Thinking Outside the Pipeline: Venturing into Distributed Off-Grid Water Markets

Traditionally, IFC’s engagement in the water sector has focused on large municipal infrastructure projects, where individual transactions are of sufficient scale to attract commercial project finance. Such projects, involving capital-intensive network infrastructure, can often be commercially attractive but have generally failed to provide access to poorer consumers living outside of formal urban centers. So what about the “base of the pyramid” populations that those large utility systems fail to reach—rural communities, and sometimes poorer urban customers living within informal settlements and rapidly growing peri-urban areas? New business models are needed, adapted to the reality of water-supply necessities in the developing world, but with the economies of scale required to achieve financial sustainability. This SmartLesson describes some early ventures by IFC to invest in and develop market opportunities in the challenging but potentially far-reaching area of distributed off-grid water supplies.

Background

How do you increase access to water for the hundreds of millions of consumers living outside of large formal urban centers? This question has long been considered a concern of the public sector, to be dealt with by governments and subsidized by donor and nongovernmental organization (NGO) programs. However, despite huge investment and effort—registered aid to Sub-Saharan Africa alone for water and sanitation is close to $3 billion per year—sustaining increased access to clean water remains a challenge. And even where public investments have succeeded in putting in place the necessary infrastructure, the technical capacity and cost-recovery mechanisms required for long-term sustainability of operations are often lacking. The prospect of greater water scarcity, due to population growth and climate pressures, compounds this challenge.

IFC has been seeking new ways to harness the innovation, technical skills, and financing of the private sector to provide affordable and sustainable water supply services to the “bottom billion” at the base of the pyramid who currently lack access to clean drinking water. One such opportunity is in the area of off-grid, distributed services (or “micro-utilities”), an approach to delivery of basic services, such as power and water, to rural communities across the developing world through small-scale, decentralized facilities. The economic driver behind this approach is the lowering of capital costs as a result of reduced grid-connection infrastructure (pipes and transmission cables), thus increasing the potential for financial sustainability, even for utilities serving small populations. IFC estimated the size of the global distributed water market to be about $114 billion as of 2005 (including packaged water and purification equipment and related services).

This concept of distributed services is not new; throughout the world, water has long been supplied via decentralized systems, from the

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1 African Minister’s Council on Water (AMCOW), September 2010, Country Status Overview on Water and Sanitation.
2 According to the WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (2010), about 900 million people lack access to any improved source of drinking water.
level of basic village wells upward. What is new is the recent emergence and growth of such models in market-based form. In 2004, a shining example of such innovation came in the shape of WaterHealth International (WHI) in India. (Box 1.)

The demonstration effect provided by the investment in WHI has provided a further impetus for IFC to think more systematically about the range of potential market opportunities in the water-supply sector. (Box 2.) In 2009, the Sustainable Business Advisory business line published the report Safe Water for All: Harnessing the Private Sector to Reach the Underserved, which provided an in-depth look at the barriers to greater private sector delivery of water and sanitation products and services to consumers at the base of the pyramid.

This study, in turn, has triggered the development of a Sanitation and Safe Water for All (SSAWA) program to support market-based approaches with the potential to expand access to water and sanitation services for lower-income consumers. The program, developed under Sustainable Business Advisory, Africa, began in Kenya in October 2010. It is exploring the potential of a range of market-based approaches, including in distributed off-grid markets such as vended-water kiosks, private operation of micro-piped community systems, and private provision of sanitation services. The program supports the development of scalable business models in these markets with the potential to achieve significant scale.

The lessons below are based on experience gained from the WHI investment and on the early knowledge generated from the establishment of the SSAWA program in Kenya.

**Lessons Learned**

1) Some form of aggregation is key to commercial viability and scalability.

In the case of large municipal water-delivery networks, high fixed costs mean that profit margins are closely tied to volumes of water billed. For small, decentralized systems, opportunities for increasing volumes are limited, while fixed operating costs (primarily labor) will be high. So the challenge is that individual operating or management contracts are often too small to attract private interest. Only via some form of aggregation can the model be financially sustainable, and therefore scalable.

