SCALING BLUEPRINTS OF WATER SUPPLY BUSINESS MODELS

A compilation of insights, milestones, benchmarks and data points along the journey of building impact-oriented water enterprises

Foreword

Water supply enterprises play a crucial role in achieving SDG 6 and related development goals. Over the past decade, various promising business models have been tested and developed to different extents. These models include, among others, Household Water Filters, Water Kiosks, Mini Grids, Preventive Hand Pump Maintenance, and Rural Utilities.

To thrive and generate impact, enterprises pursuing these models require different types of support at various stages of their entrepreneurial journey. But what exactly should water enterprises aim to achieve at these different stages? Which KPIs are most important for each business model? What external factors create a conducive context for a specific business model? What types of investments are needed at different points in the entrepreneurial journey? And how should financial resources be allocated? Answering these questions is key to guiding entrepreneurs, support organisations, funders, and impact investors in their efforts to establish viable models to improve water supply for all.

In an effort to address some of these questions, this document introduces what we call *Scaling Blueprints* for some of the business models most relevant to achieving SDG 6. These scaling blueprints encompass an analysis of the factors influencing the success of these models, as well as key milestones and financing needs at different stages of their development (maturity progression).

Based on interviews and literature reviews, this document draws on a decade of pioneering work by water entrepreneurs, financiers, support organisations, and sector experts, compiling key data points, insights, experiences, and lessons learned. In addition to these insights, we incorporated Cewas' own experience supporting water entrepreneurs since 2009 to draw conclusions and structure directional information.

We hope this publication contributes to building a pipeline of scalable, impact-oriented enterprises by making water supply business models more accessible to funders and impact investors, and by providing helpful guidance to water enterprises.

Disclaimer


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Acknowledgements

We extend our sincere gratitude to everyone who contributed to this project. Special thanks to the water entrepreneurs (many but not all of whom are mentioned throughout the document), financiers, and sector experts who generously shared their knowledge and experiences.

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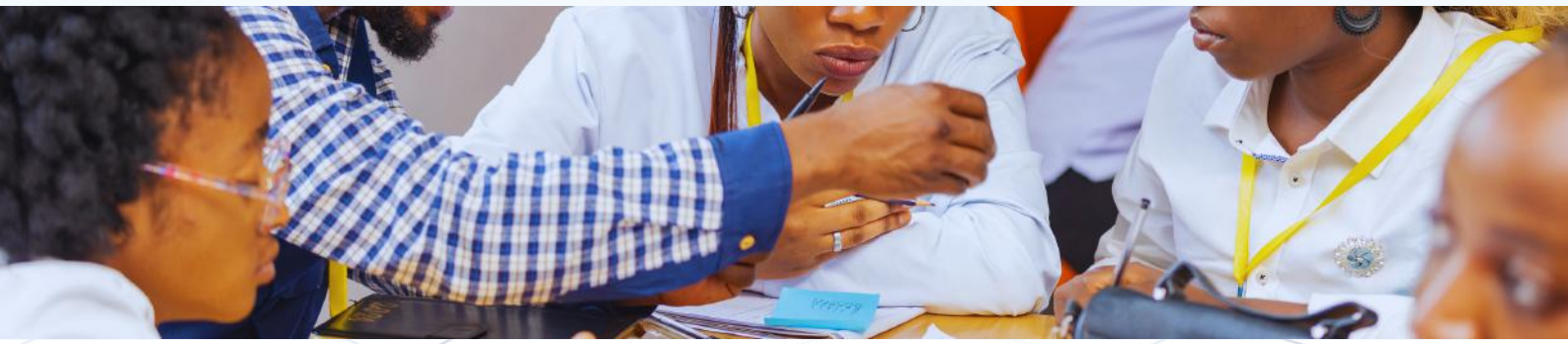
Our sincere thanks further goes to the Conrad N. Hilton Foundation, whose funding and trust in Cewas made the work on the Scaling Blueprints of Water Supply Business Models possible.

