



Last mile infrastructure for water provision in developing countries

DETAILS

SECTOR | Water

STAGE | Operations and Maintenance

TECHNOLOGIES | Water kiosk, smart metering, innovative business models

SUMMARY

Last mile infrastructure for the water sector is the connection of water access to a user's home or community. This solution is a commercially viable way of providing that infrastructure to a broader range of stakeholders through the application of the correct treatment technology, digital metering and payment, and a business model that incentivises the provision of this infrastructure. This solution is available to both private and public infrastructure service providers. Public utilities can take on the elements of the solution or outsource it to a private provider.

The last-mile market segment refers to peri-urban and rural areas, who remain unserved by most water operators. Decentralised water technologies can provide cost-effective and sustainable means of accelerating national and global strategies (e.g. the Sustainable Development Goals) to provide access to safe drinking water without the substantial investment typically needed for conventional centralised water infrastructure. Digital technologies are enabling new, commercially feasible, business models and decentralised infrastructure options that can enable the provision of access to clean water for last-mile customers.

Developing countries often lack access to clean and safe drinking water, especially in non-urban areas. More than 785 million people currently lack access to basic water services, 80% of which lived in rural areas¹. Technical solutions are known and available, but their application remains challenging, primarily because water operators and their funders lack the confidence that investing in the last-mile market will provide a financial return. Smart meters (*see also the Smart Meters Use Case*) and digital payment platforms allow water operators to service areas with increased confidence in the business case.

This combination of digital and treatment technologies can enable last-mile communities to have access to clean water through local water kiosks and community water automatic service providers.

The provision of this technology is currently limited to a few providers but future direction can include more providers offering this in more regions or governments could adopt a similar model for water provision where applicable.

¹ UNICEF. *Progress on household drinking water, sanitation and hygiene: 2000-2017*. 2017. Accessed 10 April 2020

VALUE CREATED

Improving efficiency and reducing costs:

- Avoids prohibitive upfront expense of large treatment plant and piping projects through scalable, portable and quickly deployable plants

Enhancing economic, social and environmental value:

- Increases access to clean water and therefore also associated benefits in health, development, productivity and social outcomes
- Access to water can help the management of health pandemics (e.g. clean drinking water and facilitating hand washing for personal and community hygiene)
- Increases revenue for water authorities and operators through the increasing customer base and more effective billing strategies (prepaid metering)
- Access to clean water is a platform to boost economic growth
- Water connected to the home or community allows residents to stay home rather than travel for water
- Successful early adoption, can potentially drive local economies and encourage more investment into developing last mile infrastructure
- Lower energy requirements of decentralised treatment enables off-grid operation on alternative energy sources
- Last-mile technologies and business models could assist communities to deal with natural disasters and pandemics by providing clean water to end users. Decentralised systems are less likely to be affected by large scale events

POLICY TOOLS AND LEVERS

Legislation and regulation: Local and national government strategies and development targets should be set for water supply coverage. Flexible tariff adjustments and regulatory frameworks should be allowed as new and alternative business models may be new ground for regulators managing tariff and pricing structures. Collaboration between regulators, operators, solution providers and communities is needed.

Funding and Financing: Funding is required to invest in technology for rural areas and technology transfer to bring proven technologies into developing countries. New business models enabled by these new technologies can help to attract greater private finance.

Procurement and contract management: Governments could open up the types of concessions they allocate to allow more micro-concessions that suit this style of operation. Incentivising entrepreneurship in developing areas will drive the uptake of new business models. In conjunction with this, the operator workforce will need to be upskilled to install and operate last mile infrastructure.

IMPLEMENTATION

Ease of Implementation



The technologies are not complicated but the environments they are intended for are challenging. The implementation of last mile infrastructure can be undertaken by either public or private entities but requires the cooperation of government to coordinate.

Cost



Last mile infrastructure is low cost, primarily because it is small scale and infrastructure is concentrated at the point of use. Therefore, large operational costs due to large transmission pipes and pressure boosting from centralised options are avoided. Decentralized water treatment and water meters are low-cost infrastructure items.

Country Readiness



These solutions are intended for developing countries so should be able to be adopted by any country. However, developing mobile and internet networks and infrastructure in developing countries may be necessary to enable access to mobile and digital payment platforms.

Technological Maturity



The underlying technologies have trickled down from mature technologies, although the use of them in this application is relatively new. Different business models for serving last mile customers are also in early commercial stages. More development and fine tuning is needed to ensure potential benefits are realised.

RISKS AND MITIGATIONS

Implementation risk

Risk: Due to water scarcity there may be insufficient water resources to supply rural areas.

Mitigation: Sustainable and innovative solutions in water reuse and treatment can assist in augmenting limited supply and should be coupled with education in demand management.

Risk: Currently, water operators in developing areas can lack confidence that they can provide necessary levels of service, i.e. clean water at an affordable price. As such, there is the risk of operator revenue reduction as customers will only pay for water they use rather than minimum service fees.

Mitigation: Investment into increasing service levels of operators through use of appropriate treatment methods and ensure adequate bulks supply to meet demand.

Safety and (Cyber)security risk

Risk: Digital payment platforms are at risk of cyber security threats which can jeopardize customer personal and banking details.

Mitigation: Appropriate cyber security measures need to be taken to ensure data safety.

Social Risk

Risk: Generally, water providers operate as an area-monopoly where they are the sole provider for a particular area. This may lead to predatory pricing where communities may overpay for water services.

Mitigation: Regulatory bodies will need to be created to scrutinize and ensure appropriate pricing for last mile operators. Given the decentralised model and the option for private entities to provide water, this may not be an issue where there will be competition from different “kiosks” and providers.

EXAMPLES²

Example	Implementation	Cost	Timeframe
UNTAPPED	UNTAPPED and Mathira Water and Sanitation Company (MAWASCO) ran a proof-of-concept project in Malindi, a coastal town in Kenya with a population of over 300,000 installing 6,500 Pay-as-you-Go Smart meters on an 18-month capital lease.	Over three years, MAWASCO recovered billing arrears and saved operating costs while covering their equipment lease payments. Moreover, the cash flow going through the UNTAPPED Digital Payments Platform was at 5.4 times of lease payments.	Untapped are expanding the metering service in Kenya to service and extra 550,000 customers by 2021.
CityTaps	In 2016, CityTap piloted its smart, pre-paid water meter (CTSuites) in Niger with the local water utility and has since been expanded from 20 to 1,325 CTSuites. This has positively impacted more than 13,000 people in the local community.	Households reported that they were able to better manage their water budget. The water utility Niger experienced commercial benefits from expanding their customer base and increasing the number of subscribers. 98% of subscribers have said would recommend CTSuite to a neighbour, while 72% of neighbours have said they would like to try the solution.	By the end of 2020, CityTaps expects to impact nearly 100,000 people in Niger through the installation of 10,000 additional CTSuites.

² Information for Examples in this use case was gathered via communications with commercial technology stakeholders.