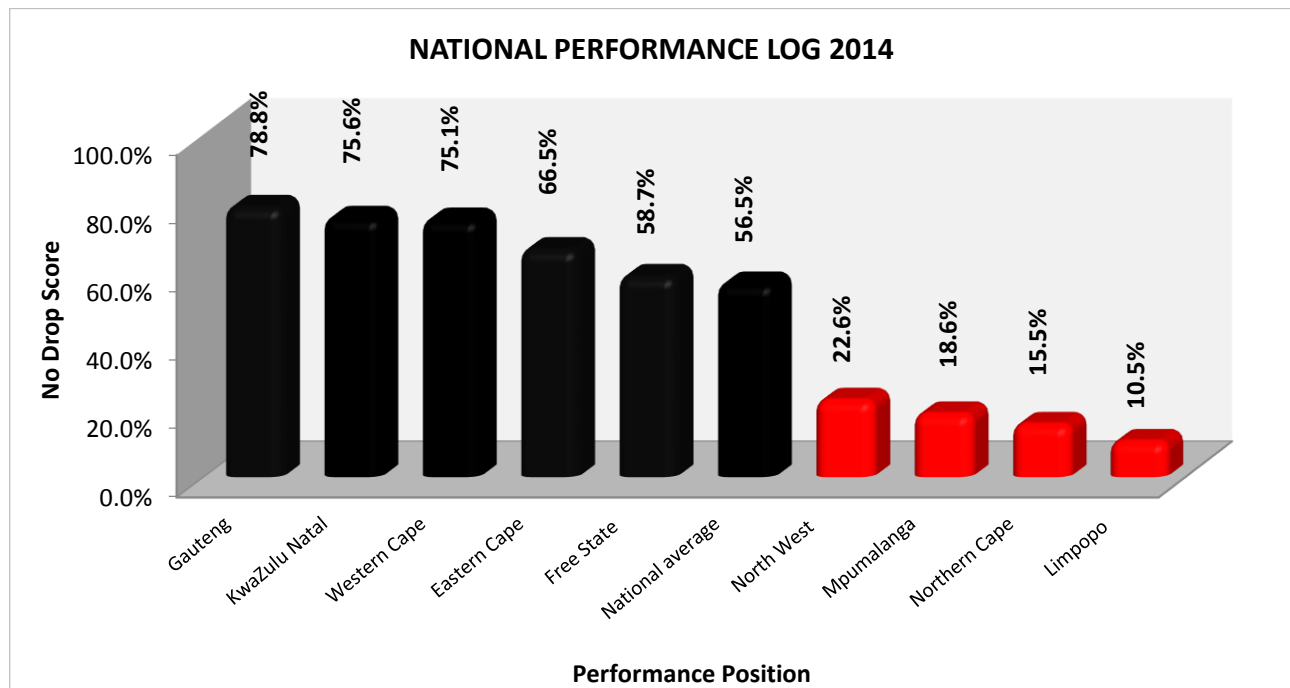
## NO DROP RESULTS – NATIONAL OVERVIEW

Based on verified evidence and data sets, the No Drop audit concluded that all 152 municipalities participated in the No Drop assessment. Data sets were received for 71 municipalities representing a total population of 32 580 710 and 9 043 534 households which is approximately 62% of the country's total population. These households are supplied via a total mains network of 121 449 km and 5 382 613 connections, with an average of 44 connections per km pipeline. A total of 4 712 677 (87.6%) of all connections are metered and 669 936 (12.4%) are unmetered. The average system pressure is 45 m, ranging between 52 m and 36 m reported by the various municipalities.

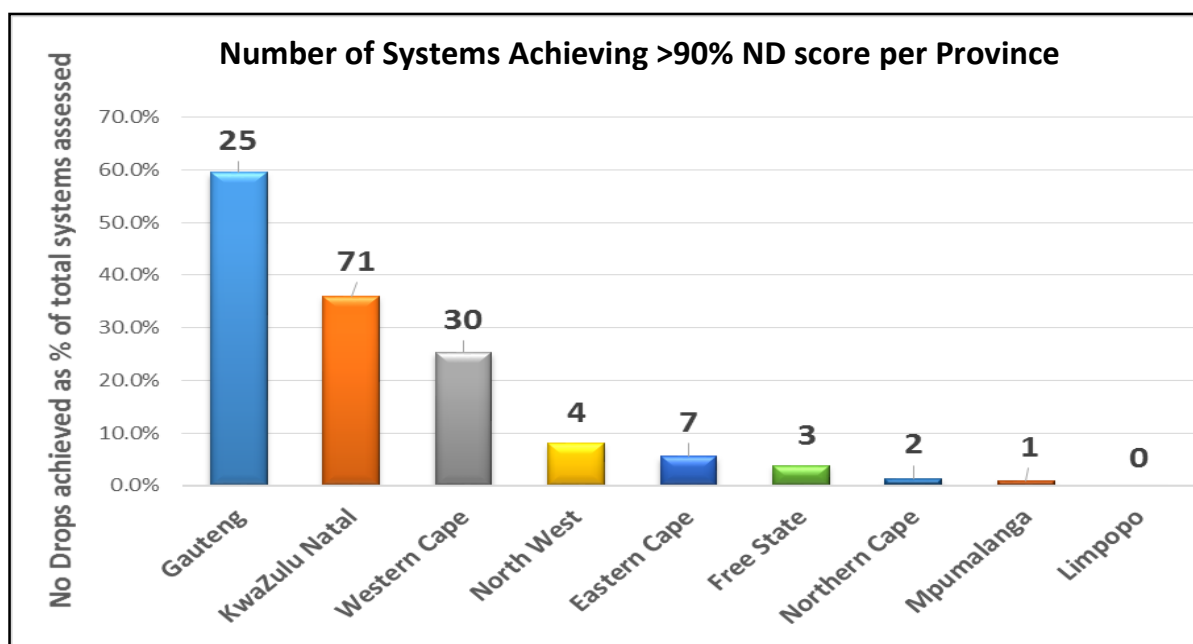
A total of 949 water supply systems have been assessed. In total, 30% of the water supply systems obtained >50% No Drop score, with the balance of 70% attaining <50%. An overall National No Drop Score of 56.5%

was achieved, which falls within the No Drop category of ‘Average Performance’. This (weighted) national score bodes well for the future of WCWDM in the country, given that it is a first time assessment and steep learning curve for the municipalities. The higher score is positively influenced by the good scores obtained by the metropolitan municipalities and some of the municipalities with larger capacity systems.

GP, KZN, WC, EC and FS achieved No Drop scores of >50%, whilst the remainder fell within ‘critical state’ category with No Drop scores <31%. The gaps between the first 5 provinces and the lower 4 are significant, measured at 35%. The national average No Drop is 56.5%, and is significantly (negatively) influenced by the lower ND scores of NW, MP, NC and LP.



One hundred and forty three (143) of the 949 systems achieved No Drop status (15%) for knowing their status and thereby earning ND scores of >90%. Gauteng, KZN and WC achieved the highest percentage No Drops, when calculated against the total number of systems per province. KZN achieved the highest number of No Drops, followed by WC and GP.



#### PLANNING:

Up to 51% of the 152 municipalities have proper or partial WCWDM Strategies and Plans in place, and is busy with some form of implementation in the field. Coupled with 38% to 40% of WSAs having proper or partial Water Balances in place, and a savings potential of R 3 billion/annum, this makes strong case to focus on improvement in the QUALITY OF PLANNING and the INTENSITY AND ACCELERATION OF IMPLEMENTATION. Of concern is that 62% of WSA do not have WCWDM contained within their IDPs. This is a fundamental requirement to get projects rolled out in the field. Regulatory letters to Mayors and Municipal Managers, annexed to their No Drop results, will serve to rectify this omission.

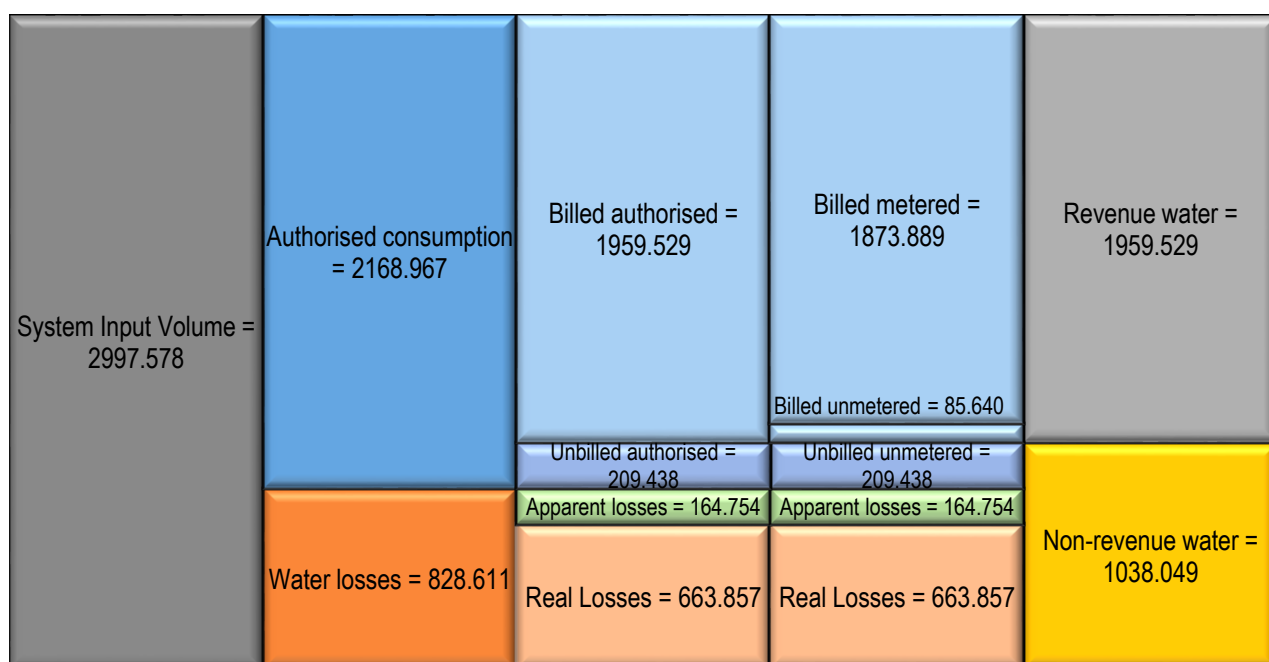
*The state of non-revenue water is a result of the collective effort, will and planning of an ENTIRE municipality.*

#### NATIONAL WATER BALANCE:

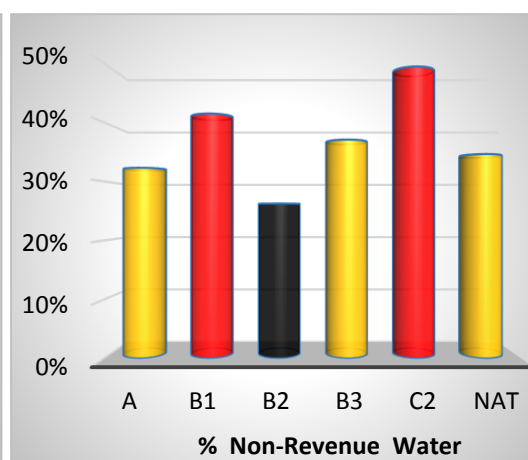
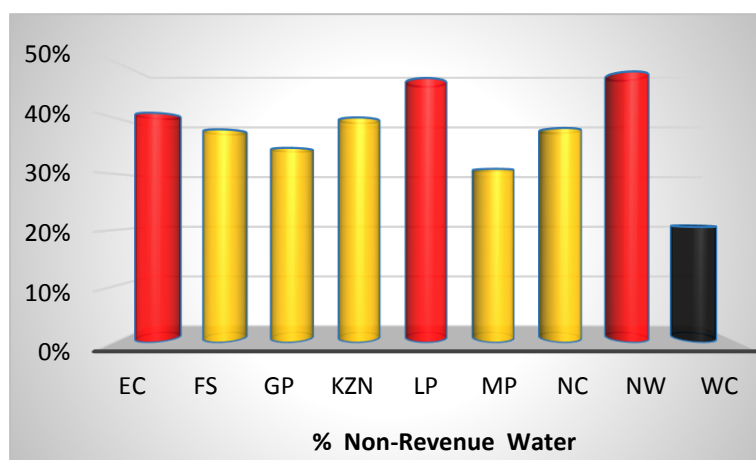
The National Water Balance for the 2012/13 audit year shows a total SIV 2 997.58 million kl/annum of which 2 168.97 million kl/a (72.4%) is Authorised Consumption and 828.61 million kl/a (27.6%) is Water Losses. The Water Losses is made up of 165.32 million kl/a (20%) Apparent Losses and 663.29 million kl/a (80%) Real Losses, which result in a NRW of 1 038.05 million kl/annum (34.6%).

#### 2012/13 IWA Water Balance (million m<sup>3</sup>/annum)

**Current IWA Water Balance Diagram (million m<sup>3</sup>/annum)**



The % NRW is made up as follows for the 9 Provinces and for the different WSA Categories:



**NRW(%) performance categories**

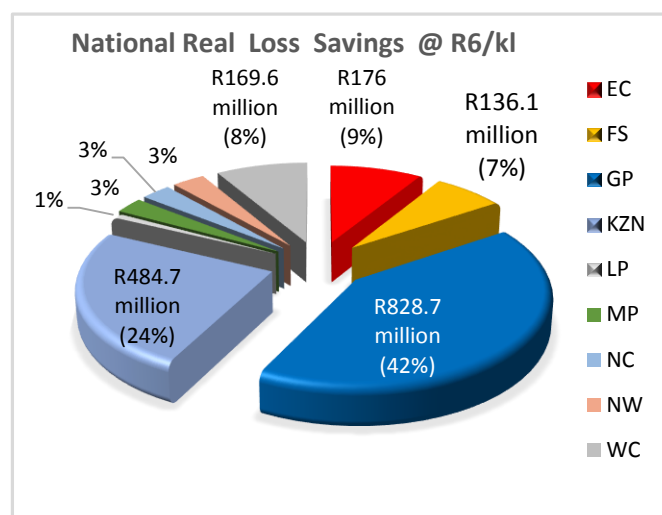
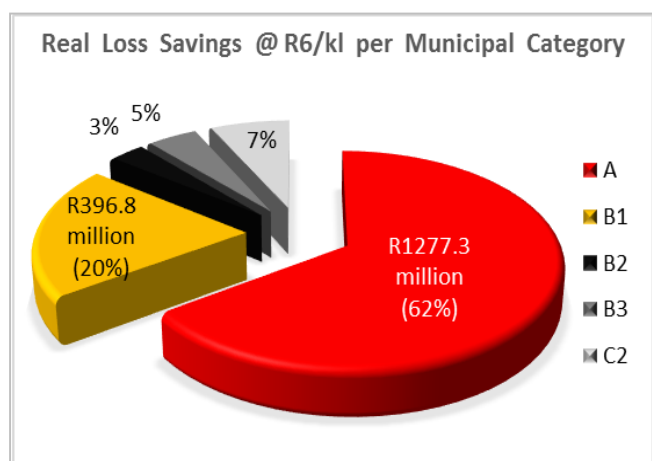
	>40%	Extremely poor
	30-40%	Poor
	20-30%	Average

## POTENTIAL SAVINGS:

	10-20%	Good
	<10%	Excellent

A total volume of 1 038.05 million kl/annum is lost as NRW which, calculated at a unit cost of R6/kl, amounts to R 6 228 million per annum for the country as a whole. By implementing Water Conservation and Demand Management projects, a potential saving of 331.65 million kl/annum can be achieved, which translate to R1 989.9 million per year. **Savings in excess of R3 billion** can be projected if all 152 municipalities' water balances are considered.