Abbreviations

BM - Business Model
CapEx - Capital expenditure
CapManEx - Capital maintenance expenditure
CNG - Compressed natural gas
CO2eq - Carbon dioxide equivalent
CRM - Customer relationship management
CSR - Corporate social responsibility
ERP - Enterprise resource planning
GHG - Green house gases
HH - Household
KPI - Key performance indicator
MFI - Micro finance institution
NRW - Non-revenue water
OpEx - Operational expenditure
O&M - Operation and maintenance
RBF - Results-based finance
RoI - Return on investment
R&D - Research and development
SDG(s) - Sustainable development goal(s)




HYDRO-ELITE SOLUTIONS
ADAPTOR
Solar panel
Solar Battery
IRRIGATION WATER
BRICK LAYING
Power plug
electric switch
DIRTY WATER CHAMBER
ACTIVATED CARBON FILTER
REVERSE OSMOSIS FILTER
UV STERILISATION CHAMBER
TAP
TARGET COMMUNITY
SAFE WATER
HYDRO ELITE OUTLET
TRADING CENTER
HOME
HEALTH CENTER
ENGARI VILLAGE
300 $
UNIT PRDN. COST
(Potential)
AREA
SERVICE
PROVIDER
COALITION
TORs:
Gov't
ASP's
Suppliers

Table of contents

Acknowledgements 4
Abbreviations 4
Scaling Blueprints 6
Benefits 6
The User Journey 7

SCALING BLUEPRINTS **8-32**
Section 1: **Household Water Filters** 8-13
Section 2: **Water Kiosk Models** 14-19
Section 3: **Mini Grid** 20-25
Section 4: **Hand Pump Maintenance** 26-31
Section 5: **Rural Utility** coming soon in the digital publication 32

ANNEX: Financing Enterprise Development **34-37**
External Financing for Enterprise Development 35
Types of Finance 36-37

About this Guide 38

Scaling Blueprints

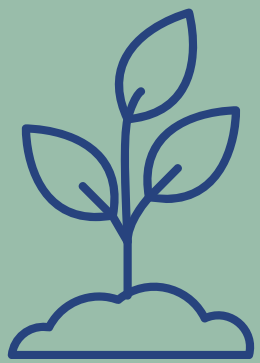
After a decade of pioneering efforts to expand safely managed water supply through social water enterprises, there remains a lack of comprehensive guidance on successfully establishing, funding, and expanding such enterprises. To address this gap, we have gathered a wide range of relevant data points, milestones, and insights pertaining to the key business models that directly contribute to safe water supply. This document synthesises our findings into what we call 'Scaling Blueprints', which outline the various stages of development—from inception to expansion—of these enterprises.

In crafting these blueprints, **we had to simplify the intricate process of building water supply enterprises**. In reality, **numerous variations of each presented business model exist, and enterprises often combine aspects of multiple models**. We urge users of this document to duly consider the need to adjust business models and tailor implementation strategies to the varying contexts and challenges of water provision.

Benefits

The Scaling Blueprints compile available experiences, insights and data into fundamental water supply business models in developing markets. They provide guidance that helps maximizing impact through WASH entrepreneurship by:

- Building a thorough **understanding** of **different** water supply **business models** and their prospects
- Specifying **KPIs, milestones and strategies** to create impact through viable business models
- Guiding **enterprise mapping and due diligence** with a clear enterprise typology and tailored criteria
- Determining **opportunities and risks** based on success factors, requirements and potential barriers
- Facilitating the **comparison** of investment options, portfolio choices and types of investments
- Identifying **barriers** and options to **improve the enabling environment** for specific business models to thrive



We hope that the blueprints provide both entrepreneurs and impact(-first) investors who seek to solve the water crisis with relevant insights into a very specific niche sector.

The User Journey

The ‘Scaling Blueprints’ can be used by foundations, philanthropic and impact-first investors, donor agencies promoting market-based approaches in WASH and intermediaries, who seek to:

01 Objectives

Establish specific objectives and suitable impact and return options, based on an **overview of impact models** as well as **scaling pathways** and **timelines**.

02 Entry Points

Identify a portfolio of suitable business models by **matching prospects** of the respective models **with investor needs**.