Aggregation can be achieved in different ways. WHI, for instance, aggregates operating costs across systems, thereby reducing marginal costs of new installations. Technicians, for example, will be much more cost-effective servicing several locations rather than one. “Scaling across” provides

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Box 1: The WaterHealth International Model

WHI is a private company that installs, operates, and maintains WaterHealth Centres (WHCs) in villages and peri-urban areas in India and Ghana. WHCs have the capacity to purify large volumes of water, sourced locally, to provide safe water to communities of several thousand residents. The local community is responsible for providing land, access to a perennial water source, and in some cases a percentage of the down payment for the installation cost (which is generally in turn sourced through donor support).

Under this model, WHI can provide reliable access to treated drinking water at prices as low as $0.08 for 20 liters. The faith shown by IFC in the company through an early-stage equity investment of $1.2 million in 2004 has paid off, catalyzing over $29 million in external equity financing, a $15 million loan investment in 2009, and a follow-on $5 million equity investment in 2010 from IFC’s Infrastructure Department.

Box 2: The Operational Value of Private Sector Management in Water

Doing business in water supply is not easy. Returns in regulated markets—in which most utilities operate—are low, and in the water sector they can be restrictively low, especially in developing countries, where customers face financial constraints. In such an environment, efficiency is critical, and success depends on economies of scale, both in volume and in operations.

It is therefore not surprising that a major constraint facing small-scale water-supply systems in the developing world is the capacity of the operators to sustain service quality. In Kenya, for example, an estimated 40 percent of rural water systems are nonfunctional, consistent with figures elsewhere in Africa. Such systems can fail for financial or technical reasons, the latter often due to a shortage of technical skills or simply a lack of spare parts needed to sustain operations. The World Bank estimates lost investment due to nonfunctional systems in Sub-Saharan Africa at about $1.25 billion over the past 20 years.

Private sector participation has proved to be one potential means to overcome such constraints. For example, in the case of WHI, supply chain management and technical skills are “internalized” within the company, providing built-in operational capacity for any WHC for the length of the contract period (usually at least 10-years). Quality assurance is also motivated by the need to maintain brand quality and avoid reputational risks, while the profit incentive drives an emphasis on “counting the pennies” by pushing volumes and reducing costs at the same time.

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the economies of scale and volume needed to make the business model work.

In Kenya, the SSAWA project is designed to support businesses looking to develop similar scalable models with the potential to reach base-of-the-pyramid consumers. One approach being explored in the vended-water market is the franchising of purified-water kiosks to individual entrepreneurs, managed by a centralized operating business with existing expertise in water purification systems. Such approaches have achieved scale in Southeast Asian markets, and early research suggests that a similar opportunity may exist in Kenya.

Aggregation does not necessarily entail standardization, and the interests of the private sector are well suited to adapting business models to local demands. For example, in Kenya, as in many water-scarce countries, water for drinking is often just one of many sources of demand that can be tapped to reach the volumes needed to recover costs. Companies testing the market have found that demand for water for micro-irrigation and for livestock can make the economics of decentralized water systems viable in some locations where demand for drinking water alone is insufficient. In these cases, the viability of the business model will depend on whether the additional volumes offset the cost of the micro-piped systems needed to distribute supply.

2) Commercial finance can increase the reach of scarce public funds, while public funds can be a catalyst to scale up commercial approaches.

Investments in the water-supply sector often need a certain level of capital subsidy built into the funding structure. This frequently translates into overdependence on subsidies, which undermines the potential scalability of a business model and restricts a key benefit of private sector participation: the ability to raise commercial finance and equity.