The pie chart LEFT demonstrate that the majority of savings ( 66%) can be affected in Gauteng (R 828.9m) and KZN (R 484.7m).

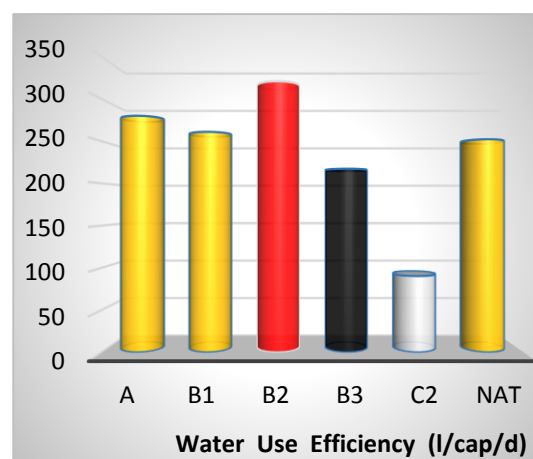
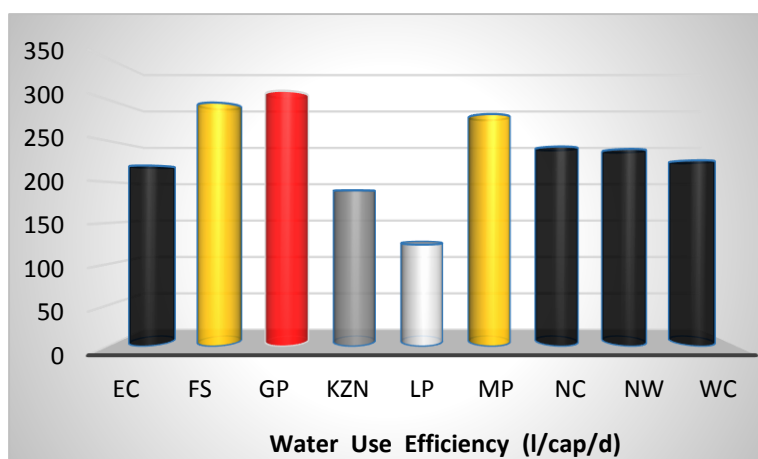


By comparing potential savings on a Municipal Category level (RIGHT), it is observed that the majority of savings can be effected in Category A (metros) municipalities, to a total of 64% of the total savings calculated for South Africa. The potential savings that can be realised by investing in WCWDM in Category A and B1 municipalities is 82% of the national savings potential.

## WATER USE EFFICIENCY:

Water use efficiency is typically one of the key performance indicators and reported at national government level. The average WUE is 237 ℓ/c/d and 234 ℓ/c/d for the Provinces and the WSA Categories, respectively. The reported efficiencies are significantly above the international benchmark of 180 ℓ/c/d and municipalities must continue to plan for improvement towards an average consumption of below 200 ℓ/c/d. For the Provinces, the results indicate GP has the highest WUE of 311 ℓ/c/d followed by FS at 296 ℓ/c/d and MP at 282 ℓ/c/d.





	>300	Extremely high per capita water use
	250-300	Poor
	200-250	Average
	150-200	Good
	<150	Excellent per capita water use management

### PRIORITY INTERVENTIONS:

The TYPE OF INTERVENTIONS will be a critical element in making a difference in the current status of water losses and non-revenue water in South Africa. The table following shows the type of interventions that lend itself to collaboration between public and private institutions to address water loss management and non-revenue water:

- ◆ Pressure management
- ◆ Pipeline, valve and meter replacement
- ◆ Top consumer audits
- ◆ Bulk metering, sectorisation and monitoring
- ◆ Household leak repair programme
- ◆ Removal of mid-blocks
- ◆ Metering of unmetered properties
- ◆ Leak detection and repair
- ◆ Community awareness

### TECHNICAL SKILLS:

The successful implementation of WCWDM plans aimed at meeting the Reconciliation Strategy- and All Town Targets in line with the provisions of the National Development Plan, will require skilled and experienced engineers, technical and financial staff in the municipal sector. The highest priority intervention plan should therefore focus to develop and retain capacity and competency in local authorities.

### FINANCIAL-TECHNICAL INTERFACE:

The information used to prepare a monthly water balance is in general credible, plausible and readily available. Proper management, reading and billing of consumer meters cannot happen if there is not a good relationship between the finance and technical departments. City of Cape Town is a prime example,



as the metro with the lowest NRW, where the consumer meters are managed and read by the same department. The finance and technical departments in all metros should interact on a daily basis to ensure consumer meters are properly installed, repaired, inspected, read and billed. All WSAs should strive to meter and bill, based on actual meter readings, to ensure the financial sustainability of the metro and customer satisfaction.

#### **COMPLIANCE AND PERFORMANCE:**

Key performance indicators and compliance with the water demand management regulations contributed most to the overall score. WSAs should endeavour to fix all leaks within 48 hours of becoming aware thereof, improve water losses, NRW and efficiency and implement pressure management. Improved compliance and performance will significantly improve the overall score of all metros.

# 1. INTRODUCTION

## 1.1 Background



### WATER USE TARGETS

The “National Development Plan – 2030” states that reducing growth in water demand is just as important as increasing its supply. The NDP assumes it to be possible to achieve an average reduction in water demand of **15% below baseline levels\*** (“business-as usual levels”) **in urban areas by 2030**. Detailed targets have been set for different areas through the Reconciliation Strategies and the All-Town Studies<sup>1</sup>. Achieving demand reductions on this scale will require **active programmes** to reduce water leakage in distribution networks, and to increase the efficiency of water use by domestic and commercial water users.

Note: The National Development Plan (2011) requires targets to be in place for 2012 and 2017. These targets must meet the Reconciliation Strategy Targets or All Town Strategy targets.

*\* baseline taken as year 2012*

Regulation of public utilities, and in particular of water and wastewater services, carries significant economic and social importance and is essential to the development and cohesion of society. In South Africa, this function is undertaken by the Department of Water and Sanitation (DWS), which has introduced a robust water services regulation strategy for the water sector. The strategy clarifies the requirements and obligations placed on Water Services Institutions (WSI), thereby protecting consumers from a potentially unsustainable and unsafe service.

The Regulation Unit within DWS has the primary task of setting and/or interpreting rules, standards and, where relevant, granting approvals for the water sector. Regulation must monitor compliance, analyse and publish results, promote transparency and establish confidence in the actions of the Regulator. It must make determinations, enforce decisions and intervene where necessary. In addition, the Regulator creates an environment conducive to sustainable investment and operations in this capital-intensive sector.

In launching a regulatory strategy appropriate for the South African Water Sector, DWS has chosen a multi-faceted and programmatic approach which enables the progressive implementation of regulation appropriate to the institutional capacity of the sector while supporting the achievement of the local government developmental objectives.

One of the approaches taken by DWS is that of incentive-based regulation which was introduced on 11 September 2008 to the water sector, at the National Municipal Indaba in Johannesburg by the Minister of Water Affairs. The concept was defined by the Blue Drop Certification Programme for drinking water quality management regulation and the Green Drop Certification Programme for wastewater services regulation. Inspired by the successes of the approach the Minister of Water and Sanitation subsequently introduced the No Drop Certification Programme for water use efficiency and water loss management on 21 May 2013 during her Budget Vote Speech.

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<sup>1</sup> In some instances, the Recon- and All Town Strategies are absent of- or unclear about the specific WSI’s targets. In such cases, the DWS is reverting back to the NDP’s target of ‘15% below baseline level’.

The DWS remains cognisant of the need to strengthen its regulatory approach based upon the fundamentals of conventional regulation to ensure that credibility is not compromised. Incentive-based regulation is a form of regulation and should not be perceived to be a weakened form of enforcement. The Blue Drop Certification, Green Drop Certification and No Drop Certification programmes are based upon the core fundamentals of regulatory responsibilities and are therefore not regarded as a Municipal Support Programmes. The results attained from the Drop audits are however, a credible and valuable source of information to trigger sector-wide support programmes since it provides intelligence on specific system- and performance related gaps and priorities that need to be addressed.

The Department acknowledges the need to work in partnership with private sector, as well as NGOs, CBOs and other government agencies to tackle the water security challenges facing all consumers in South Africa. A special word of thanks is extended to the Strategic Water Partners Network (SWPN) who co-developed and supported the No Drop initiative.

The purpose of the **First Order No Drop Assessment Report 2014** is to provide an overview of the status of municipalities as pertaining to their water losses, non-revenue water and water use efficiency, based on the 2012/13 financial year. The results are based on the findings of a No Drop assessment which formed part of the 2014 Blue Drop Assessment, which was undertaken at all municipalities in South Africa. The No Drop component focussed on three (3) key performance areas namely water balance, strategy and planning, and performance and compliance. The first order No Drop assessment ***is not a certification process***, but serve to measure a municipality's knowledge of its status.

The first order No Drop assessment essentially measures what a municipality  
KNOWS about the status of its water losses.

The information in this report was gathered per Water Services Authority (WSA) as part of the Blue Drop Certification Programme. WSAs were requested to provide a breakdown of the water balance information per system in line with the Blue Drop programme. Several municipalities indicated that they cannot provide a breakdown of the information per system as metering and billing is performed at municipal level and not at a system level. To simply the No Drop Certification Programme and align with previous water loss / NRW studies, WSAs will in future be required to report at metropolitan- or local municipality level.

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## 1.2 The Four Pillars

The National Water Act (Act 36 of 1998) recognises the pivotal role that WCWDM plays in water resource management with the objective of reconciling water supply and demand. The No Drop recognises and work towards strengthening the pillars of effective, efficient and sustainable WCWDM.

Water conservation – the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water

Water demand management – the adaptation and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.

### The four pillars of WCWDM



## 1.3 No Drop Philosophy

Inspired by the significance of the WCWDM Pillars, the No Drop strategy revolves around the active identification of mediocre performing municipalities who are consequently guided to correct the identified shortcomings while the introduction of competition amongst municipalities enhance performance which is benchmarked against best practice performance standards in the water industry.

Underlying the “Drop” philosophy is the requirement for **measurement** and, more importantly, **revealing performance** with regard to the achievement of water use targets, water losses, non-revenue water and Water Use Efficiency, which Water Services Authorities (WSA) are obligated to comply with through legislation.

The No Drop system enables the Regulator to measure the performance of municipalities, and subsequently to reward (or penalise) the institution based upon evidence of their excellence (or failures) according to the minimum standards or requirements that have been defined.

To achieve this the DWS defines and communicates a basis for measuring performance across the key areas pertaining to water use efficiency as managed by municipalities and as regulated by the Department. The Department uses a WUE scorecard too as tool to assess the core competencies (criteria) that enable acceptable performance in water demand management in the municipal sector.

It also generates feedback for participating municipalities to define risk profiles and inform turnaround plans. It further generates baseline data that can accurately provide the quantum of losses and establish metering and billing proficiencies that in turn can be used to identify municipal areas in need of targeted support, as well as highlighting priority KPA’s where collective intervention actions are required.

## 1.4 The Water Use Efficiency Assessment & Evaluation System

The full **No Drop Assessment** is a comprehensive audit and gives an inclusive view of the Water Demand Management business of the WSI based on a wide range of Key Performance Areas (KPA's). It answers questions on planning, finance, technical skills, performance, etc. In the longer term, the ND assessment scorecards will become a high value source of data and information in specific areas, or in attaining a holistic view of the WSI's capacity, capability and performance in addressing WCWDM successfully.

The **First Order No Drop Assessment** evaluates what a municipality knows about its water demand management and water use efficiency. A set of carefully selected KPAs prompt answers about planning, implementation and performance.

The No Drop assessment and evaluation process has been designed to provide **focus points**, and to **channel effort and energy to build competencies** and positively impact on current performance pertaining to WUE.

For this reason, the No Drop scorecard seeks to select the key areas (institutional, social, technical, economical and legal proficiency) required for the sector that, if strengthened, will help improve the current level of water losses and non-revenue water in the municipal sector in South Africa. In addition, No Drop endeavours to:




Develop an incentive based regulatory environment to improve service delivery and water security and reduce water losses and non-revenue water;

Provide a guideline to water services institutions to reduce water losses, non-revenue water and improve efficiency;

Incorporate the full water services cycle of the WSI by targeting political and management levels, finance and technical departments and customers;

Reduce duplication; and

Align and complement the Blue Drop, Green Drop and RPMS, as shown in the table below.

					
1	WSP	1	Strategy, planning & implementation	1	W <sub>2</sub> RAP
2	Asset management	2	Asset management	2	Asset management
3	Technical skills	3	Technical skills	3	Technical skills
4	Credibility and accountability	4	Credibility and accountability	4	Credibility and accountability
5	Compliance	5	Compliance & Performance	5	Compliance
6	Water Use Efficiency & Water Loss Management	6	Local regulation	6	Local regulation
		7	Customer care		

## 1.5 The 3% No Drop Scorecard: BD Criteria 6 – Water Use Efficiency & Water Loss Management

The 3% No Drop scorecard as used for the assessment of water use efficiency at municipal level, as part of the 2014 Blue Drop Audit, is shown in the table below.

The focus of the 3% ND assessment was:

- *Raising awareness;*
- *Introduction to the assessment criteria of ND;*
- *Understanding of the current position and performance of municipalities.*

The ND scorecard consisted of 3 Sub-criteria under BD criteria 6.