03 Investment Options

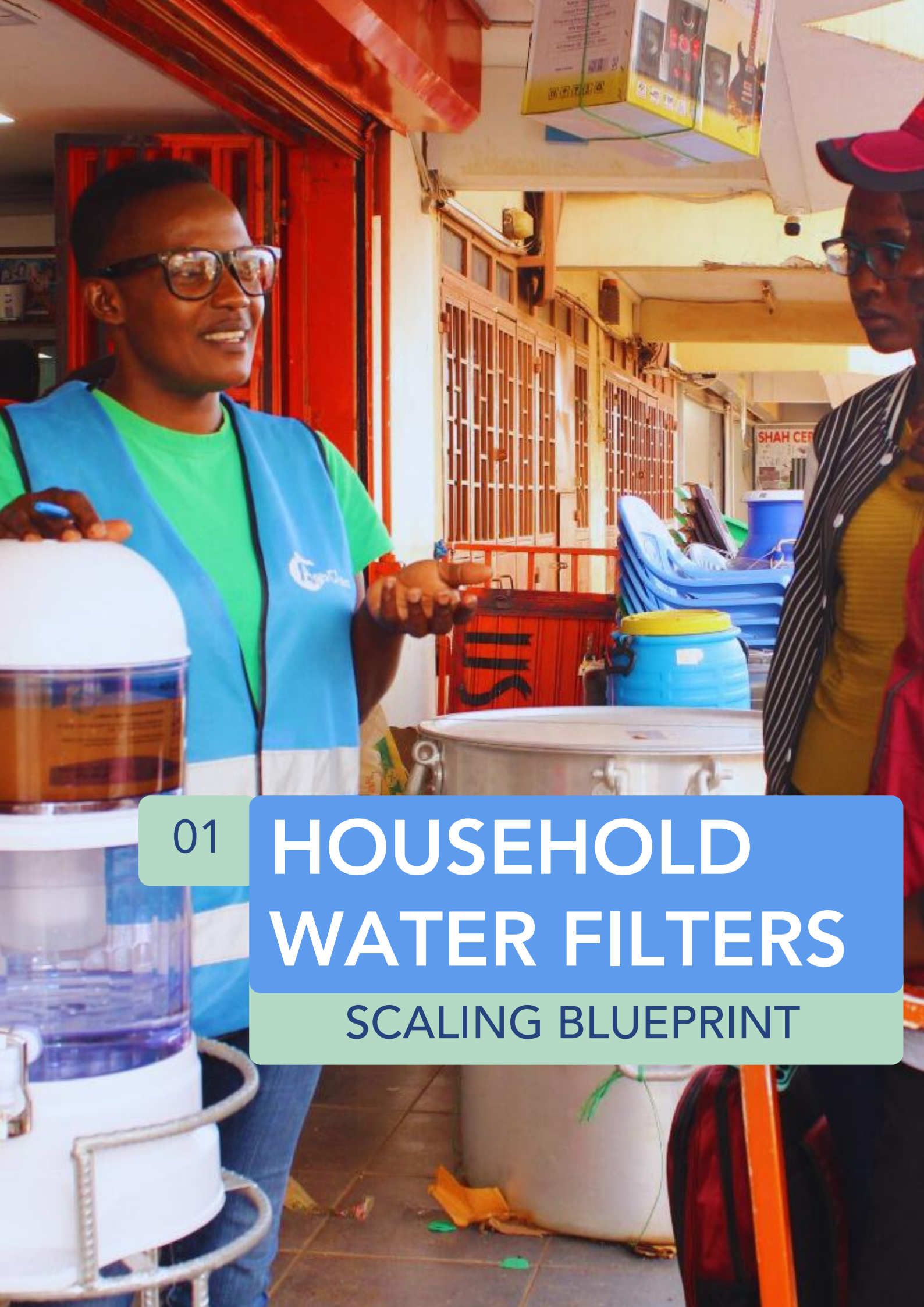
Understand success factors and financing characteristics, using **data-based benchmarks** to **analyse** investment **options**.

04 Operation-alize

Analyse markets and the investment pipeline, with an overview of **requirements**, **success factors** and **stages of enterprise development** for different business models.

