



NRW Management

A critical step towards water security

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In India, almost a third of the population lives in cities and it will increase to half in just a few decades. The increasing economic activities, population growth and rapid urbanisation have put major pressure on water supplies and water quality, affecting public health. India will soon be confronted with a serious resource challenge. The available water resources have reduced over the years but the demand has escalated and it is projected to soon overtake availability. By the year 2025, the water demand is expected to increase by over 20 per cent, with industrial requirements projected to double from 23.2 trillion litres at present to 47 trillion litres. Domestic demand is expected to grow by around 40 per cent from 41 trillion litres to 55 trillion litres, while the agricultural sector will require 14 per cent more water for irrigation, an increase from 517 trillion litres to 592 trillion litres. The water ministry predicts that the per capita water availability will reduce 36 per cent by 2025 and 60 per cent by 2050 from the 2001 level. Going forward, agriculture will remain the major water user in India. Meanwhile, the challenges posed by growing water requirements owing to urbanisation call for a monumental shift in the approach of all stakeholders.

NRW challenge

Non-revenue water (NRW) is the water that does not generate revenue for the utility and is lost before it reaches the customer. Losses can be real (through pipe and network leaks) referred to as physical losses, or commercial (theft or metering inaccuracies, incorrect billing and illegal connections). High levels of NRW are detrimental to the financial viability of water utilities, and to the quality of water itself. Utilities with high NRW rates cannot provide a sustained and reliable service to

their customers, and often lack the capabilities to fix problems or extend the network.

NRW is a real challenge faced by the majority of water utilities in India owing to increased urbanisation, higher demand, increased prices, and ageing and dilapidated distribution networks. The NRW level is quite high in Indian cities. It includes huge volumes of treated water that is lost during transmission and distribution. It also results in lost revenues and increased operational costs, thus affecting the financial capability of water utilities. A high level of NRW indicates that water utilities are poorly managed with governance issues, and lack of accountability and technical and managerial skills, which are needed to provide reliable services to citizens.

In Western countries, urbanisation took place and over a significantly longer period, when the economic conditions were improving steadily. The cities were planned with adequate funds and

Water will become the new oil of the next century and will have serious economic, social and political importance. Water is amongst the biggest stories of our era. We need to think deeply about the water challenges and work towards enduring solutions.

expertise with a robust infrastructure to manage their water and waste water along with other facilities. In contrast, the magnitude of India's increasing population and rate of urbanisation simply overwhelmed the financial and management capacities of city authorities, including their water supply and waste water management systems.

NRW management initiatives

NRW management in Indian cities is important for the operational and financial health of water utilities, but it is hard to understand why efforts to improve the situation have been so limited. Cities like Singapore, Manila and Phnom Penh have successfully implemented water loss management programmes to reduce their NRW to below 20 per cent levels. The water utilities in India are struggling to provide clean drinking water due to the ever-increasing population, expanding service areas and a high level of water losses. Reducing water losses is critical to efficient resource utilisation, effective utility management, enhanced consumer satisfaction and reduction in capital-intensive capacity addition. The utilities that have initiated and sustained water loss management programmes have gained significantly in terms of financial returns and better consumer services.

A case in point: Bengaluru water loss management

The classic example of NRW management in India is the Bengaluru water loss management project, which was initiated by the Bangalore Water Supply and Sewerage Board (BWSSB). The project was funded by the Japan International Cooperation Agency (JICA) and was awarded to a consortium of SPML Infra and Suez. At the time of project award, the NRW level in the designated area of Bengaluru was over 61 per cent. In a busy city like Bengaluru, executing a water loss management project was an engineering challenge due to high traffic in the city and narrow streets in thickly populated areas and business hubs. The project area also included areas with the maximum number of slums, posing a tough challenge in the reduction of water losses, bringing them to

optimum levels. But with strategic planning and team dedication, SPML Infra has already replaced 50-60-year-old pipes with new pipes, sealed leakages and installed electronic district meters suitable for GSM/GPRS communication to measure flow and pressure control in major areas.