### Sub-criteria 6.1: Water balance [30%]

This sub-criteria measures the consistency and credibility of the MONTHLY and ANNUAL composite IWA water balance data and diagram based on actual meter readings per system per WSI ensuring compliance (as a component in the WSDP) as per Regulation 509 of 2001 Clause 10 of the Water Supply Regulations.

### Sub-criteria 6.2: WCWDM Strategy, planning and implementation [30%]

This sub-criteria measures the state of water consumption, water losses and NRW in the WSI, review the strategies and business plans (and its inclusion in the IDP) to reduce the system input volume, water losses and NRW and evaluate the progress made with the implementation of these strategies and business plans.

### Sub-Criteria 6.3: Compliance and Performance [40%]

This sub-criteria measures the performance of the WSI against international best practice benchmarks and the water demand management regulations, and is focussed on knowing and improving the KPI status within the WSI.

#### KPA: WATER USE EFFICIENCY & WATER LOSS MANAGEMENT:

Requirements	Sub-Requirements
(6.1) <b>WATER BALANCE</b>	Provide MONTHLY and ANNUAL composite IWA water balance diagrams and supporting documents for the complete system as part of the water audit (as a component in the WSDP) as per Regulation 509 of 2001 Clause 10 of the Water Supply Regulations. Balance diagram to specify as a minimum the main components of the IWA balance including Water Losses broken down into:
	a) System input volumes
	b) Billed metered and unmetered usage
	c) Unbilled Authorised Consumption
	d) Water losses broken down into Real and Apparent Losses
	e) Free Basic Water, and
	f) Non Revenue Water
	and to be supported by a schematic or layout drawing showing bulk meters, zones and main infrastructure components.
(6.2) <b>WDM STRATEGY</b>	a) Evidence must be provided of an Council approved (or signed by MM, Tech Director or CFO, or included in the IDP) WDM strategy and business plan consisting of at least the following:
	- Background and Context

Requirements	Sub-Requirements
<b>AND BUSINESS PLAN and IMPLEMENTATION</b>	- Situation Assessment including a Needs Statement
	- Key Issues and Challenges
	- Focus Areas of Intervention
	- List of Proposed Interventions
	- Set targets for demand, NRW, commercial and real losses
	- Allocation of responsibilities to specific persons/positions in the organisation (not departments)
	- Budget and Multi-year Implementation Timeline
	b) Provide evidence of implementation against the above Plan in terms of:
	- List of Interventions (Projects)
	- Movement against targets for demand, NRW, commercial and real losses
	- Budget and Multi-year Implementation Timeline
	<i>(as per Reg 509 of 2001 Clause 10)</i>
<b>(6.3)</b> <b>COMPLIANCE and PERFORMANCE</b>	a) Provide supportive evidence for data as required in the table below in order to calculate the following: <ul style="list-style-type: none"> <li>• Physical (real) water loss baseline 2012</li> <li>• Commercial water loss baseline 2012</li> <li>• Water use efficiency baseline 2012</li> </ul>
	Population number served :
	Households served:
	Total connections:
	Metered connections:
	Unmetered connections:
	Households with deemed or flat rate billing:
	Number of metered connections billed:
	Proven Industrial use (kl/annum):
	Length of mains installed (km):
	Assumed commercial losses :
	SIV (System Input Volume) (kl/annum):
	Authorised, Billed and Metered (kl/annum):
	Authorised, Billed and Unmetered (kl/annum):
	Average system pressure (m):
	Municipality's comment on the assumed commercial loss figure of 20% as well as their PROVEN alternative figure:
	b) Using the data provided under 6.3.1 calculate the WSI baseline profile for:
	- Physical (real) water loss status
	Physical (real) water loss performance in terms of the ILI as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 200
	c) Using the data provided under 6.1 and 6.2 to calculate the WSI baseline profile for:
	- Commercial water loss status
	Commercial water loss performance indicators as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000.



Requirements	Sub-Requirements
	<p>d) Using the data provided under 6.1 and 6.2 to calculate the WSI baseline profile for:</p> <ul style="list-style-type: none"> <li>- Water use efficiency status</li> </ul> <p>Water use efficiency performance indicators as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000.</p>
<b>Bonus:</b> Availability and competence of the water loss manager and team	<p>a) The Institution must present evidence of a competent Water Loss Management Team indicating the WDM responsible persons (in form of a Organogram) with % vacant in accordance with Clause 66 (Staff matters) of the Municipal Systems Act 32 of 2000.</p> <p>b) Proof required on team manager competency (qualification &amp; Experience) with the following additional requirement: Manager to have suitable tertiary qualification with suitable experience</p> <p>c) The Institution must present evidence of a competent structured Maintenance Team (in form of Organogram with well-defined positions and job descriptions; Contract or Invoice). Logbook with maintenance entries will serve as adequate evidence</p> <p>d) Additional proof required on team competency for the team presented under (c) above (e.g. Qualification &amp; Experience &amp; Trade-test)</p> <p>e) Indicate number of suitably qualified plumbers per 1000 connections</p>
<b>Penalty:</b> Inclusion in the IDP	Components listed under the WDM Strategy and Business Plan have not included in the IDP

## 1.6 Water Balance, Scorecard and Results

The water balance provides a breakdown of the system input volume (SIV), authorised consumption, NRW, apparent and physical losses.

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

Once the water balance has been compiled, various key performance indicators (KPIs) can be calculated to measure the performance of the water supply system. With the water balance and KPIs available, the water utility can determine which components must be targeted first to improve efficiency, reduce commercial

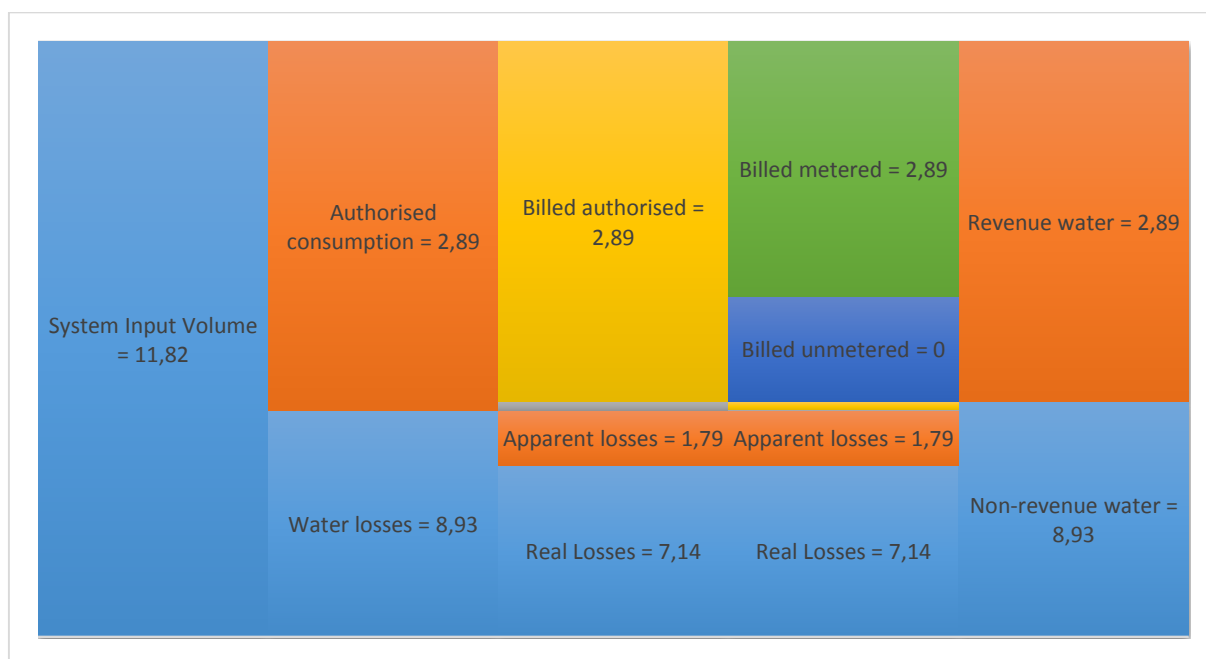
losses, physical losses and NRW. Once the main water loss contributing components have been identified and quantified, the municipality is able to identify the most effective WCWDM interventions.

The municipality's water balance is required to complete its No Drop scoring. Data from the water balance is used as input to the scorecard and provides the basis for calculating 'compliance and performance' under sub-criteria 6.3. These data sets are also used to calculate performance profiles for the provinces and the national overview of water loss and NRW in South Africa.

**Example: Data Input from 2012/13 water balance to No Drop scorecard:**

2013 Municipal No Drop Score		67.0%
Key Performance Area		Status and Performance
WATER USE EFFICIENCY & WATER LOSS MANAGEMENT (3% weight)		2,01%
No Drop Score (2013)		67.0% Average
INPUT DATA	Population	324 580
	Households	91116
	Metered Connections	6825
	Unmetered Connections	1774
	Length of mains (km)	3508
	Average System Pressure (m)	55
	2014 Water Use Targets (Water Balance Targets)	14.04 million
	System Input Volume (kl/annum)	11.82 million
	Billed Metered Authorised Use (kl/annum)	2,89 million
	Billed Unmetered Authorised Use (kl/annum)	0
	Unbilled Authorised Use (kl/annum)	0
	Assumed Commercial Losses (%)	20%
WATER BALANCE DATA	Authorised Use – billed & unbilled (kl/annum)	2,89 million
	Water Losses (kl/annum)	8,93 million
	Apparent losses (kl/annum)	1,79 million
	Real Losses (kl/annum)	7,14 million
	Revenue Water (kl/annum)	2,89 million
	Non-Revenue Water (kl/annum)	8,93 million
KPIs	Infrastructure Leakage Index (ILI)	5.08 Average
	Apparent/ Commercial Losses (%)	15.1% Good
	Non-Revenue Water (%)	75.6% Extremely Poor
	Water Use Efficiency (l/cap/day)	99.7 Excellent
OTHER	Authorised Use (l/cap/day)	24,38
	Real Losses (l/cap/day)	60.00
	% Water Losses	75.6%

**Example: 2012/13 IWA Water Balance (million m<sup>3</sup>/annum)**



## 1.7 Colour Legends

The performance of WSI's in terms of the various KPIs is colour coded as follows:

**Legend for No Drop Scores:**

90-100%	Excellent situation, need to maintain via continued improvement
80-<90%	Good status, improve where gaps identified to shift to 'excellent'
50-<80%	Average performance, ample room for improvement
31-<50%	Very poor performance, need targeted intervention towards gradual sustainable improvement
0-<31%	Critical state, need urgent intervention for all aspects of water use efficiency






**ILI performance categories**

>8	Extremely inefficient water use
6-8	Poor leakage record
4-6	Average with potential for marked improvement
2-4	Good but some improvement may be possible subject to economic benefit
<2	Excellent water loss management

**Non-Revenue Water (%) performance categories**

>40%	Extremely poor non-revenue water management
30-40%	Poor non-revenue water performance
20-30%	Average performance with potential for marked improvement
10-20%	Good performance but some improvement may be possible subject to economic benefit
<10%	Excellent non-revenue water management

**Water Use Efficiency (l/cap/day) performance categories**

	>300	Extremely high per capita water use
	250-300	Poor per capita water use
	200-250	Average per capita water use with potential for marked improvement
	150-200	Good per capita water use but some improvement may be possible subject to economic benefit
	<150	Excellent per capita water use management

## 2. NATIONAL OVERVIEW OF RESULTS

### 2.1 Introduction

Drinking water is supplied by 152 municipalities (WSAs) in South Africa, made up of 8 metros (Category A), 21 district municipalities (Category C2) and 123 local municipalities (19 category B1; 18 category B2; 78 category B3; 8 category B4). Data sets were received for 71 municipalities representing a total population of 32 580 710 and 9 043 534 households which is approximately 62% of the country's total population. These households are supplied via a total mains network of 121 449 km and 5 382 613 connections, with an average of 44 connections per km pipeline. A total of 4 712 677 (87.6%) of all connections are metered and 669 936 (12.4%) are unmetered. The average system pressure is 45 m, ranging between 52 m and 36 m reported by the various municipalities.

*\*Figures based on verified information only.*

Province	No. of Systems	No. of Integrated Systems	No. of credible data sets	Population	Number of Municipal Categories						
					A	B1	B2	B3	B4	C1	C2
EC	124	7	10	2 549 846	2	0	1	8	0	0	5
FS	80	2	6	1 719 893	1	1	3	15	0	0	0
GP	42	5	6	12 014 194	3	2	4	1	0	0	0
KZN	196	4	8	7 828 932	1	3	0	0	0	0	10
LP	74	2	2	562 210	0	1	1	5	0	0	4
MP	103	2	4	743 062	0	4	2	7	5	0	0
NC	158	7	14	704 360	0	1	1	24	1	0	0
NW	50	3	3	1 075 652	0	4	0	3	2	0	2
WC	122	6	18	5 382 561	1	3	6	15	0	0	0
<b>Totals</b>	<b>949</b>	<b>38</b>	<b>71</b>	<b>32 580 710</b>	<b>8</b>	<b>19</b>	<b>18</b>	<b>78</b>	<b>8</b>	<b>0</b>	<b>21</b>
152											

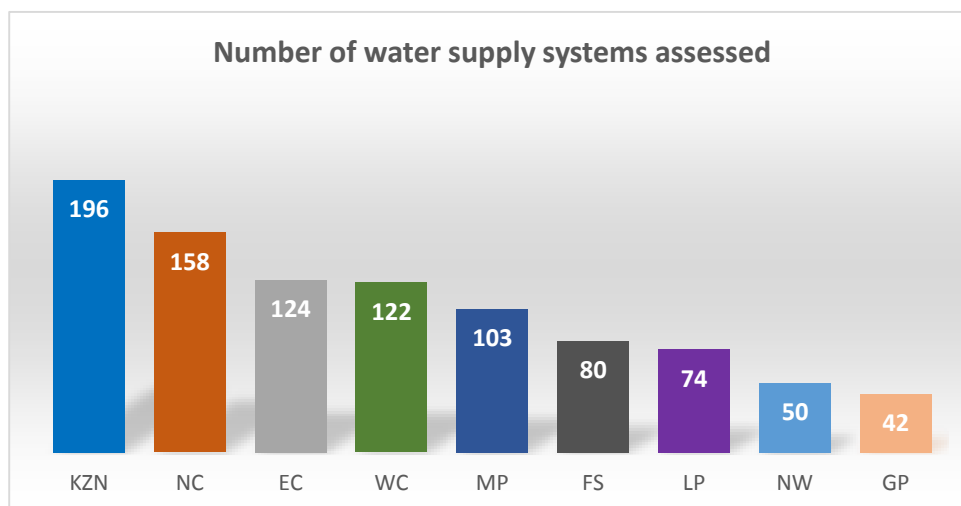
Municipal Category	No. of credible data sets	Population per Province								
		EC	FS	GP	KZN	LP	MP	NC	NW	WC
A	8	1 804 519	721 367	10 801 102	3 586 777					3 829 193
B1	16		374 450	1 161 845	799 361	521 680	700 067	284 042	1 075 652	631 431
B2	9		279 581	51 247				100 807		487 056
B3	30	243 815	344 495			40 530	42 995	319 511		434 881
B4	0									
C1	0									
C2	8	501 512			3 442 794					
<b>Totals</b>	<b>71</b>	<b>2 549 846</b>	<b>1 719 893</b>	<b>12 014 194</b>	<b>7 828 932</b>	<b>562 210</b>	<b>743 062</b>	<b>704 360</b>	<b>1 075 652</b>	<b>5 382 561</b>
32 580 710										

## 2.2 No Drop Results For 2012/13

The lack of data and credibility of data as well as the lack of supporting Water Balances per supply system, prompted the DWS to collapse some of the supply systems into one integrated system for each municipality for purposes of the First Order No Drop Assessment Report.

