

6th REGIONAL AFRICAN WATER LEAKAGE SUMMIT 2016

DBSA VULINDLELA AUDITORIUM, MIDRAND
GAUTENG, SOUTH AFRICA
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Understanding customers demand through water use history in Rand Water's Area of Supply

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Rand Water

Participating and supporting organisations:

Overview

RAND WATER'S AREA OF SERVICE - WATER & SANITATION NETWORKS

ORIGINAL AREA OF SUPPLY: Gauteng, parts of Free State, parts of Mpumalanga and North West Province

EXTENDED AREA: to include Upper Vaal and Mpumalanga

Population: Current 12 million, New 4-7 million
Economy (% of GDP): Current 34%, New 7-16%

Area of supply in 2016:

- Abstracted about 1634 Mm³/annum to produce potable water (excl. Authorised users)
- Supply potable water to:
 - Municipalities
 - Mines, spoomet, retail

Strategic role in WC/WDM

- Delivery of effective and sustainable water services is key for the water sector
- High priority targets and actions for the sector is the reduction of water demand (especially in urban areas)
- Rand Water as bulk supplier the focus is on reduction in demand on a regional level

Approach

- Good understanding of customer demand in the region- analysis of bulk meter data:
 - Develop a tool to scientifically determine the water use efficiencies in Rand Water's Area of Service and on which demand projections and targets could be based
 - Assess municipal consumption and growth in demand
 - Understand end-consumer consumption patterns
 - Monitor and evaluate the effectiveness of WDM programmes
- Integration of bulk infrastructure planning - Establishment of an integrated planning, WC/WDM forum with top 5 municipalities (Forums established with EMM and CoT). The main objectives from a WDM perspective are the following:
 - Understand growth in demand
 - Distinguish between growth, inefficient water use and water losses
 - Focus on the reduction of inefficient use and losses

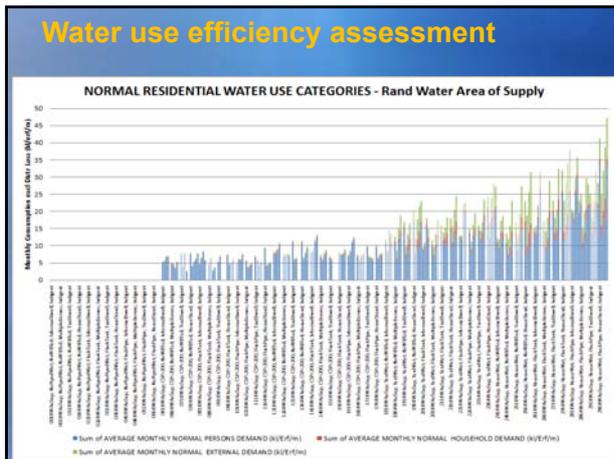
Approach

- Formalize partnerships for support and implementation of water conservation and demand management projects
 - 3 year agreement with Rustenburg for technical support and development of WC/WDM business plan
 - Assessed and developed the WC/WDM business plan for Emfuleni Local Municipality. Submitted application for funding
 - Appointed by DWS for the assessment and development of a WC/WDM business plan for the Western Highveld Region. Rand Water was appointed as Implementing Agent for the implementation of the project
 - Appointed as IA on Metsimaholo WC/WDM project funded by DWS and Sasol- installation of meters to establish baseline and retrofitting of houses
- Co-ordinate and consolidate regional public education and awareness campaigns targeting the priority areas identified by the water use efficiency model (e.g. 'Be the Hero' campaign)

