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SMART METERS: INNOVATING TO IMPROVE WATER SUPPLY IN A POST- COVID CONTEXT

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Demonstration of smart meter installation - ©UNTAPPED

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In cities across Africa, rapidly expanding low-income communities (LICs) pose unique technical and social challenges to utilities in expanding services – but they also present an opportunity to expand the customer base and generate revenues. COVID-19 is placing huge additional pressures on the financial viability of utilities, exacerbating the need for innovative service delivery models to this segment of the customer base. In the context of short and long-term challenges posed by COVID-19, water utilities must take every measure available to improve the efficiency of operations: service quality and attention to the customer will be even more important; greater control will be required over the distribution network; and billing and revenues will need to be maximized to support the bottom line.

Smart Water Meters are a new technology with the potential to assist utilities in this process of transformation. The model offers greater control for the customer, through a flexible prepayment tailored to the spending habits of low-income households; and greater control for the utility, enabling real-time data on water demand across the supply area, and supporting a shift from reactive firefighting to preventative planning. Pilots of the technology to date have produced good results; however, more testing is needed, particularly in LICs. One project expected to inform the evidence base is a pilot of 500 smart meters recently underway in Watamu, in the Kenyan district of Malindi.

INTRODUCTION

COVID-19 is placing huge stress on the operations of water utilities across Africa. Regular handwashing with soap is a key measure in combating the virus, but to sustain this practice, people must have access to a regular water supply. Innovation is urgently required to enable utilities to better manage their systems in a context of limited finances and evolving customer needs.

This article introduces Smart Meters – a new technology with the potential to improve both low-income customer satisfaction and the utility bottom line. Customers connected to Smart Meters have access to a flexible prepayment model, providing them with greater control over their account; while the utility gains access to real-time data and greater control over supply. Although more work is needed to test the technology in the specific context of service provision to low-income communities, Smart Meters could have a valuable role to play as one part of a sustainable long-term response to the crisis.



MAWASCO staff retrieve mechanical meters from the pilot area - ©UNTAPPED

THE CHALLENGE OF SERVING LOW-INCOME COMMUNITIES

Water utilities are typically mandated to serve everyone in their catchment area. In cities across Africa, this includes low-income communities (LICs), many of which have rapidly expanded in recent years. These communities are often characterised by poor-quality housing, insecure tenure and high population densities; by subsistence living and low incomes; and by low levels of access to basic services. As such, LICs can pose unique technical and social challenges to utilities in expanding services; these challenges increase the need for innovative, context-specific approaches, to ensure all LIC residents have access to a safe, reliable and affordable water supply. However, in WSUP's view, service extension to LICs must also be understood as an opportunity. Providing a formal service to these households creates a 'win-win' situation: low-income consumers benefit from a cheaper, more reliable utility supply, while the utility generates additional revenue from all these new customers.

Water utilities are on the front line of the battle against COVID-19. Without access to a safe and reliable water supply, individuals cannot practice the handwashing behaviours required to reduce transmission rates

THE IMPLICATIONS OF COVID-19 FOR UNIVERSAL SERVICE PROVISION

Water utilities are on the front line of the battle against COVID-19. Without access to a safe and reliable water supply, individuals cannot practice the handwashing behaviours required to reduce transmission rates. As a result, the pandemic has increased political attention to water supply — but it has also placed unique pressures on the financial viability of water utilities. In Kenya for example, utilities have been tasked by the government to provide services to informal settlements free of charge, leading to drops in revenue collection as high as 50%. It remains uncertain if utilities will receive future government support to help cover these losses, and there are real concerns that providing free water could undermine long-term willingness to pay for formal services.

In many countries, utilities will need financial support in the near term if they are to maintain current levels of service. The financial strain created by COVID-19 also increases the need for strategies to support long-term utility resilience. In order to place services on a sustainable footing, utilities will

need to adopt a holistic approach to strengthen all aspects of core operations. This includes financial management, but also critical business areas such as governance, staff capacity and customer engagement (Box).

CUSTOMERS AT THE CENTRE



UNTAPPED staff inspecting new smart meters in the pilot area - ©UNTAPPED

For a utility to provide all customers with continuous, safe water, innovative solutions are required – particularly in LICs. Technical inputs and technological products are significant components of improving a service, but they must be integrated into an organisational approach that is focused on the expectations of the customer. WSUP works with utilities to ensure that customers are advocates, not adversaries. For that to happen, customers must be at the centre of everything a utility does, from staff training to procurement to communications. This includes the introduction of new technologies such as Smart Meters, explored overleaf.

INTRODUCING SMART METERS: AN INNOVATIVE SOLUTION FOR SERVING LICs

In WSUP’s view, the pressures on utility operations created by COVID-19 exacerbate the already urgent need for innovative solutions to improve service levels, increase customer retention, lock-in revenues, and provide utilities with greater control over water supply.

This latter point around control is critically important. For example, many utilities still use a single meter to collect information on water supply and flow in a service area.