05 Investment Support

Inform your due diligence, post-investment monitoring and technical support, based on **business model specific KPIs**, benchmarks, **milestones** and timelines.



01

HOUSEHOLD WATER FILTERS

SCALING BLUEPRINT

01 HOUSEHOLD WATER FILTERS

BUSINESS MODEL

Water filter enterprises gear their products and services towards communities lacking access to clean drinking water for long-term household use, as well as use during humanitarian contexts. The affordable and portable water filtration solutions remove contaminants and pathogens, ensuring water is safe for consumption. They can reach remote areas and generally distribute through local (often female) on-sellers, who purchase the filters in bulk through collaboration with micro-finance institutions.

The local distributors reach out either directly to customers, or to intermediary customers such as governments, community centres, healthcare facilities and relief organizations to deliver the product, and provide education and after-sales service. Sales are often accompanied by community outreach, education, and partnerships to promote health and hygiene practices.

BUSINESS MODEL VARIATIONS

- This business model sees variations focused on the type of customer and minor product adaptations. Many business models started out in a humanitarian context, which some continued to focus on, whereas others moved to lower income households. The last-mile distribution being the most cost-intensive, some businesses collaborate with or expand to the cook-stove and solar lamp fields, and all successful businesses move from local on-sellers to higher level distributors. Profitability increases significantly with the use of carbon credit schemes.
- Replacement of filter elements can generate recurring revenue from customers and contribute to financing after-sales services and monitoring activities. Since such offers affect both the operational elements of the business model as well as the value proposition, not all businesses use replacement components.

REQUIREMENTS

- Last-mile distribution systems and value chains for similar target groups (e.g. for cook stoves / solar home systems) should be somewhat established
- Existence of Micro-Finance Institutions (MFIs) with adequate regulation thereof
- National regulation accepting of water filters or third party verification (e.g., WHO certificate)
- Government policies and NGOs actively promoting safe drinking water

TYPE OF IMPACT

- Affordability of safe drinking water
- SDG 3.3: End water-borne diseases

FINANCING OPTIONS

- Grants and awards to start up
- Debt finance for working capital
- Equity impact investments for expansion and establishment in new markets
- Carbon credits to subsidize sales and offer after-sales services
- Micro-finance for on-sellers and distributors
- Debt at low interest rate focused on businesses working with low-income households
- CSR funding for awareness campaigns and projects that support demand creation

01 SCALING BLUEPRINT

Investing Along Maturity Progression

01 R&D & Market Testing	02 Business Model & Production	03 Unit Profitability
6-12 MONTHS	6-12 MONTHS	+ 1 YEAR

Business Milestones

Develop & certify own filter(s). Product - market fit established with B2C customers through sales to **>1K customers** in initial target market.	Increase sales with a clear product pricing, achieving **20-30% margin** on cost of goods sold. 	Break-even based on increased production capacity for at least **1K units per month**, and building a system that monitors **>10K filters** as a basis to leverage carbon credits

Impact & Return

Entrepreneurial engagement in rural water supply triggered	Up to **10K households** benefit from safe water and savings of up to USUS$200/a. **~50 CO2eq reduced per annum.**	Up to **100K households** benefit from safe water and savings of up to USUS$200/a. **~50 CO2eq reduced per annum.**

Required Resources

US$20-50K from awards, start-up grants and self-financing. + support through incubation, coaching and/or on-the job trainings	**US$100K** as a mix of grant funding, debt (for inventory finance) and potentially equity	**US$150-250K** typically as a mix of grants & concessional loans

CapEx Investments

• Equipment for assembly workshop • Depending on the distribution model, potentially purchase vehicles	• Purchase models and set up lean production / assembly workshops	• Invest into distribution hubs, storage infrastructure and workshops for maintenance & repairs • Reduce production costs through efficiency investments in production (or localisation of supply chains and / or outsourcing of production)