A total of 949 water supply systems have been assessed in 152 municipalities which represents a 100% assessment of all municipalities in South Africa.

A total of 38 WSA opted to provide evidence for 'one integrated system' instead of regarding each



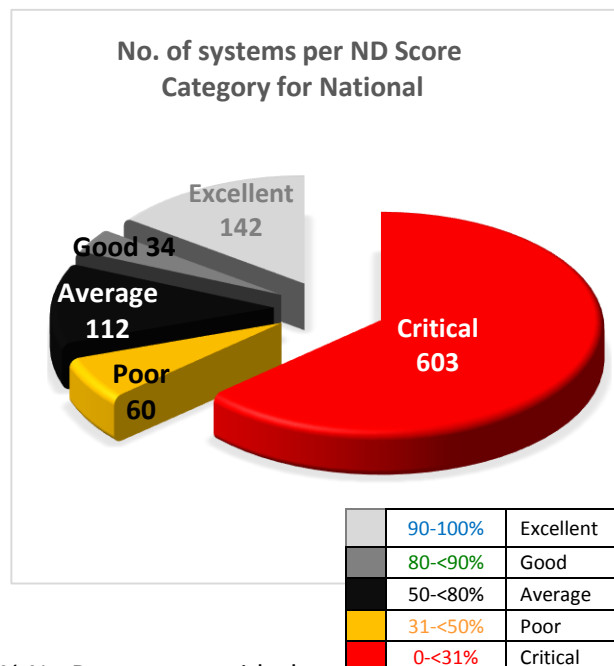
individual supply systems separately. This accounted for 239 systems being integrated into 38 systems. The remaining 710 systems were assessed as stand-alone water supply systems. (Note: the 239 systems were allocated with individual No Drop scores to ensure counting of No Drop Certifications).

2013 NATIONAL ND COMPARATIVE ANALYSIS	
Performance Category	Performance Indicators
<b>Performance indicators</b>	
Number of WSAs assessed	152 (100%)
Number of systems assessed	949 (100%)
Number of integrated systems*	38 (25%)
Average No Drop score	31.2%
Number of No Drop scores $\geq 50\%$	287 (30%)
Number of No Drop scores $< 50\%$	662 (70%)
Number of No Drop awards	143 (15%)
<b>NATIONAL (weighted) NO DROP SCORE</b>	<b>56,9%</b>

\* Per original scorecard data

In total, 30% of the water supply systems obtained  $>50\%$  No Drop score, with the balance of 70% attaining  $<50\%$ .

An overall National No Drop Score of 56.9% was achieved, which falls within the No Drop category of "Average Performance". This (weighted) national score bodes well for the future of WCWDM in the country, given that it is a first time assessment which introduced a steep learning curve for the municipalities. The score is positively influenced by the good scores obtained by the metropolitan municipalities and some of the municipalities with larger capacity systems which contribute significantly to the weighted national score.

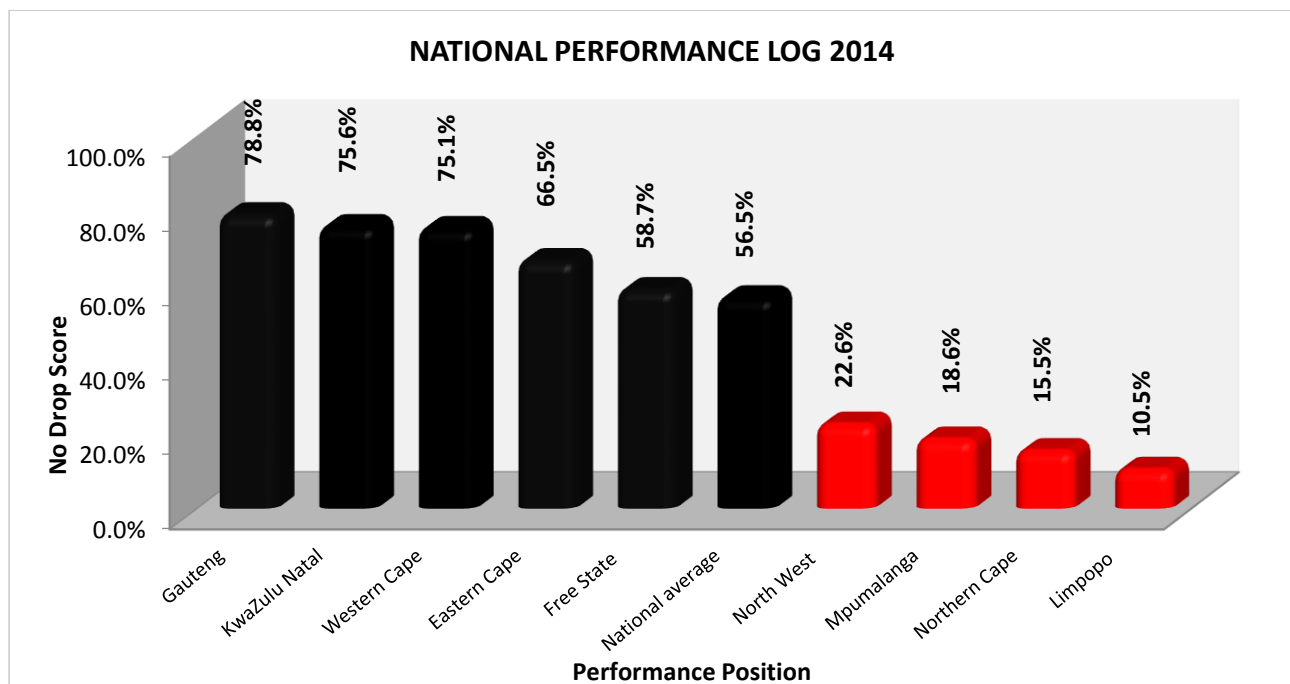


Contrary to the above, an average No Drop score of 31.2% points to a poor performance for municipalities on average. This national average is weighed down by a significantly high number of municipalities located across the nine Provinces who could not provide evidence for assessment. These municipalities and Provinces are not to be discouraged, as this is the first year of No Drop assessments, and the No Drop introduction has been a learning curve and awareness raising for all stakeholders to better prepare for the next (stand-alone) No Drop assessment.

One hundred and forty three (143) of the 949 systems achieved No Drop status and earned scores of >90%. Five Provinces achieved No Drop scores of >50% and four Provinces are in the critical state performance category with No Drop scores <31%. The gaps between the first 5 provinces and the lower 4 are significant, measured at 35%.

Position	Provinces	2014 No Drop Score (%)	No. of Systems with <30% score
1	Western Cape	81.2%	47
2	Gauteng	78.8%	10
3	KwaZulu Natal	75.6%	84
4	Eastern Cape	66.5%	81
5	Free State	58.7%	60
6	North West	22.6%	45
7	Mpumalanga	18.6%	86
8	Northern Cape	15.5%	117
9	Limpopo	10.5%	71

The National Barometer for the country with a weighted average No Drop score of 56.9% is shown in the figure below:





The following municipalities (per Province) and water supply systems attained No Drop scores of >90%. The Regulator considers these municipalities to be knowledgeable on the status of their water use status and having the necessary strategies and plans in place to address non-conformance:



**Eastern Cape:**

- ◆ Nelson Mandela Metro: Nelson Mandela Metro: Churchill, Elandsjagt, Nooitgedacht, Groendal, Springs, Loerie and Rocklands (7 systems)

**Free State:**

- ◆ Matjabeng: Allanridge, Odendaalsrus and Ventersburg (3 systems)

**Gauteng:**

- ◆ City of Tshwane: Temba, Cullinan, Wallmansthal, Rietvlei, Roodeplaat, Bronkhorstpruit, Bronkhorstbaai, Summerplace, Fountains, Onverwacht and Sokhulumi (11 systems)
- ◆ City of Ekurhuleni: Germiston, Nigel, Alberton, Bedfordview, Benoni, Boksburg, Brakpan, Daveyton, Duduza, Edenvale, Etwatwa, Katlehong, Kempton Park and Kwathema (14 systems)

**KwaZulu Natal:**

- ◆ Ugu DM: Bhobhoyi, Umtamvuna, Harding, Weza, KwaFodo, KwaMbotho, KwaNyuswa 1 & 2, KwaHlongwa, Phungashe, Assissi, Vulamehlo, KwaLembe, KwaNdelu, Umtwalume, Umzinto and Hlokozi (17 systems)
- ◆ Uthungulu DM: eShowe, Gingindlovu, Mbonambi/Umfolozi, Melmoth, Middeldrift, Greater Mtonjaneni, Mtunzini, Nkandla, Nkandla Boreholes, Ntambanana, Mtonjaneni Boreholes, Ntambanana Boreholes and Umlalazi Boreholes (13 systems)
- ◆ Ilembe DM: Dolphin Coast, Groutville, Ndwedwe, Montobello Hospital, eMayelisweni, Ntabaskop, Isiminya, Esidumbini, Isithundu, Glendale Mill, Kwasathane, Waterfall, Masimbambisane, Ngcebo, Kwadukuza/Mvoti, Zinkwazi Beach, Blythedale Beach, Driefontein, Madundube, Mphumulo Hospital, Ntunjambili, Vukile High School, Maqumbi, Maphumulo, Sundumbili/Mathonsi, Mandeni, Uthukela, Makwanini, Ifalethu, Ohwebede, Hlanganani, Lambothi, Ethembeni, Uthukela Mouth, Mazitapele, Sansouci, Gogovuma, Mushane and Amatigulu (39 systems)
- ◆ uMhlathuze LM: Ngwelezane (1 system)
- ◆ Msunduzi LM: Msunduzi (1 system)

**Limpopo:** None

**Mpumalanga:**

- ◆ Mbombela LM: Karino (1 system)

**Northern Cape:**

- ◆ Hantam LM: Calvinia and Loeriesfontein (2 systems)

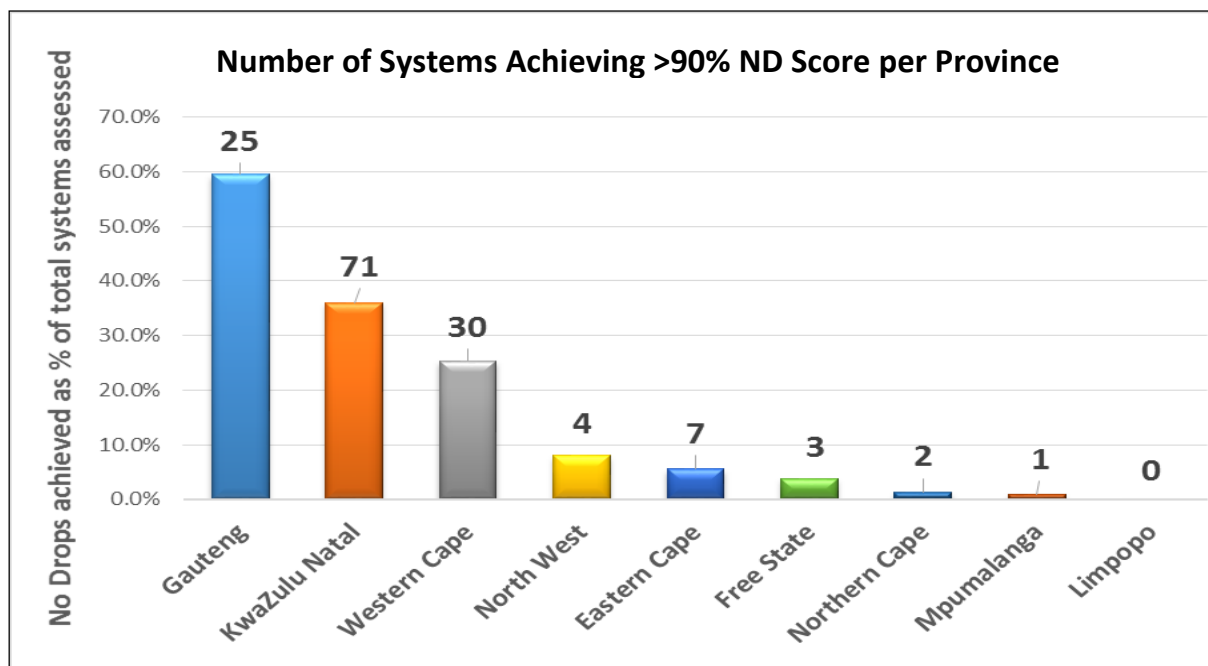
**North West:**

- ◆ Tlokwe LM: Tlokwe (1 system)
- ◆ Rustenburg LM: Marikana, Rustenburg and Vaalkop (3 systems)

**Western Cape:**

- ◆ Beaufort West LM: Beaufort West, Merweville and Nelspoort (3 systems)

- City of Cape Town Metro: City of Cape Town (1 system)
- Drakenstein LM: Bainskloof, Drakenstein-Paarl, Gouda, Hermon and Saron (5 systems)
- Knysna LM: Buffalo Bay, Karatara, Rheenendal and Sedgfield (4 systems)
- Overstrand LM: Greater Hermanus, Buffels River, Kleinmond, Stanford, Greater Gansbaai, Buffeljags Bay, Baardskeerdersbos and Pearly Beach (8 systems)
- Swartland LM: Malmesbury and Moorreesburg (2 systems)
- Theewaterskloof LM: Caledon, Botrivier, Genadendal, Grabouw, Greyton, Tesselaarsdal and Villiersdorp (7 systems).