Water use efficiency assessment

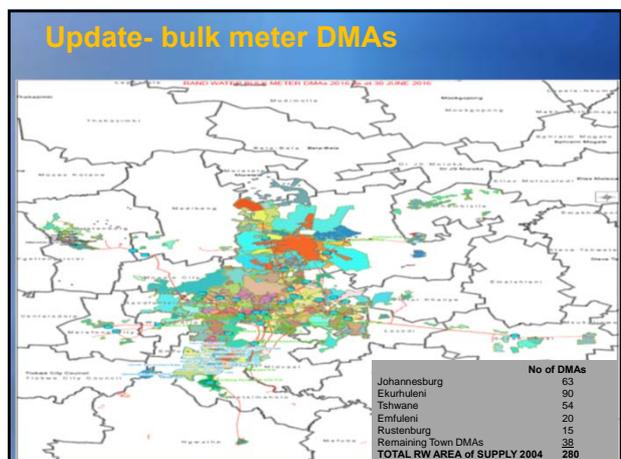
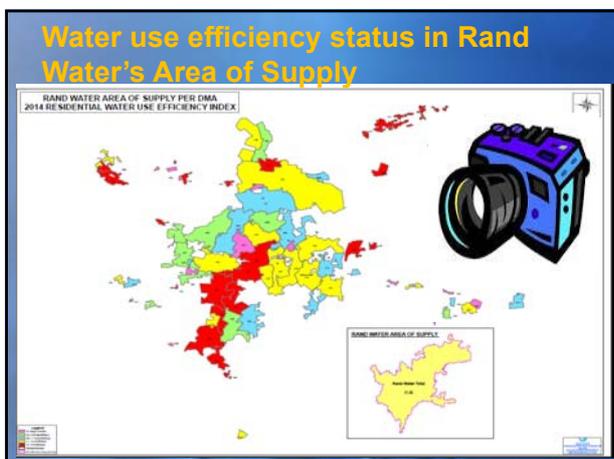
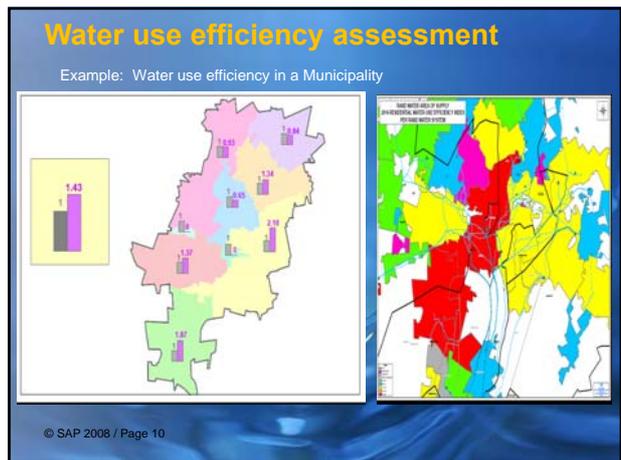
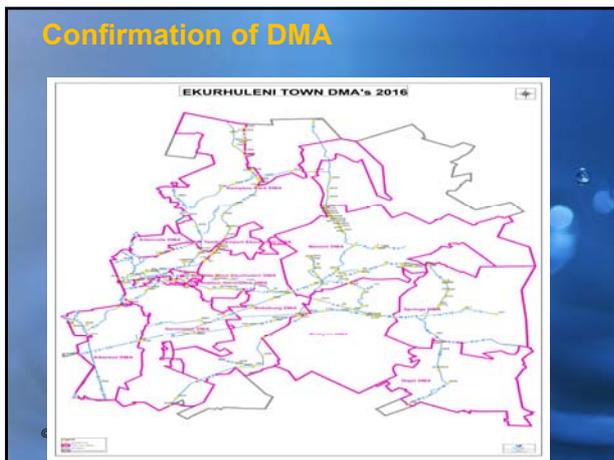
- Development of a decision-making tool - water use efficiency model
 - Water use efficiency model developed by Rand Water
 - Based on the scientific determination of a normal/expected demand and comparison with actual consumption
 - Developed 300 categories and assigned a normal consumption to each
 - Ratio of current/actual consumption to normal demand is defined as water use efficiency index (WUEI) and colour graded as follows:

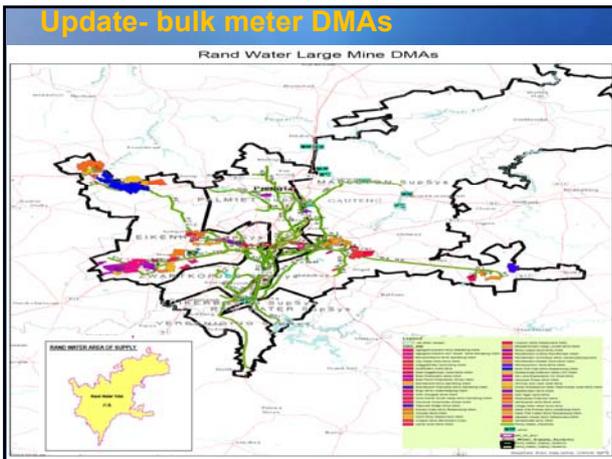
Water use efficiency index	Colour coding	Classification
>0.7	Yellow	To be investigated, supply constrains
0.7 - 0.9	Green	High efficiency
0.91 - 1.1	Blue	Normal efficiency
1.1 - 1.5	Orange	Low efficiency
1.51 - 2.5	Red	No efficiency
> 2.5	Black	To be investigated, data error??



Principles applied

Example Categories	Avg persons/Hh/ category in RW AoS	Persons use (€/c/d)	Household use (€/hh/d)	Household use (€/er/d)	Normal distribution losses	Normal consumption (k€/er/month)	Normal consumption in (€/c/d)
House connection with flush pipe; brick house on a stand; INDIGENT	10.2	110	45	200	10%	43	139
House connection with flush pipe; brick house on a stand; LOW INCOME	3.6	121	90	300	10%	28	256
House connection with flush pipe; brick house on a stand; MEDIUM INCOME	4	133	135	400	10%	36	304
House connection with flush pipe; brick house on a stand; HIGH INCOME	4.2	146	180	500	10%	45	357





Water use efficiency assessment

Stakeholder engagement process:

- Internal
- SALGA
- Municipalities
 - City of Johannesburg through its entity Johannesburg Water
 - Ekurhuleni Metropolitan Municipality
 - City of Tshwane
 - Emfuleni Local Municipality
 - Merafong City Local Municipality
 - Rustenburg Local Municipality
 - Mogale City Local Municipality
 - Metsimaholo Local Municipality
 - Randfontein Local Municipality
 - Westonaria Local Municipality
 - Govan Mbeki Local Municipality
 - Water Services Forum

Other:

- Vaal River Strategic Steering Committee
- Water Leakage Summit at DBSA in August-2015 & 2016
- Mining/Industry forum

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Assessment of demand

- Analyze bulk meter volume trends (as at 30 June 2016 – 1 751 meters on database of which 494 = municipal, remainder mines, spoornet, direct consumers, Rand Water check meters etc.)