Working Capital

• Refine marketing strategy • Piloting distribution channels (e.g. storage hubs, saving groups, MFIs) • Develop after sales services and processes to monitor and ensure proper use filters	• Refine marketing strategy • Piloting distribution channels (e.g. storage hubs, saving groups, MFIs) • Develop after sales services and processes to monitor and ensure proper use filters	• Develop finance, HR, and marketing teams • Develop a data-based monitoring and inventory management systems • R&D to diversify product portfolio • Continuous investments into the training and expansion of sales teams to increase coverage and market penetration

Value Chain

• Campaigning to raise awareness on benefits of safe drinking water and purification with household water filters.	• Potentially leverage CSR funding (linked to off-set models for water use) for awareness raising initiatives	• Establish partnerships to centrally source materials for production partner; and build a network of service partners to enable distribution and ensure after-sales services in remote areas.

04 Demand Creation & Market Expansion

+ 2-3 YEARS

05 Replicating Units / Scaling

+ 2-5 YEARS

Business Milestones

Capacities to produce 10K units per month, and building a system that monitors **>10K filters** as a basis to leverage carbon credits

Sell 2 million filters within **5 years** and establish profitable operations in at least **2 countries**

Impact & Return

At least **250K households** benefit from safe water and savings of up to US$200/a.
~125 tons CO2eq reduced per annum

At least 2 million households benefit from safe water and savings of up to US$200/a
~125 tons CO2eq reduced per annum

Required Resources

US$150-250K typically as a mix of grants & concessional loans

US$100K-200K to finance expansion to other countries.
+ pot. up to **US$ 1M for CapEx investments** in debt and equity depending on production setup

CapEx Investments

- Invest into distribution hubs, storage infrastructure and workshops for maintenance & repairs
- Reduce production costs through efficiency investments in production (or localisation of supply chains and/or outsourcing of production)

- Purchase models and set up lean production / assembly workshops

Working Capital

- Certification of impact data
- Leverage carbon credits to subsidize salaries and overheads and bring down market price
- Continuous investments into the training and expansion of sales teams to increase coverage and market penetration
- Make governance adjustments to set business up for commercial investments*

- Expand team and corporate structures
- Potentially invest into the development of commercial product lines to subsidise mission products
- Establish long-term carbon credit projects to allow offering filters at a reduced price, while establishing a pathway towards generating RoI for investors

Value Chain

- Establish partnerships to centrally source materials for production partner; and build a network of service partners to enable distribution and ensure after-sales services in remote areas.

- Establish additional distribution channels

*Aqua Clara Kenya, for example, opted for a setup in which a non-profit entity fully owns a for-profit entity. The shares of the non-profit entity get diluted if investors become shareholders in the for-profit entity.

Investment Model - KPI Targets

Aside from knowing what to invest into and when, it is key to establish performance targets. These assist in monitoring whether you are progressing on your scaling journey. Specific targets will depend on the context in which you operate, your pricing strategy and various other factors.

The following section provides EXAMPLES of targets and target ranges for KPIs affecting the impact and viability of household water filter models, compiled based on insights from Aqua Clara (Kenya), Nazava (Indonesia and Kenya) and Spouts (Uganda).

Cost of Production

In the process of scaling their production, Aqua Clara Kenya is bringing production costs down to approx. 1'800 KES (14 USUS$) from around 2'400 KES, by using more local materials, sourcing input materials in bulk and outsourcing assembly, etc.

Aside from the cost of production, the sales commission is a key factor contributing to the price for the end-user. Aqua Clara offers a commission of 500 KES per filter and Nazava calculates a commission into the product price.

and Density of Customers

Aqua Clara Kenya and Nazava have annual sales targets ranging from 15'000 to 35'000 filters per year per country. Long-term sales targets at the scaling stage can reach as high as 500'000 filters per year to establish operations at scale, generating attractive returns on investment.

After-sales services are typically managed by regional teams that provide follow-up support, visit customers to monitor filter usage, and ensure maintenance. To optimise logistics, these teams ideally serve dense clusters of customers.

Distribution Channels

Aqua Clara Kenya operates with a model of distribution hubs and a minimum sales target of 350 filters per hub and month. Currently at expansion stage, ACK plans to setup 10 additional hubs within 3 years.

Nazava has successfully scaled the distribution of water filters in Indonesia through cooperation with MFIs that provide pre-financing for saving groups and sales agents to buy filters from Nazava.

