Prepaid Water in Nairobi: Case Study

Overview

Nairobi, Kenya's capital city, has a population of about 3.4 million people, but only 50 percent have direct access to piped water. The remainder rely on boreholes and private vendors. Leaks associated with aging networks and illegal connections deplete the available supply, resulting in an estimated 30 percent daily supply deficit. Only 40 percent of the population has an uninterrupted supply.

Nairobi City Water and Sanitation Corporation (NCWSC) struggles to fund its operations, let alone improvements, because average user tariffs are subeconomic and collection rates are inadequate. An estimated 50 percent of customers have arrears that qualify them for disconnection. NCWSC has 200 utility staff attending to disconnections, but the impact on payment levels is limited, and the cost impact on customer relations is high.

Better demand management and improved collection rates are priorities for the utility. Nairobi Water introduced prepaid meters in 2009 on a limited scale on 620 individual connections in middle- and low-income areas. The utility acknowledges that it under-estimated what an effective and prepayment system entails. It now has a growing number of failed meters that it cannot repair, and 1,600 in its stores that it is reluctant to install.

There are just two vending sites for credit purchase. This has prompted a growing number of customers to demand that their prepaid meters are removed and replaced with postpaid meters. In one area, Jericho, most prepaid meters were bypassed or vandalized soon after installation, because residents there had not previously had to pay for water at all, and consultation prior to installation was limited. The utility is undecided about whether to pursue prepayment for individual connections. If it does, it is adamant that they be Standard Transfer Specification (STS)-compliant to make vending options as accessible as possible.

In 2013, NCWSC installed six piloting prepaid standpipe meters in informal settlements, to support more equitable water prices for people without their own connections. It aims to provide 2,000 prepaid standpipes by 2019.

Lessons

Give special attention to contracting effective after-sales support. Make provision for **a** maintenance service contract when installing a prepaid meter system, as well as in-house training of staff in maintenance and repairs.

Installing prepaid meters entails more than a supply contract for metering components. Effective prepayment requires an integrated management system, and extensive preparation and consultation with staff and customers to reorientate their thinking.

Prepayment in low-income areas with individual connections and a poor payment history carry a higher risk of bypasses and vandalism. The Nairobi experience suggests that there is value in focusing staff resources on improving the relationship between customers and the utility, and explaining what water tariffs pay for.

Why the utility installed prepaid meters

Prepaid meters were introduced on some individual connections for a variety of reasons:

- Strengthening demand management, given chronic supply shortages in the city.
- Improving collection rates and reducing losses (estimated at 5 to 10 percent) caused by customers colluding with staff to lower their bills.

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Photo 0. Prepaid meters installed in a middle-income housing estate. Credit is loaded on a smartcard, and top-ups are available from two pay points.

- Reducing the cost of collections, and deploying staff to monitor systems and detect leaks to reduce nonrevenue water (NRW) below 40 percent.
- The new meters worked well enough for the first two years, but the failure rate is now rising rapidly and more than 100 have been exchanged or replaced with conventional meters. They are not reparable.

Nairobi also introduced prepaid meters at communal standpipes, with the aim of

- Improving the water supply, at a more equitable tariff, to people in informal settlements without their own connections.
- Providing affordable alternatives to supply from unauthorized connections managed by cartels and gangs.

Implementation

In 2009, NCWSC installed 620 prepaid meters on individual connections in several middle-income housing estates and apartment blocks (Photos 1 and 2), and a low-income settlement, Jericho, where residents had previously not had to pay for water (Photo 3). In the middle-income areas, the prepaid meters were received fairly positively, but after two years, they started to prove increasingly unreliable.

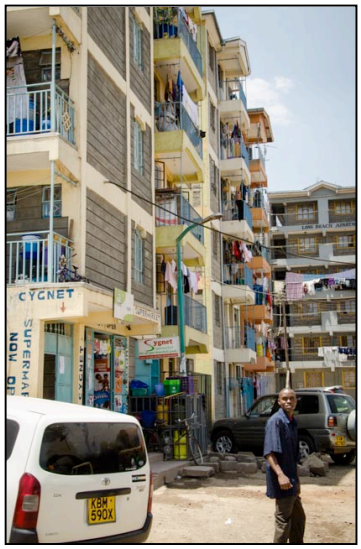

Photo 2. Prepaid meters serving individual tenants in an apartment block

In Jericho, the low-income housing estate, prepayment was not a success. This was a council housing estate where the council had previously paid the service bills. The area also had a high level of criminal activity. Water and electricity prepayment were introduced in Jericho at the same time that residents were required to pay for their own services for the first time. There was minimal engagement with customers

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before installation. The meters were installed at the back of the properties because of midblock mains, and to get to the meters, utility officials had to walk through the main house. This made monitoring difficult, and it was compounded by concerns about criminal gangs operating in the area. As a result, most meters were quickly bypassed (sometimes by utility staff) and payment levels were low. The meters have essentially been abandoned.