Long-term: > 20yrs consumption data

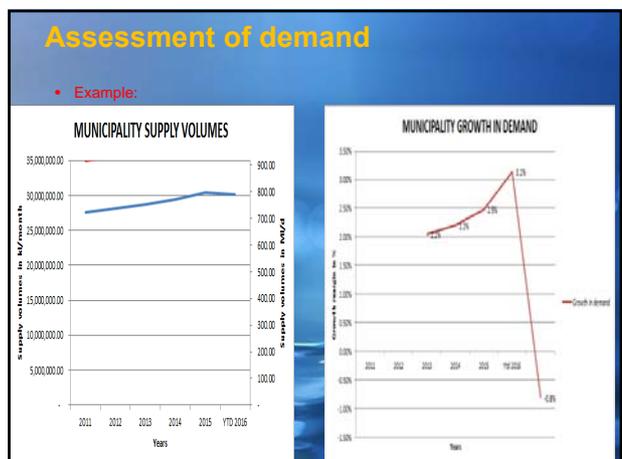
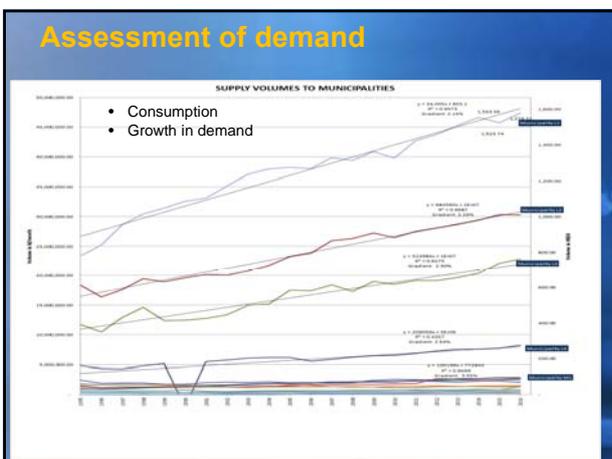
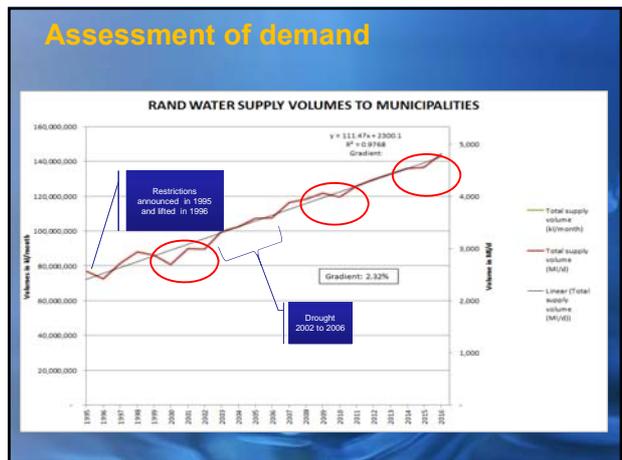
- o better/accurate projection of future water demand

Medium-term: 3 to 5 years consumption data

- o Analyze and understand the impact of measures implemented
- o Identify the problem areas and opportunities for demand management
- o Evaluate the sustainability of interventions

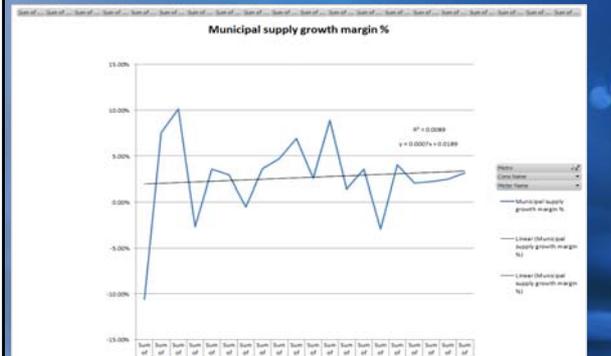
Short term: 1 to 2 years consumption data

- o Seasonal variations
- o Operational changes
- o Metering and billing issues



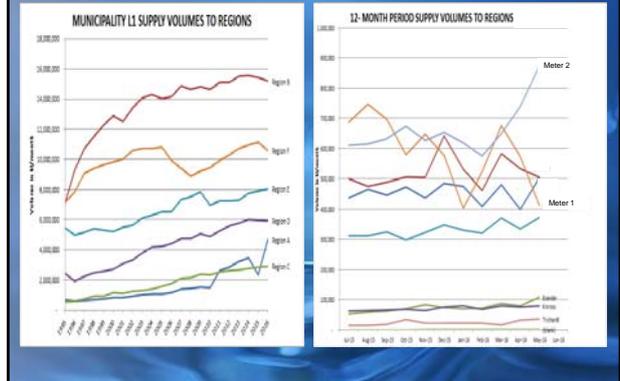
Assessment of demand

- Example:



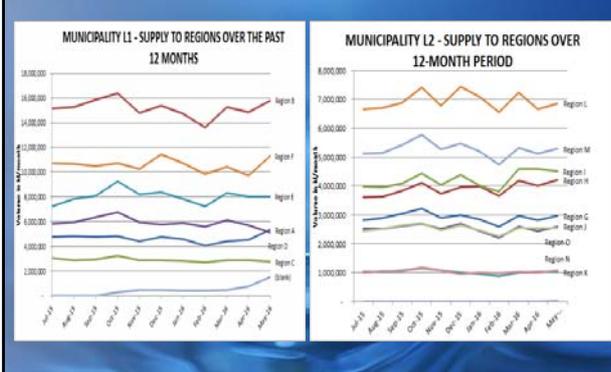
Assessment of demand

- Example:



Assessment of demand

- Example:

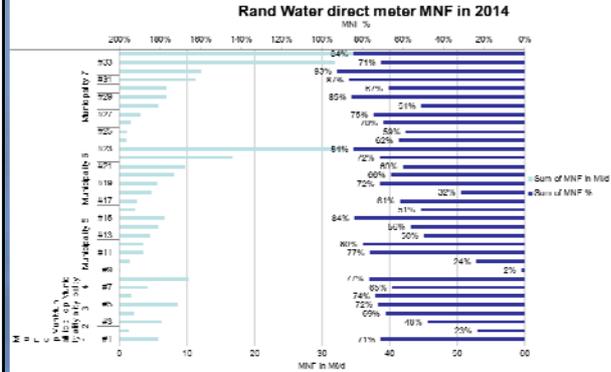


Understanding end consumer demand patterns

- Some of Rand Water's meters are on direct connections, i.e. without reservoirs downstream of the meters
- This enables Rand Water to measure the actual consumption patterns of the end-user
- Minimum night flow analysis on logging data

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Understanding end consumer demand patterns



MNF and WUE model

- In comparison with water use efficiency model developed by Rand Water, the majority of the 34 selected meters (about 21) are located in the low and no efficiency areas.
- The likelihood is great that the MNF of these meters are mainly attributed to losses in distribution systems and end-user properties
- A breakdown of the MNF into components was done using South African Night flow user guide principles, WRC reports, Water balance information from DWS website and Rand Water model

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Components of MNF

RAND WATER DIRECT METERS LOGGED: SYSTEM INPUT VOLUME 410 Ml/d	ACTIVE USE 123 Ml/d 30% of SV	Active use 123 Ml/d		
	MINIMUM NIGHT FLOWS 237 Ml/d 70% of SV	Normal legitimate night use - 4.7Ml/d or 2% of MNF	Normal Residential night use - 3.2 Ml/d or 1% of MNF Legitimate non-residential night use - 1.5 Ml/d or 0.5% of MNF	Night consumption - 10.7 Ml/d or 4% of MNF
		Background leakage (unavoidable) - 6Ml/d or 2% of MNF	domestic background leakage - 1.3 Ml/d or 0.45% of MNF Background leakage on mains - 0.8 Ml/d or 0.3% of MNF Background leakage on connections - 3.9 Ml/d or 1.4% of MNF	
		Night leakage (bursts and losses) - 276.3 Ml/d or 96% of MNF	Customer night leakage - estimated at 196.4 Ml/d or 68.43% of MNF Distribution system night leakage- 79.90 Ml/d or 27.83% of MNF	
Night leakage or losses - 276.3 or 96% of MNF				

• The losses are predominantly on properties.

Conclusion

- Analysing available data enables RW to have a better understanding of the water use patterns and inefficiencies in its Area of Supply
- Allows for focused sessions with municipalities/customers on demand and planning issues
- Participate and facilitate the integration of bulk supply planning for the region
- Facilitate the development of demand targets – scientifically determined

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Conclusion

- Identify and prioritize high demand areas for further investigation
- Assist in the identification of appropriate WC/WDM programmes/measures to be implemented
- Monitor and evaluate the effectiveness of WC/WDM programmes implemented in the area of supply
- Implementation of appropriate water demand management interventions
- Enables Rand Water to fulfill its role in accordance with the National WC/WDM strategy of DWS

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In a nutshell....

A systematic and scientific approach will ensure that water demand management is applied equitably and fairly across Rand Water's customer base.

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- Thank You -