One hundred and forty three (143) of the 949 systems achieved No Drop status (15%) for knowing their status and thereby earning ND scores of >90%. Note: The metric indicated above the bar (25, 71, ...) represents the NUMBER OF NO DROPS ACHIEVED per province, whilst the bar itself indicates the number of No Drops achieved when calculating AS A % OF TOTAL SYSTEMS ASSESSED in each Province.

On a performance comparison scale, Gauteng achieved the highest % No Drops as a percentage of their total number of systems whereby 60% of the 42 Gauteng systems received No Drop status, followed by KZN (35% of 196 systems) and Western Cape (25% of 122 systems).

## 2.3 The Quality of Evidence Provided (KPA 1 and 2)

Municipalities were required to present evidence to satisfy 3 sub-criteria of the 2014 Blue Drop Audit:

- *Sub-criteria 6.1 of the audit measures the consistency and credibility of the MONTHLY and ANNUAL composite IWA water balance data and diagram based on actual meter readings per system as per Regulation 509 of 2001 Clause 10 of the Water Supply Regulations.*
- *Sub-criteria 6.2 reviews the Municipality's strategies and business plans (and its inclusion in the IDP) to reduce the system input volume, water losses and NRW and evaluates the progress made with the implementation of these strategies and business plans.*

- *Sub-criteria 6.3 measures the performance of the WSI against international best practice benchmarks and the water demand management regulations, and is focussed on knowing and improving the KPI status within the WSI.*

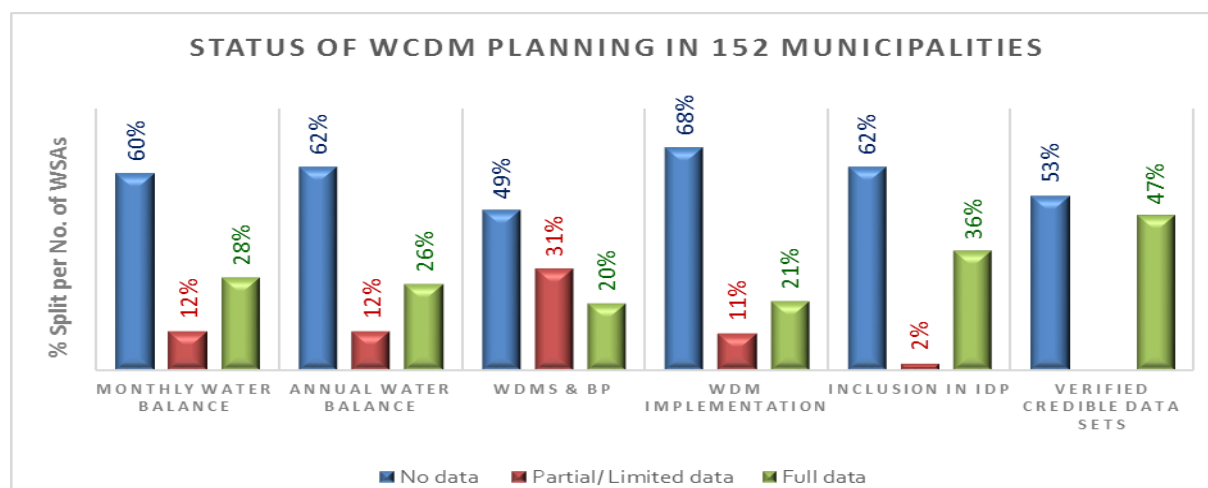
In order to derive maximum benefit from the available data, the Department has collapsed the various supply systems into one integrated system for each municipality per Province. The results are reported accordingly:

Data Status	CRIT 6.1 - Water Balance		CRIT 6.2 - WDM Strategy and Business Plan and Implementation			CRIT 6.3 - Compliance and Performance
	Monthly Water Balance	Annual Water Balance	WDMS & BP	WDM Implementation	Inclusion in IDP	Verified Credible Data Sets
No data	91 (60%)	94 (62%)	74 (49%)	104 (68%)	94 (62%)	81 (53%)
Partial data	18 (12%)	18 (12%)	47 (31%)	16 (11%)	3 (2%)	0
Full data	43 (28%)	40 (26%)	31 (20%)	32 (21%)	55 (36%)	71 (47%)
No. of Municipalities	152	152	152	152	152	152

The results show that 91 to 94 of the 152 integrated systems (60-62%) do not have monthly and annual Water Balances in place, and 12% have partial balances in place. The following planning profile is observed:

- ◆ 20% of the municipalities have WDM strategies and plans in place, with 49% not having any plans in place;
- ◆ 21% of municipalities implement WDM projects and have budgets and capacity to support implementation;
- ◆ 68% of municipalities do not implement any water demand measures, whilst 11% implement some form of demand management;
- ◆ 36% of municipalities have WDM plans included in the IDP in detail, and 2% are mentioned in the IDP only;
- ◆ 62% of municipalities do not have WDM projects included in the IDP;
- ◆ The No Drop auditors found the credibility of data and information satisfactory at 47% of the municipalities, and not satisfactory for 53% of the auditees.

The following figure shows the submissions made for No Drop assessment as pertaining to WCWDM planning:



## 2.4 The National Water Balance (KPA 1 and 2)

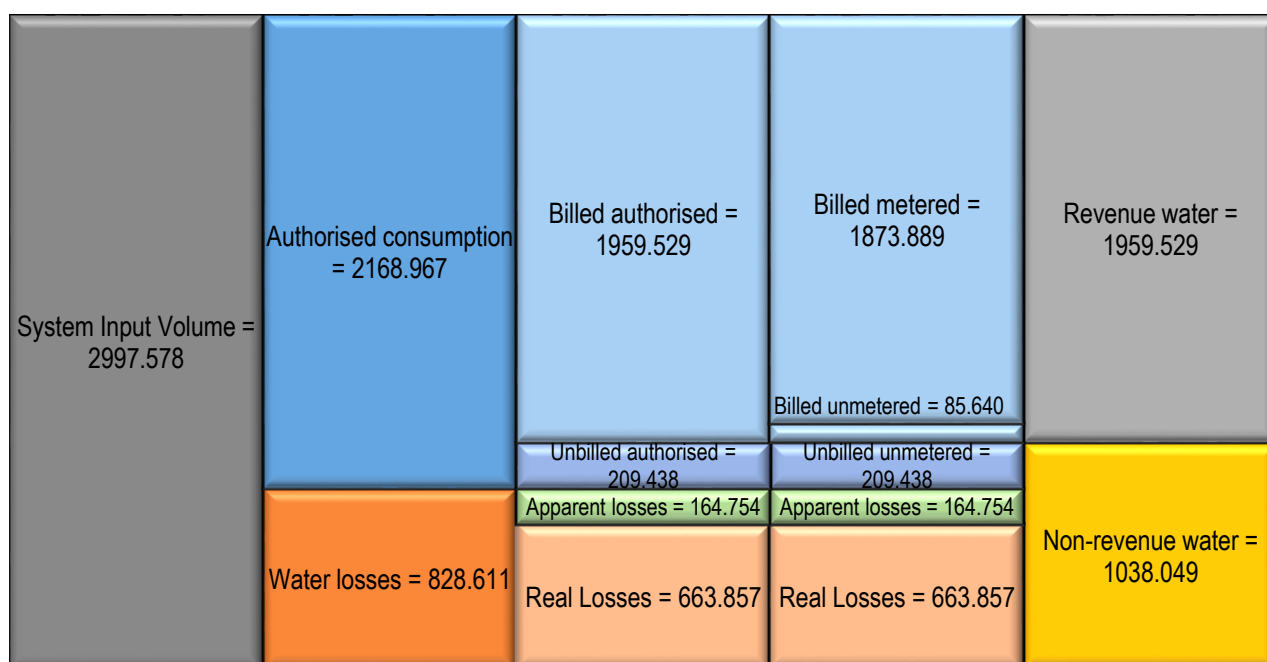
A summary of the results from the 71 (of 152) credible and available data sets is reflected in the table following.

2013 National No Drop Score		56.5%
Key Performance Area		Status and Performance
WATER USE EFFICIENCY & WATER LOSS MANAGEMENT (3% weight)		1.70%
No Drop Score (2013)		56.5% Average
INPUT DATA	Population	32 580 710
	Households	9 043 534
	Metered Connections	4 712 677
	Unmetered Connections	669 936
	Length of mains (km)	121 449
	Average System Pressure (m)	45
	2014 Water Use Targets (Water Balance Targets)	n/a
	System Input Volume (kl/annum)	2 997.58 million
	Billed Metered Authorised Use (kl/annum)	1 873.89 million
	Billed Unmetered Authorised Use (kl/annum)	85.64 million
	Unbilled Authorised Use (kl/annum)	209.44 million
	Assumed Commercial Losses (%)	20%
WATER BALANCE DATA	Authorised Use – billed & unbilled (kl/annum)	2 168.97 million
	Water Losses (kl/annum)	828.61 million
	Apparent losses (kl/annum)	165.32 million
	Real Losses (kl/annum)	663.29 million
	Revenue Water (kl/annum)	1 959.53 million
	Non-Revenue Water (kl/annum)	1 038.05 million
KPIs	Infrastructure Leakage Index (ILI)	6.27 Poor
	Apparent/ Commercial Losses (%)	5.5%
	Non-Revenue Water (%)	34.6% Poor
	Water Use Efficiency (l/cap/day)	252 Poor
OTHER	Authorised Use (l/cap/day)	182
	Real Losses (l/cap/day)	56
	% Water Losses	27.6%

Based on the National Water Balance for the 2012/13 audit year shows a total SIV 2 997.58 million kl/annum of which 2 168.97 million kl/a (72.4%) is Authorised Consumption and 828.61 million kl/a (27.6%) is Water Losses. The Water Losses are made up of 165.32 million kl/a (20%) Apparent Losses and 663.29 million kl/a (80%) Real Losses, which result in a **NRW of 1 038.05 million kl/annum (34.6%)**.

### 2012/13 IWA Water Balance (million m<sup>3</sup>/annum)

**2014 IWA Water Balance Diagram (million m<sup>3</sup>/annum)**



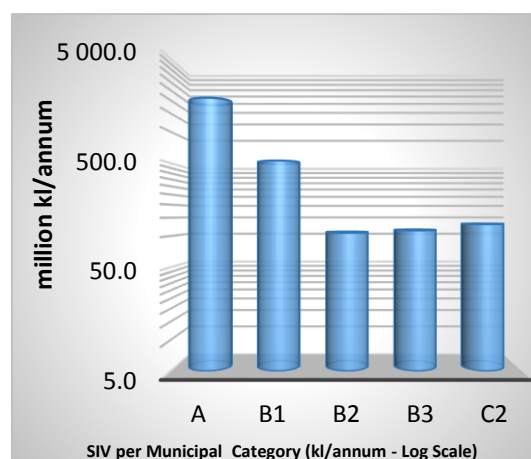
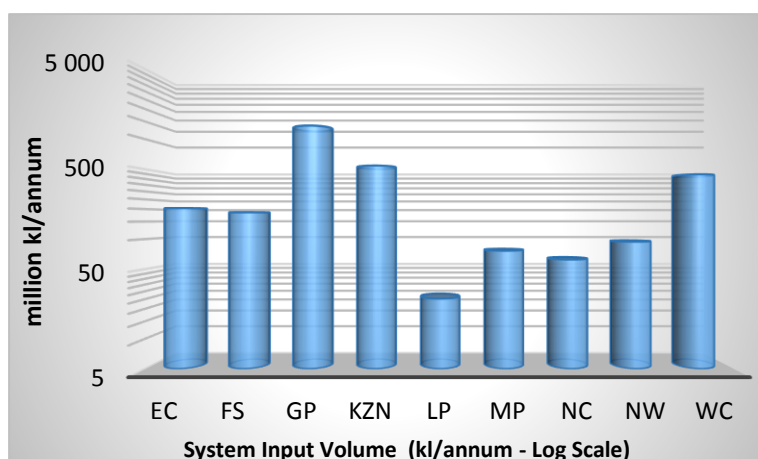
## 2.5 Compliance and Performance (KPA 3)

### Audit Methodology

No Drop data was extracted from sub-criteria 6.3 of the Blue/No Drop assessment scorecards and the associated 2012/13 evidence/data. A secondary moderation processes ensured that the results contained in the scorecards were verified against the Water Balance historical trends. Where inconsistency and/or credibility concerns were detected, the ensuing data and results were corrected, supplemented or negated (in cases with limited data sets). Only the verified results are used in this report, and considered under the following Key Performance Indicator (KPI) headings.

#### 2.5.1 System input volume (kl/a)

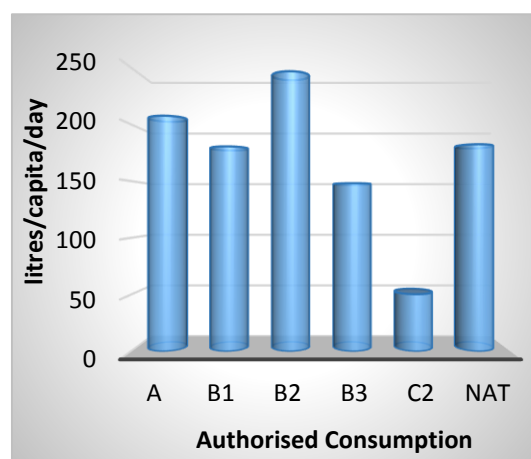
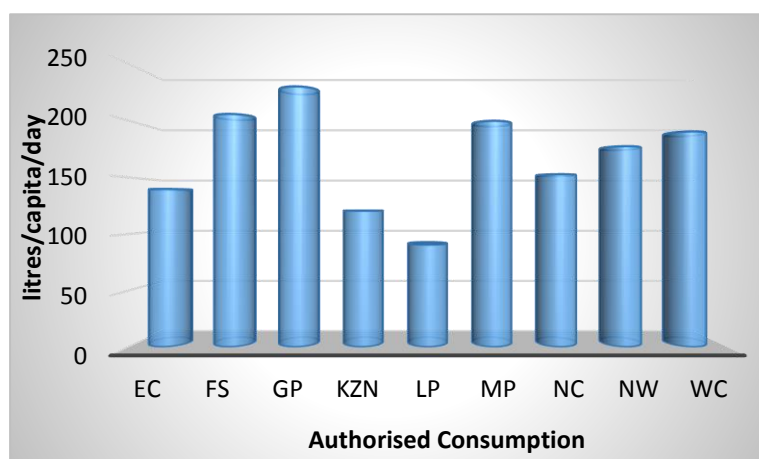
*The System Input Volume represents the potable volume input to the water supply system from the water utility's own sources, as measured at the water treatment works (WTW) outlet, as well as any water imported from other sources.*



A total consumption of 2 997.58 million kl/a is recorded for the 71 municipalities who submitted credible data, of which the Provinces of KZN, WC and GP (5 of 8 Metros) account for the majority of the total consumption, i.e. 78.3% (2 348.42 million kl/a). When comparing SIV for different Categories municipalities, it can be seen that the 8 Category A municipalities (Metros) account for the majority of the total consumption for 70.7% (2 118.64 million kl/a).

