

# NON-REVENUE WATER

## New 'one-stop-shop' to improve non-revenue water management

*Petro Kotzé reports on a new online knowledge hub aimed at helping water managers with the rising problem of non-revenue water.*



As recently highlighted in provinces such as Gauteng, non-revenue water (NRW) is a critical issue for municipalities. NRW refers to water that is produced and supplied but does not generate revenue because of various losses throughout the distribution system. These losses are generally categorised into physical losses and commercial losses. Physical losses refer to leaks in the distribution systems, theft and unauthorised consumption, while commercial losses are attributed to meter inaccuracies, billing errors and data handling issues.

In South Africa, almost half of the water that is treated to drinking quality standards leaks from the distribution system or, although it costs money to treat and transport, is not paid for. There are many solutions to NRW, and the matter has been

the subject of research and new technology development for years. Technical experts have created guidelines, tools and technologies, but those who need them might be unaware of their existence or not know where to find the scattered information.

Now, the Water Research Commission (WRC), with funding from the Department of Science, Technology and Innovation (DSTI), has created an online knowledge hub where all the existing expert resources that water managers need to deal with NRW have been consolidated. It is called the NRW Management Portal South Africa (<https://managenrw.co.za/>) and it is open for business. It's more important than ever that people involved in potable water management visit the portal and use the

information, as statistics show that the amount of water lost in South Africa has increased and continues to do so every year.

## South Africa's 'lost water'

The [National No Drop Report for 2023](#), an assessment of water losses and NRW in municipalities and Water Services Authorities (WSA), details the scope of the challenge.

The report states that 4.39 billion m<sup>3</sup> of drinking-quality water was supplied to the system from rivers, dams, springs, boreholes, and bulk water service providers (called System Input Value or SIV) for 2022/23. Almost half of this (47.4%) was written off as NRW (totalling 2.08 billion m<sup>3</sup>), caused by leaks and bursts in the piping system, losses through meter inaccuracies, unauthorised consumption, billing mistakes and administrative inefficiencies, and unbilled consumption of clean water.

By far the biggest factor is water losses (40.8% or 1.79 million m<sup>3</sup>). An indication of the condition of the water system, it means that we lose most of our water through things like burst pipes, overflowing reservoirs and leaking connections, as well as poor, or lacking, metering. Over and above the poor state of the water distribution system, NRW is also a telling indicator of the state and health of municipalities that have been mandated to manage and take responsibility for the provision of services. A system in which the percentage of NRW is high cannot be financially viable.

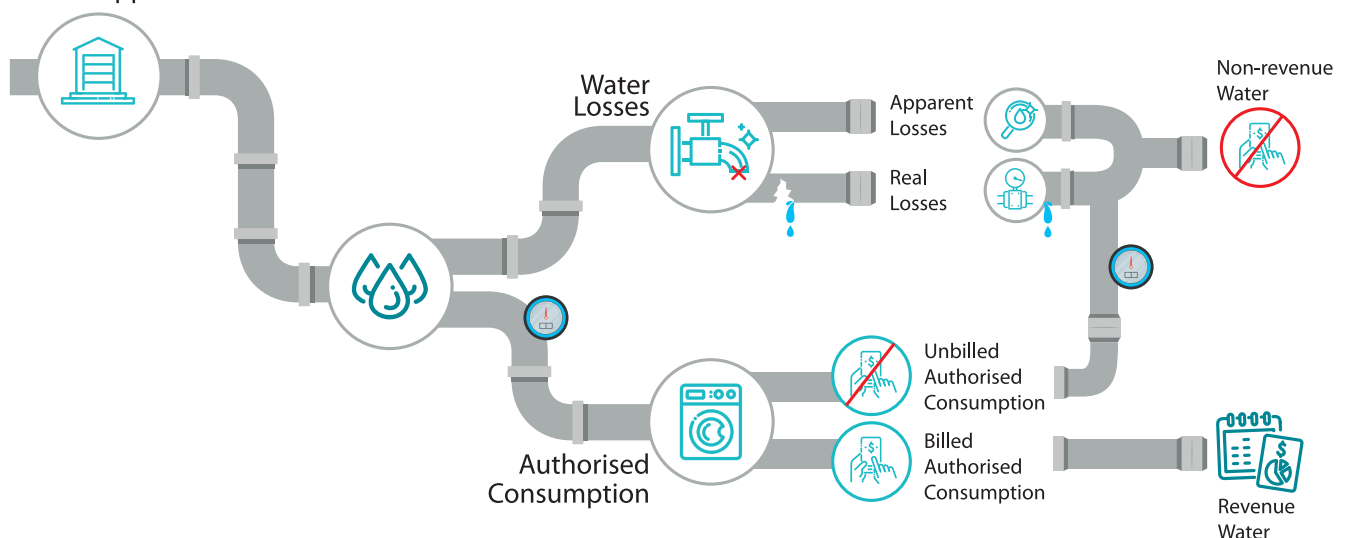
It's clear that many municipalities grapple with issues relating to infrastructure maintenance, effective billing and revenue collection, accessing budgets to undertake effective maintenance, and the skills needed to balance this suite

of dynamics. The results are visible in the statistics. Despite attempts to raise awareness about the issue, NRW and water losses have steadily increased by 5.9% and 4.3%, respectively, since June 2016.