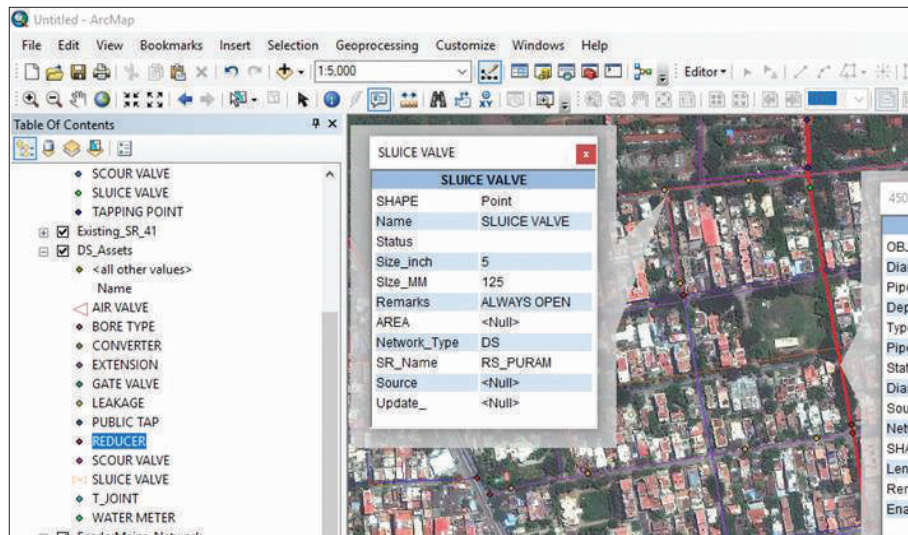
By using an innovative technology, helium leak detection, to accurately identify and locate hidden leaks in large and small pipes, the NRW level was reduced from 61 per cent to 27 per cent, saving 39.2 million litres of drinking water per day. The water saved from the project will be used to provide drinking water facilities to 110 urban settlements. For this, water networks are being developed in the extended colonies of Bengaluru. Reducing leakages has been the focus of the project, and the initiatives taken have resulted in significant improvements. The water loss management work is in progress and has a target to attain an optimum NRW level of 15-18 per cent, which will save another few million litres of drinking water every day.

IT initiatives for the project

IT has played a crucial role at every phase of project execution. A detailed analysis of IT implementation in the project is given below.

Digitalisation of the water network

The design phase involved studying the existing network and digitalising it using GIS software.



The digitalised network consisted of all pipeline details and specifications, which were further used for design and engineering. After digitalisation, the network was imported into design software called WaterGEMS for analysis. The details were then transferred to drawing software AutoCAD for reference and execution.

Design of the network

After the existing network is developed on the GIS software platform, it is imported and analysed by "InDesign" software for the final outcome of the improved distribution system. The dots in the picture represent junctions that hold the desired pressure valves, which will reflect on the ground upon implementation of the works.

SCADA integration and UFW calculation

With the formation of district metering areas (DMAs), the inlets and outlets of these areas are installed with electromagnetic flow meters for accounting the net inflow to the area. The net inflow to the DMA is compared with the summation of the billed and unbilled accounted volume for the same area and the difference between the net inflow volume and the accounted volume is termed as the unaccounted-for water (UFW) volume. To calculate the UFW volume for 43 DMAs, all the inlet and outlet flow meters are integrated with the supervisory control and data acquisition (SCADA) system through GSM-based communication technology. Accessing all flow meter data from a single location through SCADA helps calculate the net inflow for each DMA with ease. Separately, the consumption volume calculated from the billing and collection system of BWSSB is fed separately for calculating the UFW.

The way forward

Water is essential for human life, but too often it is being wasted, polluted and taken for granted. To tackle an increasingly complex water situation, water utilities in India need to focus on efficient water management and adopt new technologies for maintaining the municipal water supply systems. Utilities which carefully and creatively use their water assets for strategic urban planning will ultimately be more sustainable and competitive. ■