## 2.5.2 Authorised consumption (l/c/d)

**Authorised consumption includes metered/unmetered and billed/unbilled consumption and provides an indication of the actual water used by the consumer.**



The per capita total authorised consumption by the collective consumer in the country is 2 168.97 million/kl/annum, with a weighted average per capita consumption of 182 l/c/d.

The Gauteng Province displays the highest per capita authorised consumption at 230 l/c/d followed by the Free State (206 l/c/d), and the rest of the Provinces fall below 200 l/c/d. The high per capita consumption in Gauteng is highly influenced by the City of Johannesburg which has the highest per capita consumption (262 l/c/d) of all metros.

For the WSA categories, category B2 has the highest per capita authorised consumption of 247 l/c/d followed by Category A at 208 l/c/d, with Category C2 municipalities having lowest unit consumption at 50 l/c/d.



A high authorised unit consumption could be an indication of inefficient water use, often as a result of high internal plumbing leakage, paying consumers who do not value the scarcity of water or effective metering and billing systems. The high per capita authorised consumption in Category B2 municipalities is attributed to effective metering and billing systems and compares well with the low NRW. A low authorised unit consumption could be an indication of unmetered consumption not included in the water balance or a large number of unauthorised consumption or theft.

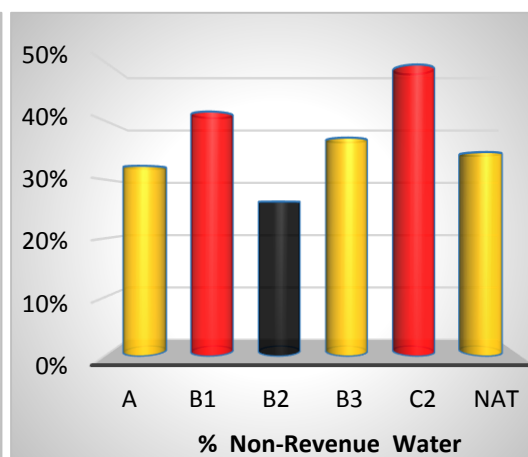
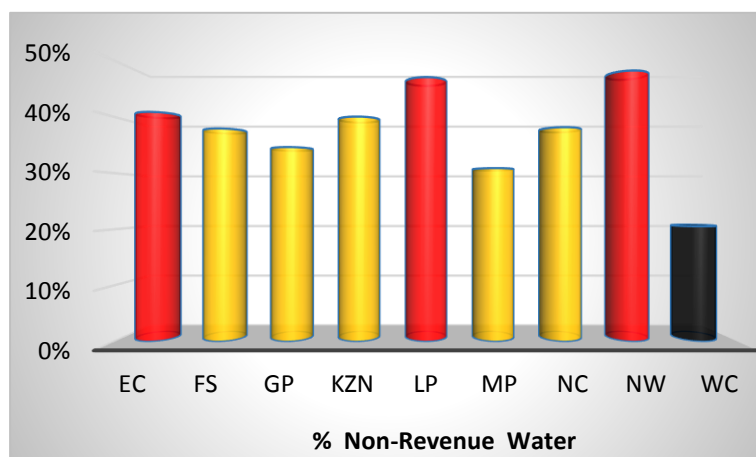
### 2.5.3 Non-revenue water (%)

**NRW is the volume of water supplied by the water utility but for which it receives no income. It should be noted that all billed water is considered revenue water, irrespective whether it is paid for or not.**

- No Drop Benchmark: >40% = EXTREMELY POOR ; 30-40% = POOR ; 20-30% = AVERAGE ; 10-20% = GOOD ; <10% = EXCELLENT
- National Weighted Average: 34.6% = POOR

**NRW(%) performance categories**

	>40%	Extremely poor
	30-40%	Poor
	20-30%	Average
	10-20%	Good
	<10%	Excellent



Seven (7) of the 9 Provinces (78%) and WSA Categories B1, B3 and C2 have NRW in excess of 30% which is the benchmark for 'poor' performance. The national weighted average is 34.6%. When comparing the Provincial NRW, the highest NRW is seen for EC, LP and NW (red), and when comparing WSA Categories, NRW is highest for B1 and C2 Category municipalities (red). The high percentage NRW in the EC, LP and to an extent NW is expected due to the high number of rural water supply schemes in these provinces and the complications associated with metering and billing. Both graphical scenarios suggest generally poor non-revenue water management, when noting that 'good NRW' is benchmarked at 10-20% NRW.

A total volume of 1 038.05 million kl/annum is lost as NRW which, calculated at a unit cost of R6/kl, amounts to R 6 228 million per annum for the country as a whole. The financial and potential saving, at a fixed unit cost of R6/kl is considered in the following table. By implementing Water Conservation and Demand Management projects, a potential saving of 331.65 million kl/a can be achieved, which translate to R1 989.9 million per year. For a country concerning itself with water conservation and economic growth based on water security, a potential **saving of R 2 billion** is worth investing in. This potential saving is

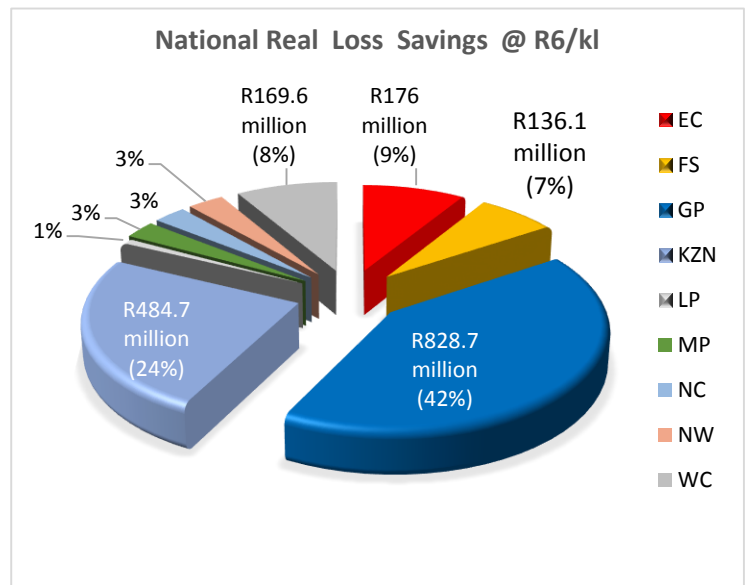


calculated from the 71 usable datasheets, which passed the No Drop quality assurance (credibility) checks. **Savings in excess of R3 billion** can be projected if all 152 municipalities' water balances are considered and extrapolated.

Provinces	UARL kl/annum	Current	Target				Rand value (million) @ R6.00/kl		
		CARL kl/annum	ILI	TARL kl/annum	ILI	Savings kl/annum	UARL R million	CARL R million	Savings R million
EC	11 870 482	58 651 622	4.94	29 325 811	2.47	29 325 811	71.22	351.91	175.95
FS	6 610 866	45 350 016	6.86	22 675 008	3.43	22 675 008	39.67	272.10	136.05
GP	38 911 399	276 245 955	7.10	138 122 977	3.55	138 122 977	233.47	1 657.48	828.74
KZN	24 269 957	161 553 612	6.66	80 776 806	3.33	80 776 806	145.62	969.32	484.66
LP	2 691 904	5 304 558	1.97	2 652 279	0.99	2 652 279	16.15	31.83	15.91
MP	3 191 217	17 976 759	5.63	8 988 380	2.82	8 988 380	19.15	107.86	53.93
NC	2 790 243	18 530 844	6.64	9 265 422	3.32	9 265 422	16.74	111.19	55.59
NW	3 138 140	20 290 418	6.47	10 145 209	3.23	10 145 209	18.83	121.74	60.87
WC	17 602 670	56 520 194	3.21	28 260 097	1.61	28 260 097	105.62	339.12	169.56
<b>National Totals</b>	<b>105 810 800</b>	<b>663 290 792</b>	<b>6.27</b>	<b>331 645 396</b>	<b>3.13</b>	<b>331 645 396</b>	<b>634.86</b>	<b>3 979.74</b>	<b>1 989.87</b>

The pie chart demonstrates that the majority of savings can be generated in Gauteng (R 828.9m) and KZN (R 484.7m).

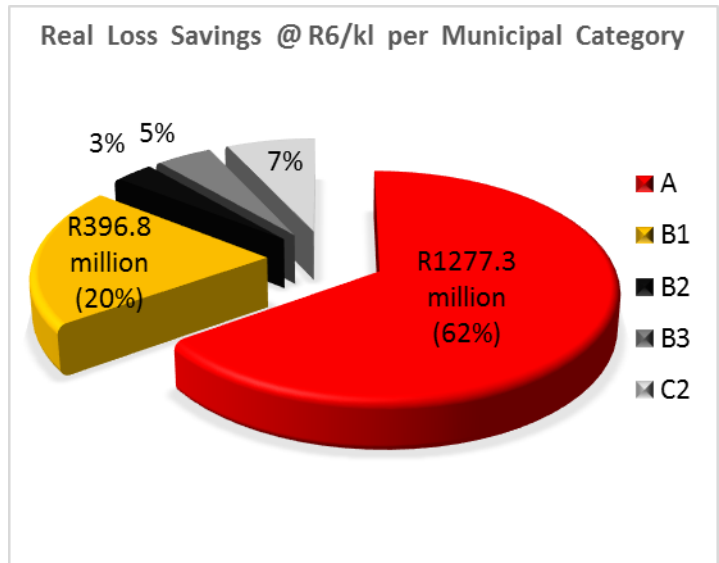
By comparing potential savings on a Municipal Category level, it is observed that the majority of savings can be generated in Category A municipality municipalities, to a total of 64% of the total additional savings calculated for South Africa. The potential savings that can be realised by investing in WCWDM in Category A and B1 municipalities is 84% of the national savings potential.



Municipal Categories	UARL kl/annum	Current	Target				Rand value (million) @ R6.00/kl		
		CARL kl/annum	ILI	TARL kl/annum	ILI	Savings kl/annum	UARL R million	CARL R million	Savings R million
A	78 676 721	425 776 292	5.41	212 888 146	2.71	212 888 146	472.06	2 554.66	1 277.33
B1	20 215 165	132 260 243	6.54	66 130 121	3.27	66 130 121	121.29	793.56	396.78
B2	4 189 468	19 950 954	4.76	9 975 477	2.38	9 975 477	25.14	119.71	59.85
B3	6 915 534	28 846 724	4.17	14 423 362	2.09	14 423 362	41.49	173.08	86.54
C2	11 512 588	45 859 704	3.98	22 929 852	1.99	22 929 852	69.08	275.16	137.58
<b>Provincial Totals</b>	<b>105 810 800</b>	<b>663 290 792</b>	<b>6.27</b>	<b>331 645 396</b>	<b>3.13</b>	<b>331 645 396</b>	<b>634.86</b>	<b>3 979.74</b>	<b>1 989.87</b>

The acceptable minimum level of leakage or UARL for the available datasets is 105.8 million m<sup>3</sup>/annum which is valued at R 634.86 million/annum based on R 6.00/kl. The current level of physical leakage or CARL, however, is 663.3 million m<sup>3</sup>/annum or 6.27 times higher than the acceptable minimum level of leakage. The current level of physical leakage is valued at R 3 979.74 million/a based on R 6.00/kl. If the CARL could be halved to an ILI 3.13, which is an acceptable level of leakage for developed countries, a saving of 331.6 million m<sup>3</sup>/annum or R 2.0 billion/annum could be realised. The R 6.00/kl is considered a realistic bulk water supply tariff for 2013/14, based on the Water Services Tariffs Report for 2012/13 (DWA, 2013).

Any escalation in water unit prices above the assumed average cost of water (R6/kl) would result in higher savings potential in future (i.e. >R3 billion).



High %NRW is possibly as result of customers not paying for water services, not being connected and billed by the municipality, households connected to the system through illegal connections, customers not receiving bills, incorrect billing based on estimates and difficult to understand for the average customer, and the general lack of co-operation between the finance and technical departments of the municipality. All these factors impact on revenue management and overall financial sustainability of the municipality.

The most common causes for high physical water losses are

- leakage on transmission and/or distribution mains,
- leakage on service connections up to point of customer metering,
- leakage and overflows at utility's storage tanks, and

The most common causes for commercial losses are:

- unbilled unmetered consumption,
- unauthorised consumption,
- customer metering inaccuracies
- high internal plumbing leakage on private properties, and
- inefficient garden watering and household water use.

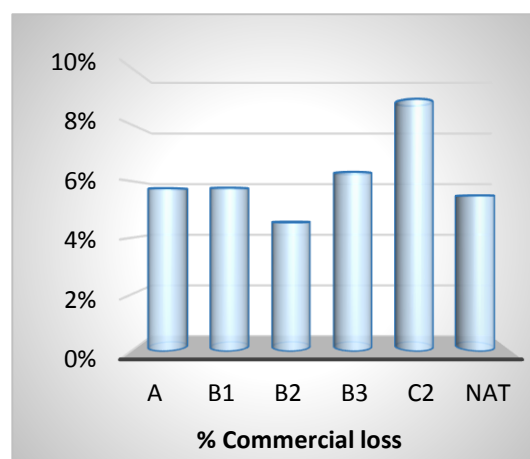
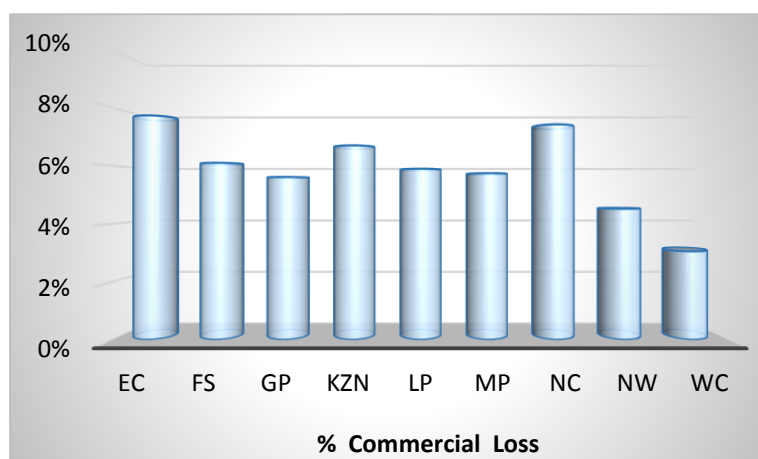
Root causes for high losses are:

- Disjointed liaison and responsibilities across the technical and financial departments resulting in inaccuracies on the water balance
- Frequent replacement of Councillors and / or inadequate knowledge base of the importance of WCWDM
- Limited management information to support informed decision making
- Inadequate decision-making processes, financial and technical management
- Lack of human resources at operational level to perform basic functions such as proactive maintenance, leak repairs and community awareness
- Lack of adequate planning and budgeting processes to support the implementation of projects,

- Lack of water operations and maintenance budgets to support WCWDM since water tariffs are not cost reflective,
- Lack of prioritisation of asset management, operation and maintenance and water loss/NRW reduction
- Lack of adequate metering, billing and cost recovery
- Inadequate training of Councillors, as well as financial and technical personnel
- Overly optimistic savings projections from WCWDM measures and unrealistic timelines set to achieve the savings result in a 'quick-fix' culture
- Lack of coordination and value add from sector partners, e.g. SALGA, CoGTA, DBSA, NT, DWS, etc. to resolve issues such as political support and vacancies rates.

