Introduction to Non-revenue Water concepts and definitions

Regional Workshop on “Capacity Development, Water Operators’ Partnerships and Financing for Non-revenue Water Management”

7-9 July 2014, Dushanbe, Republic of Tajikistan
Reducing WLR in low and middle income countries to just half the current level would deliver the following benefits:

- **11 billion m³/a** would be available to water customers
- **130 million people** more could again access public water supply
- Water utilities would gain **US$ 4 billion** of self-generated cash flow

UN-U Bonn, September 3rd, 2008

- World population 6.1 billion
- 0.5 billion living in water deficit areas
- 1.2 billion lack access to safe drinking water
- > 50% living in urban settlements
- > 50% WL in many towns, mega-cities
45 million $m^3$ of drinking water are lost in the world’s water systems every day!!

• ... this quantity could serve nearly **200 million** people

• **1/3** of the water is lost in developing countries

• **20-50%** loss (even more in some cases) of produced water

In many of the **21 megacities** (>10 million): **250-500 million $m^3$** are lost or not paid for...
## Scale of the Problem: Global NRW Estimates

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<td>Physical Losses</td>
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<td>Developed Countries</td>
<td>745</td>
<td>300</td>
<td>15%</td>
<td>80%</td>
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<td>Eurasia (CIS)</td>
<td>178</td>
<td>30%</td>
<td>70%</td>
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<td>Developing Countries</td>
<td>837</td>
<td>35%</td>
<td>60%</td>
<td>16</td>
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<td>(out of 1,903)</td>
<td>250</td>
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<td>Source</td>
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<td>Water Supply and Sanitation Sector Board Discussion Paper Series No.8 (W. Kingdom, R. Liemberger, P. Marin)</td>
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<td>TOTAL</td>
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**Note:** Total NRW = Supplied Urban Population * System Input * (1 - Level of NRW) * Ratio of Physical Losses + Ratio of Commercial Losses
Water Loss Figures from Different Countries

Source: BGW 2004 u.a.

Water losses in %

Developing Countries

Bulgaria: 37%
UK: 29%
Italy: 27%
France: 25%
Danmark: 9%
Germany: <8%

Source: BGW 2004 u.a.
Technical aspects of NRW

• New and low-cost techniques for leak detection, strategies for continuous remote control in monitoring and metering are available

• Wide gap between availability of technologies and management tools for their application

• Benefits by flow metering and pressure measurement (reduction of costs, risk prevention, water saving, longer lifetime, water quality control,...)

• Costs of failures from leaking or collapsing pipe network exceed savings in expenses for structural maintenance and rehabilitation
Times Change, and so does the (assumed) WL-Optimum!

Whereas ± 15 % WL have been assumed the economic "Optimum" during the past decades, the updated, a present "Optimum" is significantly lower (depending on local conditions)

→ because of increased costs for supplied water (production + distribution), especially power

→ because of increased regional shortages and increased vulnerability to system failures and surplus damage of WL

→ because of improved technologies for WLR (leak detection, trenchless rehabilitation, automated metering, asset management etc.)
The Cost Hierarchy of Water Production

- Specific consumption
- Urban growth
- Degradation of resources

Conventional technologies:
- Easy: €0.2
- Medium: €0.5
- Difficult: €0.8

ReUse: €1.0
DeSal: €1.2
Surplus Costs for delayed action:

Accidents, foundation destabilisation, road collapse, wetting of buildings, appliances etc., tree and greenland damage, flooding, diseases, clean up costs, emergency surplus costs, groundwater contamination, and ST surplus,
Spectacular BURST LEAKAGE

Bursts are large, reported fairly quickly and therefore do not leak for long
WLR, rehab in time might have saved money!
Surplus Costs: Reduced Lifetime of Buildings
Surplus Costs: Accidental Damages
Surplus Costs: Erosion
Surplus Costs: Surface Washout plus Accidental Damage
Surplus Economical Damages through WL

ADMINISTRATIVE LOSSES

• excessive consumption  Soweto Washing Machine
• illegal water trafficking  Cochabamba
• unwillingness to pay / to charge  Saigon central

⇒ financial destabilisation of Water Utilities
⇒ non-sustainable water services!
Admin Losses: Illegal Connections
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Admin Losses: Illegal Connections
Over 80% of Pipe Network Invisible to the Public
Why WLR is not PR-attractive

- WLR activities are either invisible to the public, or disturbing.

- Today's politicians will be made responsible for costs & disturbances of WLR, whereas the benefits are for tomorrow.

- Serious "package solutions", for easy handling by the client, are not yet strong on the market.

- Lobbying powers are focused rather on large investments (desalinations, dams), than on WLR as business target.
What CEO‘s from Large Water Utilities, responsible for mio 22 customers in 4 regions worldwide, consider as **success factor for water efficiency**

between very high (1) and less important (5) [IEEM, survey IV 2009]

- (technical) management
- good maintenance (asset conditions)
- available budget
- customer satisfaction
- political backing / support
What CEO’s from Large Water Utilities, responsible for mio 22 customers in 4 regions worldwide, consider as **pre-condition for good utility management** in priority ranking, from lowest (5) to highest (1) 
[IEEM, survey IV 2009]

1. Know-How  
2. Technologies  
4. Political Support  
   execution)  
5. Budget  

(➔ Capacity Development)  
(➔ adapted, appropriate)  
(➔ empowered decisions,  
(➔ must cover necessary activities)
For the implementation of WLR (long-lasting activity, not fixed to one location, installations as well as operational measures on-site decisions needed interactive planning unavoidable) the role of Capacity Development is of very high priority.

Once, the know-how is there, and sustains, the other restrains can be resolved, successfully!
Political and administrative aspects of NRW

• Financial and technical assistance complement each other (infrastructure and capacity development) in water loss reduction programs

• Introduction of commercial accounting systems and financial management

• Framework conditions can be improved through decentralisation and commercialisation (e.g. procurement, financial autonomy)

• Culture of collaboration and partnership to strengthen efforts to control corruption and to build up confidence in the water management

• Developing ownership and corporate identity at the top management of water authorities to be backed up with level of ownership within staff of water companies and consumers