In response, the research and innovation sector has developed and refined a portfolio of tools, guidelines, and technologies to support municipalities. Investigative studies that put in place baselines and analyse policy, skills and other dynamics also continue. Still, finding ways to help municipalities address NRW challenges remains a high priority to many partners, including the Department of Water and Sanitation (DWS), DSTI, the WRC, the South African Local Government Association (SALGA) and the Municipal Infrastructure Support Agent (MISA).

In support of positioning these research and innovation resources to be used by those who need them, WRC RDI Roadmap Manager Shanna Nienaber says partners reported that an important next step would be to fund a project to consolidate the existing knowledge base on the topic in a user-friendly way. This would also allow experts to identify gaps in the available knowledge, which can then be addressed with appropriate funding. The resulting project was undertaken by the WRC in partnership with the DSTI. Engineering consultancy WRP, which specialises in water resources engineering, water conservation, demand management, and NRW reduction, was commissioned to build the portal. The project objective was to consolidate and package the existing advisory packages, solutions, guidelines, reports, innovations and technologies in the proven and emerging pipeline related to NRW so it could be easily accessed and used by partners like the DWS, municipalities, SALGA and MISA.

## Water Supplied



*Non-revenue water is the difference between the amount of water injected into the water-supply system and the actual amount of water billed to customers as a result of real losses due to leakage, apparent losses due to metering inaccuracies or unauthorised consumption (e.g. illegal connections), and unbilled authorised consumption.*

The resulting 'one-stop-shop' for NRW management was launched at the 11<sup>th</sup> South African Water Loss Summit, held online on 20 and 21 August. It heralds the completion of the first phase of the knowledge portal. Though it caters specifically for the water services sector, water users across all sectors will find it valuable.

## **An overview of the NRW management portal**

Nienaber explains that the portal will be useful to three core user groups (as a starting point). The first group is municipalities mandated to manage and bill for water and maintain the infrastructure. The second user group is the cohort of consultants supporting municipalities in doing the work, like replacing and refurbishing pipes, water load planning, leak management, etc. The third audience is the researchers, innovators, advisors, and national departments providing an exploratory and advisory function for NRW.

The bulk of the resources available on the portal were published by the WRC and the DWS. The information is categorised into topics of advisory packages, guidelines, and tools (which form the bulk of the available resources); applied research and baseline reports; equipment and technologies; funding; policies, legislation, and regulations; practical case studies; software solutions; technical briefs, templates; and training materials. The information is available in various formats, including documents, presentations, images, spreadsheets, data, and videos.

The information, Nienaber says, is categorised to link to the stages of NRW management. "Essentially, the portal is premised on the different lifecycle management steps of dealing with non-revenue water."

These are planning, design, funding, implementation, operation, and maintenance. Together, the stages form a cohesive framework for addressing NRW and achieving sustainable water resources management, water services, and financial viability.

The portal offers the tools that will help users conduct each stage of NRW management:

- Planning stage: Strategies to identify and mitigate factors contributing to NRW, laying the groundwork for efficient water management.
- Designing: Creating infrastructure and optimising systems to minimise water loss and maximise revenue generation.
- Implementation: Translating plans into action and deploying technologies and methodologies to monitor and control water flow.
- Operation: The daily management of water distribution systems, utilising best practices to minimise losses and enhance efficiency.
- Maintenance: Activities crucial for preserving infrastructure integrity, addressing leaks, and optimising long-term performance.

## **A wealth of information, but easy to navigate**

The portal also offers different ways to search for the needed information, Nienaber says. The first route is via a custom search function. This is most suitable for people who know exactly what tools they are looking for, like experienced municipal engineers and consultants. This route allows users to search for keywords, categories or authors. For example, the keywords

'pressure management' can be tagged with 'bulk water supply'. The tools available are presented in summary and can then be downloaded.

A second route, the toolkit search, is suitable for people who are less experienced with the support tools available to support NRW implementation., Nienaber says. Here, users will find pre-packaged toolkits that list materials for the various stages of NRW management mentioned above, and they can be easily selected and downloaded.

A third option, an overview search, provides a sense of the body of knowledge available to support NRW, such as advisory packages, baseline reports, equipment and tech, case studies, and software. It offers a summary of all information available per category, an option more suitable for academics. A database of all available material on the NRW portal can also be downloaded. (From this option, users can also deduct who the experts and authorities on specific topics are.)

Based on feedback from the first phase of the project, further development and opportunities are being explored. "It's a work in progress," she says, but the existing format is already an invaluable resource. "If you visit," she says, "you're likely to find what you're looking for." The WRC is inviting all parties involved in NRW management to do exactly that. To access the information, users need to register first and then build a profile to access full functionality.

The portal is available here: <https://managenrw.co.za/>

## **Non-revenue water threatening SA's water security**

The latest No Drop Report, released in 2023, paints a bleak picture of non-revenue water in South Africa. The report assessed the degree to which drinking water distribution systems of municipalities supplied water efficiently, without wasting water. Only four municipalities scored more than 90% thus qualifying for No Drop Certification. They were Overstrand, Midvaal and Swartland local municipalities along with the City of Cape Town.

In the last ten years non-revenue water has increased 10% to 47%. This far surpasses the international average of 30%. The high percentage of NRW in South Africa is caused by physical losses, poorly functioning or non-existent water meters, illegal connections and poor billing and revenue collection. The Department of Water and Sanitation has called on municipalities to improve operation and maintenance of their infrastructure, repair leaks, improve metering, billing, revenue collection and debtor management, improve pressure management and engage in community education and awareness.