#### 2.5.4 Commercial loss (%)

***The commercial loss, as % of the SIV, is made up from the unauthorised consumption (theft or illegal use), plus all technical and administrative inaccuracies associated with customer metering.***



The weighted average commercial loss for the Provinces and the WSA Categories, as % of the SIV, is 5.5%. The graphs above show commercial losses in the order of 3-8%. Most WSA's find it difficult to calculate commercial losses, as its input parameters is not easy to measure illegal connections, meter accuracy and transfer errors. As result, most WSAs accept industry default values for commercial losses and there is almost no quantification of the actual percentage. A default value of 20% is used as the norm, unless a municipality can motivate a different value. The reported commercial losses are not considered accurate and seem unusually low. The commercial losses are expected to increase once these parameters are better quantified.



High commercial losses can be a result of high unbilled and unmetered consumption, high unauthorised consumption, and customer metering inaccuracies.

#### 2.5.5 Physical water loss (ILI unit)

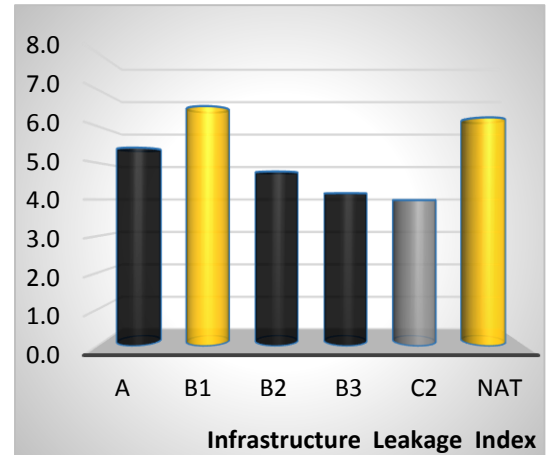
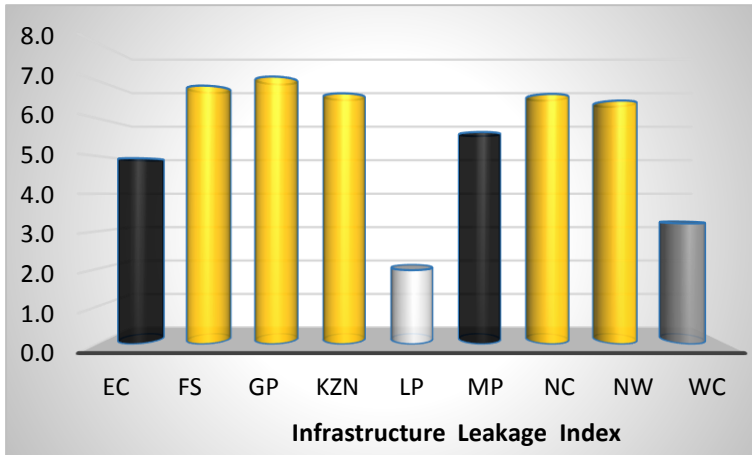
***The Infrastructure Leakage Index (ILI) is the preferred real water loss indicator of the IWA and used in the scorecard to assess real losses. The ILI provides an indication of the current physical losses versus the***

**expected physical losses. For example, an ILI of 3 means that the current leakage in the system is 3 times the expected minimum leakage.**

- ND Benchmark: >8 = EXTREMELY INEFFICIENT ; 6-8 = POOR ; 4-6 = AVERAGE ; 2-4 = GOOD ; <2 = EXCELLENT
- National Weighted Average: 6.23 = POOR

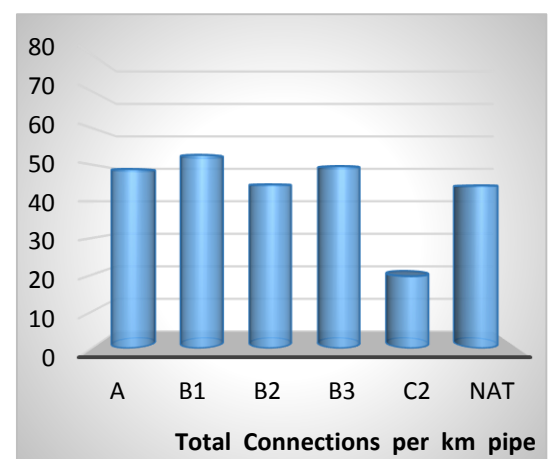
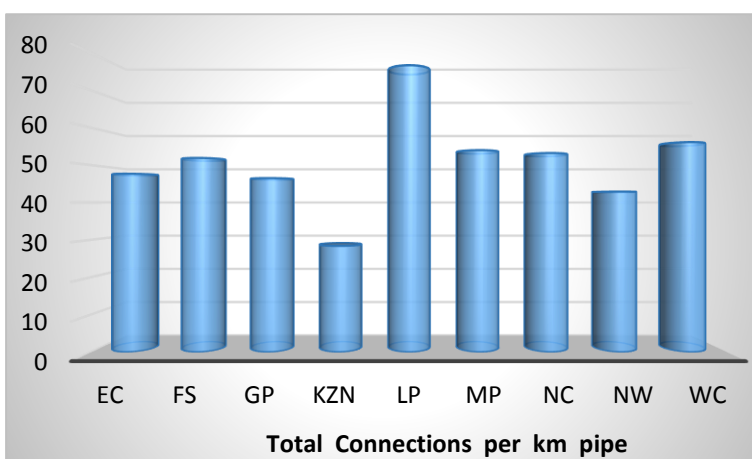
**ILI performance categories**

>8	Extremely inefficient
6-8	Poor leakage record
4-6	Average
2-4	Good
<2	Excellent water loss management



The weighted average national ILI is 6.23. This falls within the performance category of ‘average, with room for improvement’. When comparing the Provincial ILI performance, it is noted that FS, GP, KZN, NC and NW reflect a poor leakage record. Comparing the WSA Categories, it is observed that Category B1 reflects the worst leakage record, followed by Category A metros. The best performer in the Provinces is for LP and for the WSA categories, Category C2. The very low ILI for LP is due to the very high component of unbilled consumption and subsequently by a very high NRW of 47%.

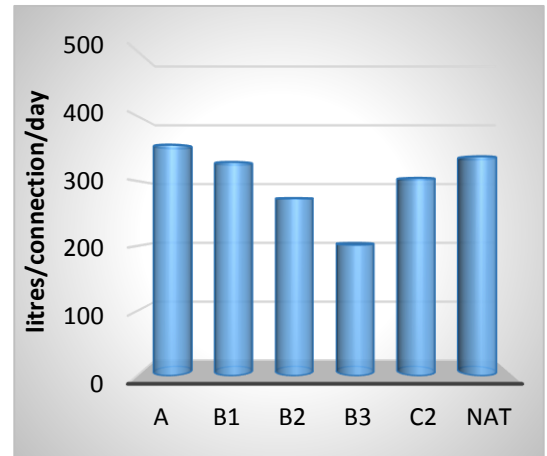
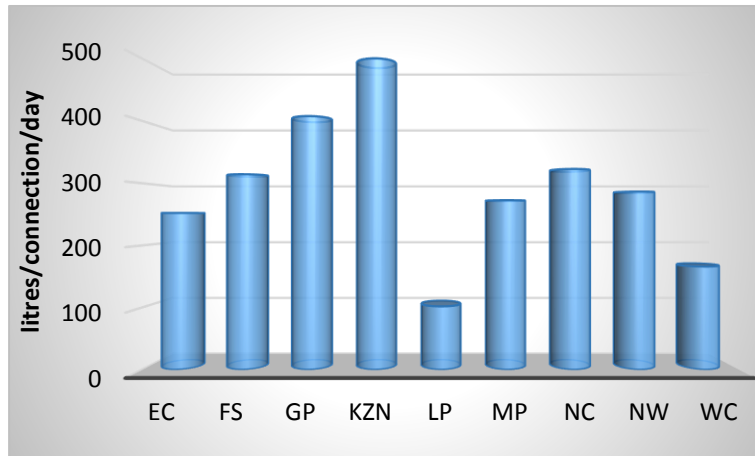
When considering that the length of mains and number of connections influences the ILI calculation, the following comparison can be made:



Connection density per length of pipeline is not a performance parameter, it does provide insight into the set-up of connections and meters on the existing water supply pipeline. For the Provinces, the density of connections per km mains varies between 77 connections per km mains in LP to 28 connections/km in KZN, with an average of 51 connections/km. For the WSA Categories, the density of connections/km varies from

53 connections/km in Category B1 to 20 connections/km in Category C2, with an average of 43 connections/km.

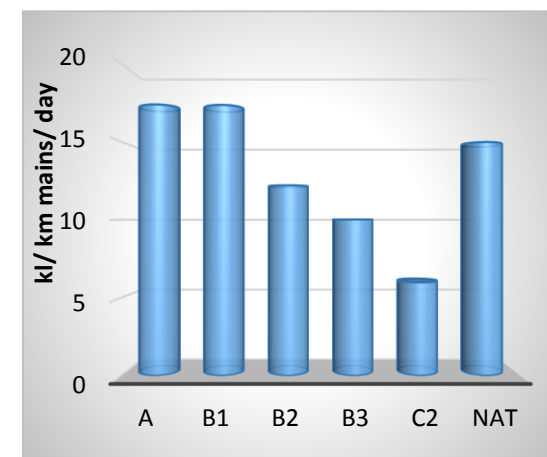
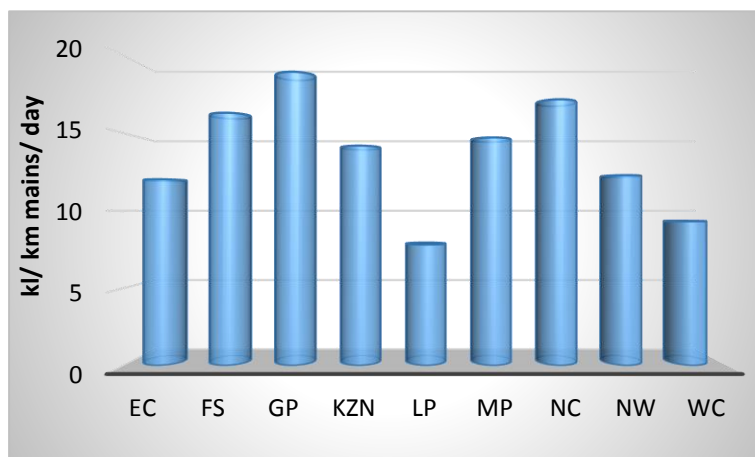
Some of the metros have raised the validity of the ILI as an indicator and the Department will investigate this further. Other real water loss indicators include litres/connection/day (1<sup>st</sup> graph set) and m<sup>3</sup> or kl/km mains/day, which are illustrated in the 2<sup>nd</sup> graph set.



The graph set above shows that KZN, GP, FS and NC display the highest losses per connection per day (500 to 314 ℓ/connection/d), whereas LP and WC show comparatively low losses per connection. It also shows that categories A, B1 and C2 have the highest losses per connection per day (356 to 305 ℓ/connection/d), whereas category B3 shows the lowest losses per connection.

The graph set to follow also shows that much higher real losses are incurred per km mains for GP, NC and FS, compared to the lower real loss per km mains in LP.

The WSA categories show that higher real loss per km mains is reported for Category A and B1, compared to the lower real loss per km mains in category C2.





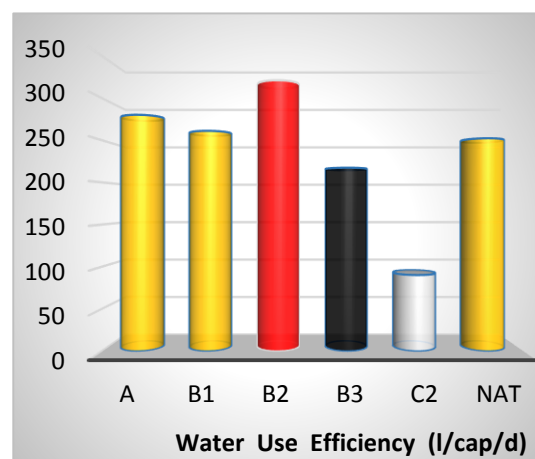
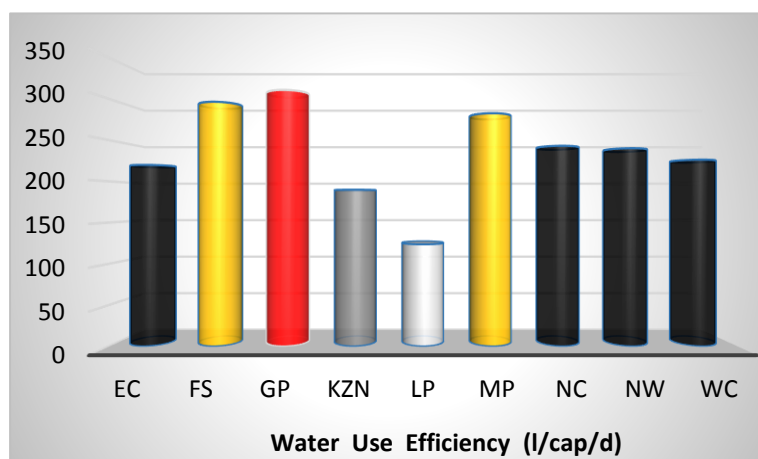
High physical losses could indicate leakages on the transmission and/or distribution mains, leakage on service connections up to point of customer metering, leakage and overflows at utility's storage tanks.

