Strategic Perspective of Water losses in South African Municipalities

Presented by Allestair Wensley
Chief Engineer : Water Services Planning
Water Services Master Class # 1
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Contents

• Water Loss & Water Demand Management
  – What is it?
  – Why is it important in South Africa?

• Results
  – DWA Reconciliation studies
  – WRC NRW studies
  – DWA MuSSA

• Challenges

• Conclusions and Recommendations

• Future actions
In a well managed water distribution system...

✓ the input volume will be known,
✓ leaks will be fixed,
✓ consumers will be metered and billed,
✓ few disruptions in supply,
✓ consumers will be penalised if they waste water
✓ assets are known and will be maintained
From this:

- Leaking Taps and Toilets
- Inefficient Garden watering
- Intermittent supply

- More Visible Leakage
- Poor Public Image
- Poor Service Delivery

- High Water Use
- High Water bills

- Reluctance to pay
- Low payment levels

- Bankrupt Municipality
- No Asset Management
- No Bulk Meters
To this:

- Asset Management & Maintenance
  - Training & Capacity Building

- Viable Municipality

- Job creation
  - Proper Metering and Billing
  - Improved Service Delivery

- Willingness to pay
  - Higher income to Municipality

- Lower Leakage Levels
  - Lower Household Bills
National NRW (2009)

Situation is far from ideal!!!!
Role players

• President Jacob Zuma:
  – What? → ”half the current water loss”
  – When? → “by 2014”

• Who?
  – DWA
  – Treasury
  – DBSA
  – Office of the Presidency
  – Municipalities!!!
DWA Water Resources All Towns
Reconciliation Studies

Need to optimise limited resources!!!!
National NRW Assessment based on the standard IWA Water Balance

<table>
<thead>
<tr>
<th>System input</th>
<th>Authorised consumption</th>
<th>Billed consumption</th>
<th>Revenue water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unbilled consumption</td>
<td>Non-revenue water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commercial losses</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physical losses</td>
<td></td>
</tr>
</tbody>
</table>
Water balance and KPI’s
Minimum Information Required

• Input volume
• Billed metered consumption
• Billed unmetered consumption which include
  – Free basic water + flat rate consumption
• Calculate Non-revenue water: volume and %
• Calculate litres per capita per day
Municipal Categories

• A: Metropolitan municipalities (x6)
• B1: Major cities – 21 x secondary cities, municipalities with largest budgets
• B2: Minor cities - 29 x municipalities with a large town as core
• B3: Rural dense - 111 x municipalities with large urban population but no large town
• B4: Rural scattered – 70 x municipalities with mainly rural population and maybe small town as core
Strategic Perspective % NRW

• Metros (A) are below national average – extensive WC/WDM programmes in most
• Large city (B1) municipalities above average – limited WC/WDM programmes, capacity, etc
• Small city (B2) municipalities below average – assume it is easier to manage
• Dense rural (B3) municipalities on average - various levels of implementation
• Scattered rural (B4) municipalities very high – standpipes with limited metering and billing
## Strategic Overview

<table>
<thead>
<tr>
<th>Category</th>
<th>% NRW</th>
<th>I/c/d</th>
<th>% Potential Assessment</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>34.3</td>
<td>291</td>
<td>84.0</td>
<td>6 of 6 (100%)</td>
</tr>
<tr>
<td>B1</td>
<td>41.3</td>
<td>241</td>
<td>63.6</td>
<td>20 of 21 (95%)</td>
</tr>
<tr>
<td>B2</td>
<td>30.5</td>
<td>229</td>
<td>65.7</td>
<td>26 of 29 (90%)</td>
</tr>
<tr>
<td>B3</td>
<td>37.0</td>
<td>164</td>
<td>55.7</td>
<td>55 of 111 (50%)</td>
</tr>
<tr>
<td>B4</td>
<td>72.5</td>
<td>65</td>
<td>46.4</td>
<td>25 of 70 (36%)</td>
</tr>
<tr>
<td>National</td>
<td>36.8</td>
<td>235</td>
<td>59.2</td>
<td>132 of 237 (56%)</td>
</tr>
</tbody>
</table>
I/c/d Strategic Perspective

• Metros (A) have highest I/c/d due to wet industries
• Large (B1) and Small (B2) city municipalities on average – some wet industries, wide spread of data (73 to 466 l/c/d)
• Dense rural (B3) municipalities on average – wide spread of data (29 to 661 l/c/d)
• Scattered rural (B4) municipalities below average - low (standpipes) level of service
Preliminary National NRW Assessment

Based on 122 data sets of a potential 237 municipalities

- Billed metered consumption
- Billed unmetered consumption
- Non-Revenue water
- % Non-revenue Water
% Non-revenue water per province

- Limpopo: 36.2%
- Northern Cape: 27.2%
- Eastern Cape: 29.2%
- Gauteng: 35.9%
- Mpumalanga: 44.6%
- KwaZulu Natal: 42.9%
- Free State: 42.0%
- Western Cape: 34.1%
- North West: 35.5%
- National: 35.5%
International NRW benchmark