These meters are not sufficient to provide a granular picture of the service experienced by each customer at the household level, or to collect vital information about ongoing water location, pressure and flow: utilities monitor what water goes into an area and what is used by a customer, and very little else. This data gap contributes to a range of issues, including delays in the identification, isolation and resolution of leakages where they occur, leading to increased Non Revenue Water (water that enters the distribution system which is then lost or unaccounted for) and service disruptions for the customer.

Smart Meters are a new technology with the potential to mitigate these issues. The Smart Meters sit within the wider water supply system, connected to a communication network, and supported by software packages so data can be received and analysed centrally. This enables the utility to collect more detailed data, both about how water moves within the service area and how it is consumed at the household level. Potential advantages of Smart Meters for both customers and the utility include:

Improved customer satisfaction: Customers connected to Smart Meters have access to a flexible prepayment model, providing them with greater control over their account. This enables customers to top up their accounts in small amounts by mobile phone, with customers then debited according to their water usage. This model is well-adapted to the spending habits of low-income households, who prefer “little-and-often” payments to less frequent and higher billing.

Improved utility operations: Smart Meters can be accessed remotely, in comparison to standard meters which require manual reading. This can vastly reduce inaccurate meter readings through human error. But more significantly, staff



MAWASCO staff oversee commissioning of smart meters - ©UNTAPPED

time and resource previously spent on manually reading meters and collecting small payments from households can be redeployed: meter reader staff can still provide a vital direct point of contact with customers, but can focus more on customer care and communication about water consumption, payment, small-scale leakage repair, identifying illegal connections to the network and making new connections. Meanwhile, customer care staff based within the utility can pivot to resolving more complicated, in-depth issues with the system, rather than day-to-day customer care and complaint resolution.

Preventative planning: Smart Meters allow the utility to see the status of the whole water supply area at any given moment. This real-time mapping supports utilities to shift from reactive firefighting to preventative planning: better knowledge about water demand per area reduces the risk of inconsistent water pressure and protects the network from degradation. This in turn mitigates the risk of contamination, improves water quality at the point of supply, and prevents air blockages that disrupt meter readings. If and when leaks and water pressure drops do occur, they can be detected immediately before customers experience prolonged service disruption.

NEXT STEPS: PILOT PROJECT IN MALINDI

At the global level, Smart Meters are increasingly viewed as critical for utility efforts to track water usage and identify waste and leakage: a recent report estimated the drive for the digitalization of water utilities' distribution network will result in an installed base of 400 million smart water meters worldwide by 2026.¹ Although the context in which utilities operate will vary significantly by region, and many African utilities will face a specific set of challenges, WSUP believes the potential of Smart Meters to support African utilities is also clear. The technology has already been used by our partner utility Nairobi City Water & Sewerage Company (NCWSC) in relation to major customers, resulting in improved billing and revenue collection; another partner utility, Nakuru Water and Sanitation Services Company (NAWASSCO), are adopting a phased approach to introducing the technology. A recent pilot of CTSuite – a smart and prepaid water meter and software developed by CityTaps – in Niamey, Niger, demonstrated improved customer repayment and high levels of customer satisfaction with the technology and service delivery model.²

Nonetheless, more work is needed to test the technology, particularly in the context of improving services to LICs. An exciting new project involves the installation of 500 Smart



Configuration of smart meter communication antennae - ©UNTAPPED

Meters in Watamu, in the Kenyan district of Malindi. The project is a partnership between Malindi Water & Sewerage Company (MAWASCO), WSUP, CITYTAPS (a water solution provider producing PAYGO smart water meters), and UNTAPPED, a water finance, technology and consulting company providing financing and support to water utilities. Co-financed by a grant from the French Ministry of Finance and by a lease agreement from UNTAPPED, the pilot is centrally aimed at improving the efficiency of billing and revenue collection and reducing Non Revenue Water. Importantly, the pilot will target low-income customers, who can use their PAYGO smart meters to top-up small amounts on their account. MAWASCO will have access to detailed dashboards via an online cloud platform, to analyze water consumption and payment collection in real time at a global level and on a per customer basis. The 18-month pilot began in July 2020, with results expected to be available from November 2020, subject to continued easing of COVID restrictions.

CONCLUSION

In the context of short and long-term challenges posed by COVID-19, water utilities must take every measure available to improve the efficiency of operations. Service quality and attention to the customer will be even more important – many low-income households are now accustomed to getting their water for free, and their continued custom cannot be taken for granted. Similarly, financial performance must be maximised to support the bottom line: that means improved billing and revenue collection and reduced Non Revenue Water. Although only one part of the organisation-wide response required by utilities, innovations like Smart Meters could play an important role in navigating the crisis.

¹ <https://www.abiresearch.com/press/400-million-smart-water-meters-be-installed-worldwide-2026-scalable-meter-data-management-crucial/>

² CityTaps (2019) CityTaps Pilot in Niamey, Niger – Conclusions. Available at: https://uploads.strikinglycdn.com/files/61fe0e7e-2baf-426a-9e2a-1e7f96a5322a/Impact_Report_2019_Final_UK.pdf