## 2.5.6 Water Use efficiency (l/c/d)

**Litres per capita per day provide 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 (m<sup>3</sup>/year) and not just the domestic component, it does provide a useful indicator.**

- No Drop Benchmark: >300 l/c/d = EXTREMELY HIGH ; 250-300 l/c/d = POOR ; 200-250 l/c/d = AVERAGE; 150-200 l/c/d = GOOD ; <150 l/c/d = EXCELLENT
- National Weighted Average: 252 l/c/d = AVERAGE

>300	Extremely high per capita water use
250-300	Poor
200-250	Average
150-200	Good
<150	Excellent per capita water use



Water use efficiency is typically one of the key performance indicators and reported at national government level. The national WUE weighted average is 252 l/c/d. The reported efficiencies are significantly above the international benchmark of 180 l/c/d and municipalities must continue to plan for improvement towards an average consumption of below 200 l/c/d.

For Provinces, the results indicate GP has the highest WUE of 311 l/c/d followed by FS at 296 l/c/d and MP at 282 l/c/d. All Provincial WUEs are above the benchmark of 180 l/c/d, with the exception of LP. LP reports a WUE below the international benchmark value, which indicates 'excellent' per capita water use management but is in line with the high number of rural water supply schemes in the province. Future No Drop assessment will verify these performances in detail as WUE is regarded as the dominant indicator of water loss management.

For the WSA Categories, the results indicate that Category B2 has the highest WUE of 321 l/c/d, followed by Category A at 280 l/c/d and category B1 at 261 l/c/d. All municipal categories are above the benchmark of 180 l/c/d, with the exception of Category C2. Category C2 reports a WUE well below the international benchmark value with excellent per capita water use management. Category C2 municipalities are all rural.



A high use of water per capita could be an indication of inefficient water use due to high internal plumbing leakages or paying consumers who do not value the scarcity of water. Unmetered as well as unauthorised consumption needs to be addressed to improve this status.



### 3. CONCLUSION AND RECOMMENDATIONS

#### PLANNING:

Up to 51% of the 152 municipalities have proper or partial WCWDM Strategies and Plans in place, and is busy with some form of implementation in the field. Coupled with 38% to 40% of WSAs having proper or partial Water Balances in place with the addition of a savings potential of R 3 billion/annum, this makes a strong case for focussing on improvement in the QUALITY OF PLANNING and the INTENSITY AND ACCELERATION OF IMPLEMENTATION of WCWDM Strategies and Regulations. Of concern is that 62% of WSA do not have WCWDM contained within their IDPs. This is a fundamental requirement to get projects rolled out in the field. Regulatory letters to Mayors and Municipal Managers, annexed to their No Drop results, will serve to rectify this omission.

#### PRIORITY INTERVENTION:

The INTERVENTIONS undertaken will be critical in making a difference to the status of water loss and non-revenue water in South Africa. A detailed analysis of the Category A (metropolitan municipalities) water balances and WCWDM Plans indicate that the following projects are listed as the most appropriate interventions to address water loss management and non-revenue water. The No Drop PAT results for 2014-2015 will provide more detail on municipality-specific project plans which will be used to mobilise resources and implement partnerships to address water losses per municipality. The table following shows the type of interventions that lend itself to collaboration between public and private institutions.

Type of Intervention Required	BUF	CPT	EKU	ETH	JHB	MAN	NMB	TSH
Pressure management		X		X	X	X	X	X
Pipeline, valve and meter replacement	X	X	X	X	X	X		X
Top consumer audits		X	X	X				X
Bulk metering, sectorisation and monitoring	X						X	X
Household leak repair programme		X	X		X	X		
Removal of mid-blocks			X		X			
Metering of unmetered properties	X		X	X		X		
Leak detection and repair		X		X	X	X		
Community awareness	X				X		X	
Water re-use	X	X						

The WCWDM programmes in most municipalities will need to focus on asset renewal and on pressure management. Pressure management will however only be possible if bulk metering, sectorisation and monitoring activities are in place.

Leak detection and repair should be performed on an ongoing basis to reduce physical leakage and improve public perception. A water utility cannot promote water conservation in their communities while they have water running down the streets.

#### **TECHNICAL SKILLS:**

The successful implementation of WCWDM plans aimed at meeting the Reconciliation Strategy- and All Town Targets in line with the provisions of the National Development Plan, will require skilled and experienced engineers, technical and financial staff in the municipal sector. The highest priority intervention plan should therefore focus on development and retention of capacity and competency in local authorities.

The No Drop audits revealed that engineering and technical team responsible for WCWDM are distributed across various departments and functions within their organisations, often with a diluted focus on water loss management. The following engineering and technical staff is required according to '*Guidelines for Engineers: Numbers & Needs in Local Government*':

- 100 000 population requires: 5-7 civil engineers /prof technologists, 24 technicians, 96 artisans = total technical team = 126 persons per 100,000 population
- 5-7 civil professionals/100,000 population and 1 civil professional / 600-800 km pipeline.

The audit confirmed that 121 449 km and 5 382 613 connections are servicing the 32.5 million consumers (only verified data used). This would imply that 1950 engineers, 1300 technicians and 30 550 artisans (qualified) would be required to service the above infrastructure.

The No Drop results indicated that an average rate of 6 plumbers is available per 1000 connections, with only 0.2 plumbers/1000 connections available in Category A municipalities. This alludes to levels well below the demand in the field.

Municipal Category	A	B1	B2	B3	C2	Average
Qualified plumbers per 1000 connections	0.19	11.02	4.72	7.95	10.32	5.93

#### **MEETING THE TARGETS:**

There is still a lack of political support, budgets and alignment to the Department's reconciliation strategies and understanding of the possible consequences of water restriction. The targets set under the various reconciliation strategies are included in the NDP and NWRS2 and it is critical that these targets are achieved to avoid possible water restrictions and the subsequent detrimental economic impact. All WSAs must revise their strategies and business plans to ensure targets are in line with resource availability and are achieved and the risk of water restrictions, recently also coined 'water shedding' is minimised.

#### **ASSET MANAGEMENT:**

Asset management has a direct impact on WCWDM. Without proper operation and maintenance, it will not be possible to monitor the water losses in a distribution system and perform basic functions such as

metering, billing and cost recovery. Asset management should be performed on a proactive basis, and data obtained from bulk meter, and control valve performance should be used to assess the leakage in the system. All WSAs could improve the operations and maintenance of their assets, which have a direct impact on water loss control.

#### **FINANCIAL-TECHNICAL INTERFACE:**

The information used to prepare a monthly water balance should in general be credible, plausible and readily available. Proper management, reading and billing of consumer meters cannot happen if there is not a good relationship between the finance and technical departments. City of Cape Town is a prime example, as the metro with the lowest NRW, where the consumer meters are managed and read by the same department. The finance and technical departments in all WSAs should interact on a daily basis to ensure consumer meters are properly installed, repaired, inspected, read and billed. All WSAs should strive to meter and bill based on actual meter readings, to ensure the financial sustainability of the metro and sustained customer satisfaction.

#### **COMPLIANCE AND PERFORMANCE:**

Key performance indicators and compliance with the water demand management regulations were the areas that contributed most to the overall No Drop score. WSAs should endeavour to fix all leaks within 48 hours of becoming aware thereof, improve water losses improve, NRW and increase water use efficiency and implement pressure management. Improved compliance and performance will significantly improve the overall score of all municipalities.

#### **COMMUNITY AWARENESS:**

There is significant scope for increased community awareness in all WSAs. Consumers need to be made aware that South Africa is a water scarce country and the value of water should be appreciated. Community awareness programmes will improve the relationship between the WSAs and its customers, create consumers that are more informed and reduce the risk of service delivery unrest. The look-and-feel and content of the water bill is an important tool to create an aware and informed user.

#### **BENCHMARKING:**

South Africa is a leader in water loss benchmarking and has adopted the concepts and methodologies of the IWA Water Loss Task Group. These concepts and methodologies have been included in the development of the No Drop scorecard but further research is required to interpret and understand the impact of certain parameters on some of the KPIs. WSAs are also encouraged to further investigate and quantify their commercial losses, which is a function of their consumer meter accuracy, illegal connections and data transfer errors. The audited water balance results provide the Department with a better understanding of how WSAs prepare an IWA water balance. This will enable the Department to develop guidelines to standardise the water calculation.

#### **TOP PRIORITIES:**

The key WCWDM interventions include pressure management, top consumer audits, household leak repair programmes, metering of unmetered properties and water re-use, which has been proven to provide a high return on investment, with payback periods of less than 3 years. Pipeline, valve and meter replacement programmes require huge capital expenditure, but are required to ensure the sustainability of the water infrastructure. Community awareness programmes are expensive to implement and the impact is often difficult to measure, but should form an integral part of any successful WCWDM programme.

**RISK MANAGEMENT TOOL:**

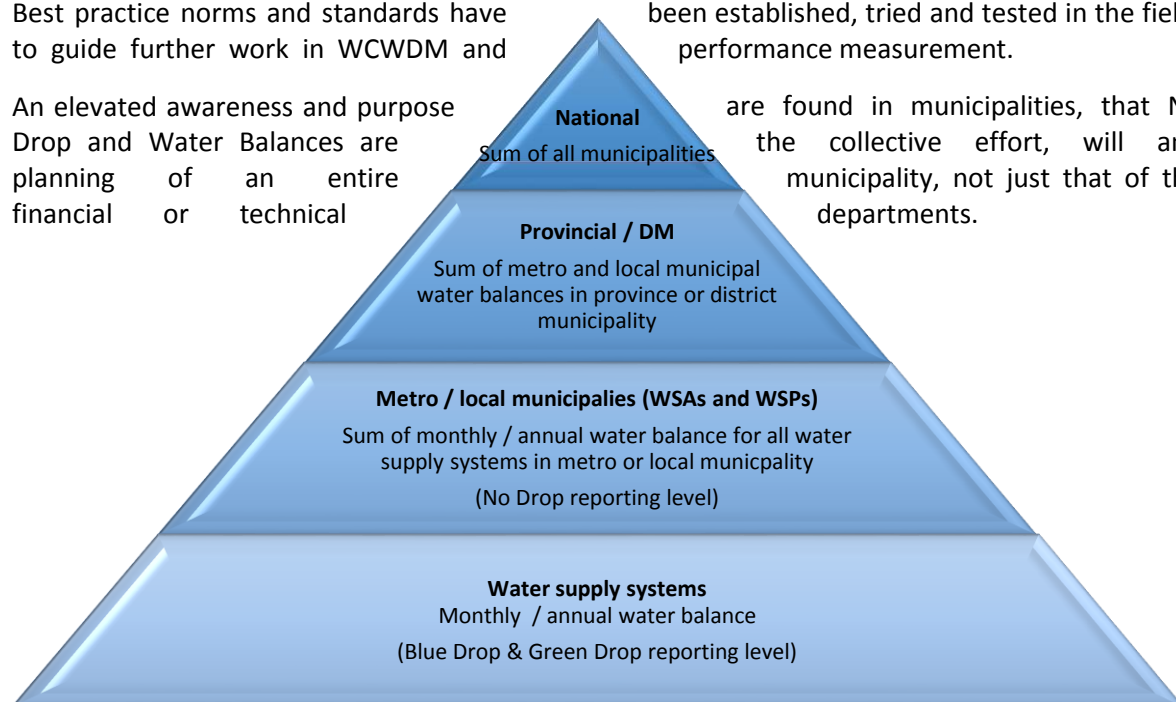
The NDRR PAT tool has been developed to help WSAs to self-assess and measure their risk on a 'hard-and-fast' manner and to report against a risk-based monitoring system. The tool is available from the DWS, and is used by the DWS to monitor risk and identify 'hot spots' or priorities where water losses is moving towards critical scenarios.

## 4. REVIEW OF THE NO DROP VALUE PROPOSITION

Two years into the development and first round of implementation of No Drop incentive-based regulation, it is fitting to review the value proposition of the No Drop programme. The No Drop Strategy and the Four Pillars of WCWDM are good reference points to execute such evaluation. The key outputs from the process namely the First Order No Drop Assessment Report 2014 for all municipalities, and the No Drop Report 2015 for metropolitan municipalities, present suitable baseline and benchmark information to confirm the value proposition.

Upon review, the key successes can be considered as follows:

- ◆ The No Drop has established itself as a prominent regulatory tool which drives PROGRESS and EXCELLENCE;
- ◆ The No Drop has successfully tied into the strong regulatory awareness developed by the Blue and Green Drops and has been able to develop traction in the sector very quickly because of this. No Drop's recognition level is fast approaching that of the companion Drops;
- ◆ A current and comprehensive set of data and information on NRW and water losses at all 152 municipalities in SA has been confirmed and verified;
- ◆ In-depth knowledge and quantification of the status of the Metros' water losses, which represents 47% of urban water consumption in SA, has been quantified, verified and prioritised;
- ◆ A strategy has been established and implemented to drive and measure WCWDM in line with the NWRS(2) and National Development Plan;
- ◆ Financial incentive and savings potential have been quantified as business case to invest in WCDM;
- ◆ A risk-based evaluation for early detection of digressive behaviour in performance has been developed and implemented, resulting in a risk-based baseline for regulation, support and partnerships;
- ◆ A dated project list for focussed intervention to improve the status working towards the 15% target as set out by the National Development Plan has been developed for metropolitan municipalities;
- ◆ Best practice norms and standards have been established, tried and tested in the field, to guide further work in WCWDM and performance measurement.
- ◆ An elevated awareness and purpose are found in municipalities, that No Drop and Water Balances are the collective effort, will and planning of an entire municipality, not just that of the financial or technical departments.



When considering the Four Pillars for WCWDM, the No Drop has proven itself to be a 'driver of change' and conformer to good practice over a fairly short timespan:

**Technical:**

- ✓ Credible and verified information on water losses in the municipal sector
- ✓ Current and accurate data
- ✓ System, process and procedure to measure progress or digress on a continuous basis

**Social:**

- ✓ An informed municipal sector and Community of Practice
- ✓ An informed public and raised awareness to save water

**Legal:**

- ✓ A focussed, informed and results-orientated Regulator
- ✓ Foundation to improve technical and financial skills required for WCDM in municipalities

**Economic:**

- ✓ A Business Case for private-public partnerships
- ✓ Rand-based opportunity and investment framework
- ✓ Projects / intervention types to address the identified gaps.