% Non Revenue Water

RSA Average = 36.8%

World Average 36.2%
Municipal l/c/d Distribution /Category

National Average = 235

Litres / Capita / Day
International l/c/d benchmark

Average consumption (litres/capita/day)

RSA Average = 235 l/c/d
World Average = 177 l/c/d

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET)
## Estimated National NRW

### NRW Based on Available Data Sets

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Input (mcm/a)</th>
<th>NRW (mcm/a)</th>
<th>% NRW</th>
<th>l/c/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17 420 512</td>
<td>1 849 091 117</td>
<td>634 192 022</td>
<td>34.3%</td>
<td>291</td>
</tr>
<tr>
<td>B1</td>
<td>7 756 187</td>
<td>683 667 320</td>
<td>282 585 164</td>
<td>41.3%</td>
<td>241</td>
</tr>
<tr>
<td>B2</td>
<td>3 882 070</td>
<td>325 623 095</td>
<td>99 407 207</td>
<td>30.5%</td>
<td>230</td>
</tr>
<tr>
<td>B3</td>
<td>3 845 279</td>
<td>230 642 568</td>
<td>85 229 869</td>
<td>37.0%</td>
<td>164</td>
</tr>
<tr>
<td>B4</td>
<td>4 245 736</td>
<td>101 138 956</td>
<td>73 334 514</td>
<td>72.5%</td>
<td>65</td>
</tr>
<tr>
<td>National</td>
<td>37 149 785</td>
<td>3 190 163 057</td>
<td>1 174 748 776</td>
<td>36.8%</td>
<td>235</td>
</tr>
</tbody>
</table>

### Extrapolated NRW for whole country

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Input (mcm/a)</th>
<th>NRW (mcm/a)</th>
<th>% NRW</th>
<th>l/c/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17 420 512</td>
<td>1 849 091 117</td>
<td>634 192 022</td>
<td>34.3%</td>
<td>291</td>
</tr>
<tr>
<td>B1</td>
<td>8 092 611</td>
<td>713 321 335</td>
<td>294 842 273</td>
<td>41.3%</td>
<td>241</td>
</tr>
<tr>
<td>B2</td>
<td>4 201 444</td>
<td>352 411 778</td>
<td>107 585 337</td>
<td>30.5%</td>
<td>230</td>
</tr>
<tr>
<td>B3</td>
<td>6 705 407</td>
<td>402 195 059</td>
<td>148 624 049</td>
<td>37.0%</td>
<td>164</td>
</tr>
<tr>
<td>B4</td>
<td>12 401 732</td>
<td>295 425 394</td>
<td>214 209 031</td>
<td>72.5%</td>
<td>65</td>
</tr>
<tr>
<td>National</td>
<td>48 821 707</td>
<td>3 612 444 683</td>
<td>1 399 452 712</td>
<td>38.7%</td>
<td>203</td>
</tr>
</tbody>
</table>
## Estimated Cost of NRW

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Rate (R/kl)</th>
<th>Estimated cost to supply water (input volume)</th>
<th>Estimated value of NRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>R 5.00</td>
<td>R 9 245.46</td>
<td>R 3 170.96</td>
</tr>
<tr>
<td>B1</td>
<td>R 4.50</td>
<td>R 3 209.95</td>
<td>R 1 326.79</td>
</tr>
<tr>
<td>B2</td>
<td>R 4.00</td>
<td>R 1 409.65</td>
<td>R 430.34</td>
</tr>
<tr>
<td>B3</td>
<td>R 3.50</td>
<td>R 1 407.68</td>
<td>R 520.18</td>
</tr>
<tr>
<td>B4</td>
<td>R 3.00</td>
<td>R 886.28</td>
<td>R 642.63</td>
</tr>
<tr>
<td>National</td>
<td>R 16 159.01</td>
<td></td>
<td>R 6 090.90</td>
</tr>
</tbody>
</table>

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET)
Municipal Strategic Self Assessments (MuSSA): Vulnerability Check!
Challenges

• Poor data quality from municipalities
• Not all data elements captured by municipalities
• Data interpretation and feedback to municipalities required to raise awareness and improve data
• Municipalities need to take ownership of their water loss status quo
Conclusions (1)

• Current data represents ±76% of population
• National figures highly influenced by metro and major city data (79% of water supplied)
• Wide distribution of % NRW (1.5% to 100%)
• Wide distribution of l/c/d (6 to 661 l/c/d)
• Potential assessment indicates that WC/WDM is not sufficiently implemented
• % NRW and l/c/d in line with international trends
Conclusions (2)

• 105 (44%) of municipalities cannot supply a water balance
• 36 (15%) of municipalities have never submitted water balance data in a six year period
• 43 (18%) of municipalities have good water balance data with no gaps or questions
Recommendations

• Municipalities must be made aware that WDM is a strategic issue in a water scarce country and impacts significantly on water for growth and development
• Only continuous monitoring, analysis and feedback will improve results
• Municipalities must take ownership of WCWDM
• Study provides baseline for future monitoring
Current and Future Actions

• Educating Stats SA to ensure data quality improves with the 2011 survey

• The team will be working more closely with:
  – Municipalities
  – Stats SA
  – Dept of Cooperative Governance
  – Auditor General
  – Regulation
Thank You!!!!