Photo 3. Jericho, a low-income council housing estate in Nairobi's Eastlands

Service delivery performance

The meters worked reasonably well for the first two years, but then customer complaints alerted them to a rise in the number of faults. NCWSC is not geared to provide a rapid response to service failures or perform regular monitoring. A growing number of meters have now been replaced with an unmetered "straight through" unmetered connection.

Nairobi Water does not monitor its prepaid meters routinely after installation, and has limited data on consumption, sales, and performance.

From this pilot, NCWSC's billing department concluded the following:

- Prepayment will be met with meter bypasses if people are unwilling to pay, and if there is no monitoring or follow-through with sanctions where people bypass.
- It is a bad idea to introduce prepayment in areas without adequate engagement with customers, and particularly in areas where customers have previously not had to pay for services.
- Segmenting the market is good strategy. The advice is to target prepaid meters in high-income areas with a good payment history where access for meter readers is difficult. In these areas, meter readers often estimate consumption, which leads to billing queries. Automatic meter reading (AMR) could address this challenge more simply than prepayment.
- Prepayment might be feasible in low-income areas that are stable and have good leadership, but not in areas with a poor history or no history of payment.

Proponents of prepaid metering within Nairobi Water maintain that prepayment should focus "where people are likely to co-operate." In "difficult areas," the utility should instead put more people on the ground to build willingness to pay through campaigns, and should first focus on building acceptance of regular payment. Prepayment should only be considered once payment levels are acceptable and established. Prepayment is neither a quick fix nor a magic bullet.

Informal settlements

Individual connections are simply not an option as the default in informal settlements, because unresolved land tenure issues make it difficult to formalize the servitude (land use arrangements across generations of owners or tenants) required to lay down reticulation networks. Residents need a more equitable alternative to kiosks and private vendors, who charge these customers substantially more than they charge customers with the convenience of a home connection. The utility supplies water to kiosks at a discounted tariff,

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Photo 4. Informal settlement residents await the arrival of the governor to formally "open" a new prepaid standpipe, October 2013.

and they are supposed to resell at 2 KSH (USD 0.027) per 20-liter jerry can or container. Often they charge more, because of overhead that may include protection money to a gang or cartel operating in the area.

Water vendors sell water by the jerry can for 2 to 5 shillings each, but the price can rise above 15 shillings in times of scarcity. There have been proven instances of local gangs and cartels colluding with utility officials to create artificial shortages to boost informal water prices.

Nairobi Water started piloting prepaid standpipes in late 2013, and had installed six by early 2014 (Photo 4). The tariff is 50 cents (USD 0.05) per 20-liter container, which is lower than the lowest block of the rising block tariff for individual connections. The utility aims to introduce 2,000 prepaid standpipes over the next five years, and hopes to enable mobile phone-linked credit purchases as soon as possible. NCWSC aims to mitigate supply interruptions that affect the performance of prepaid standpipes with overhead tanks to provide a continuous supply of water at communal tap stands.

It remains to be seen whether the gangs and cartels will tolerate the introduction of prepaid meters that undercut their prices.

Finance, funding, and revenue

Sales for prepaid individual connections are currently subeconomic. The proprietary software used could not accommodate the combination of a standing charge and rising block tariff used for residential customers with postpaid connections. The average tariff being used is less than customers would pay if they were using a conventional meter with postpayment. The utility is modelling tariff options and aims to adopt a fixed tariff per kiloliter for prepaid meters.

Summary

Nairobi Water acknowledges that it underestimated what it takes to run a prepayment system for individual connections in a city with frequent supply interruptions and low water pressure, and is undecided about whether to proceed with further installations. It is, however, committed to scaling up prepaid standpipes in informal settlements, to help meet its social obligations to provide more affordable water to low-income city residents.

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