Private sector participation in distributed services can offer flexibility in the blending of public and market finance, thereby maximizing the reach of scarce public resources. Different mechanisms are available to achieve this. For example, WHI is exploring an approach whereby the subsidy is tiered according to village size, with larger villages requiring lower subsidy levels than small ones. In another approach, the government uses a competitive bidding process to determine levels of subsidy needed for a cluster of water supply systems. Conversely, if an installation in a particular higher-income or densely populated area can be fully commercially financed, then the private sector can proceed on a purely market-financed basis, allowing public funds to go where they are needed most.

Take for example one promising market opportunity identified in the sanitation sector in Kenya. A local company, Ecotact, has pioneered a distributed service model for pay-per-use urban sanitation facilities marketed under the IkoToilet brand. Ecotact started out in selected high-traffic parts of Nairobi, where individual facilities were profitable—thanks to high customer volumes and innovative revenue streams such as external advertising and cross-sales of other products. With the visibility of the brand built and economies of scale established, the company is becoming creative in developing partnerships with the government and donors to expand facilities into schools and urban slums through blended public-private funding, thereby growing the business and increasing access to much-needed services.

3) Maintaining focus on comparative advantage and building strategic partnerships can be the difference between success and failure.

Where subsidies are necessary, the difference between success and failure frequently rests on the ability to be creative in developing partnerships. WHI achieved its current scale, for instance, in large part due to an extensive range of partnerships with development agencies, foundations, NGOs, and wealthy philanthropists. The key is to identify and leverage the added value of each partner—and potential win-wins that often go beyond financial support. For example, in partnerships with health-promotion NGOs, WHI benefits from increased demand generated by the NGO’s safe-water education campaigns, and the NGO benefits from linking its education work to new and reliable clean-water supplies.

While developing partnerships, the importance of specialization cannot be overstated. Under the WHI model, donors provide invaluable financial support, visibility, and
oversight; **NGOs** provide crucial education and awareness raising (a critical ingredient for early adoption of services such as safe water); and the **private company** sets up and operates the system. Moving activities and responsibilities from one partner to another can arguably compromise the health of the overall operation. For example, an NGO that is effective at raising donor funding may be tempted to set up and operate water supply systems within the communities it interacts with. It may be able to do so at competitive costs initially, but it is less likely than a private operator to have the incentives in place to sustainably run such operations for long periods. In contrast, a private organization will build operation and maintenance costs into the price of the service. And any impact on upfront costs is likely to be offset by the benefits of sustainable long-term, high-quality services.

Other examples point to the value of partnering with local financial intermediaries to achieve scale. In Kenya, for instance, the World Bank Water and Sanitation Program has helped establish a partnership between the local K-Rep Bank, the Global Partnership for Output-Based Aid, and local communities, to blend 40 percent market financing into small piped-water systems. In such cases, the local bank has the potential to act as a powerful “scale multiplier,” given its strong comparative advantages in identifying and appraising commercially viable business plans, and the incentives to reduce marginal costs by expanding project pipelines.

**Conclusion**

Scaling up off-grid, distributed water supply models via market financing and private sector operation will not come easily. This high-volume, low-margin business needs significant investment in operational infrastructure, plus management structures geared to meet the needs of rural retail environments. It is also a fragmented market, where the key to success lies in the ability to achieve scale through aggregation of some form. However, the prize is significant, because scalable distributed service models, operated and managed by the private sector, may ultimately prove to offer one of the most capital-efficient means for developing countries to accelerate increased access to safe water.

Through investments in companies such as WHI and advisory services projects such as SSAWA, IFC is playing both a practical and a thought leadership role in the development of new market opportunities in the water and sanitation sector. Indeed, a key objective of the SSAWA program in Kenya will be to encourage market development in this space and to identify and support the demonstration of more WHI-like business models. It is hoped that this will bring together investment and advisory services in catalyzing market solutions to the challenge of providing access to water and sanitation services for consumers at the base of the pyramid. We hope this SmartLesson is just a first installment in IFC’s emerging ventures into distributed off-grid water markets.