Market Penetration

Local sales agents have been reported to cover up to 80% of targeted villages. While these agents typically operate with monthly sales targets of 30 to 50 filters, the income opportunity for sales agents decreases as market penetration increases.

Investment Model - Other Parameters

Market Price for Household Water Filters

A pricing and financing model that matches ability and willingness to pay of BoP customers is key to scaling HH water filter models. By reducing costs from 3'700 KES to 2'500 KES (~20 USUS$) in pilots Aqua Clara has seen conversion rates triple. Spouts is selling its Purifaya filters in Uganda starting from 100K UGX (~25 USUS$). Nazava has been able to sell close to 200K filter units in Indonesia and other countries with prices ranging between 20 to 40 USUS$ and replacement filters priced at 8 USUS$.

Cost Reduction for Safe Drinking Water

As a benchmark, Nazava and other household water filter enterprises claim to reduce costs for safe drinking water by >95% as compared to bottled water alternatives.

Subsidising Filters with Profit Margins of High End Products

By targeting more affluent customers with commercial products, HH Water Filter businesses can cross-subsidize mission products for the BoP. For this purpose, commercial products should be priced to yield a 50% profit margin, while maintaining a strong comparative advantage with water dispensers.

Certified CO2 Reductions

Carbon finance offers a relevant revenue stream for HH Water Filter businesses. For continuously used filters, enterprises can obtain mitigation certificates of up to 3 tons of CO2-eq per year.

02

WATER KIOSK MODELS

SCALING BLUEPRINT

02 WATER KIOSK MODELS

BUSINESS MODEL

Water kiosks (or water vendors) provide a modular, decentralized approach to delivering safely treated drinking water, which is typically sold in bottles or 20 liter containers that are collected at a storefront or home-delivered. Water kiosks offer complementary services to centralized water supply, targeting customer groups who are currently unserved by piped networks as well as those using unsafe water from piped supply.

The value proposition of water kiosk models revolves around a promise of high quality water for domestic consumption. The business model highly depends on the amount of water sold (demand for water is subject to seasonal fluctuation). Given the low brand loyalty of customers, the model needs to also focus on getting the water as close as possible to the customer and invest into sales and marketing to achieve the market penetration that is critical to to success. Given the comparably high capital expenditures (CapEx), it is important to use the production capacity of the the infrastructure assets effectively.

BUSINESS MODEL VARIATIONS

- Variations of this business model are characterised by the source of water and the delivery mode.
- The water source affects the cost and available amount. The two main variations of this business model are water kiosks that have their own source (requiring extraction permits) and on-seller models that purchase water from utilities in bulk, treat it and act as last mile distributer.
- The rather passive fetch and pay model is usually applied in kiosks run by centralised utilities and NGOs and has limited quality assurance and convenience, as customers collect water in their own containers. Bottled water models are often more entrepreneurial, adapting different approaches to bring water closer to the customer, focusing on actively taking market share and overcoming the lack of brand loyalty.

REQUIREMENTS

- Service provision licenses or agreement with local government, water extraction permits or bulk water agreement with central utility
- Tariff autonomy or sufficiently profitable tariffs; Note: Sales price affects viability and affordability and fluctuates between countries and (peri-)urban and rural contexts
- Clarity on taxes that apply to (bottled) water sales from kiosks
- Capable local kiosk operators
- Presence of alternative water sources can be a limiting factor

TYPE OF IMPACT

- SDG 6.1: Kiosks provide customers with basic water supply
- IRIS+: Public water point coverage

FINANCING OPTIONS

- Grant & debt financing for CapEx: Enterprises have reported costs ranging between 20-50K USUS$ per water kiosks and 6-10K USUS$ per water ATMs
- Ground water quality further affects CapEx: with good quality, CapEX can be as low as 18k USUS$/unit, for polluted peri-urban sources it can reach 55k–87k USUS$/unit*
- Self financing, grants or debt for operators to start-up kiosks and reach unit break-even
- Grants and/or equity for working capital to bring holding company to break even (particularly as units may be profitable but company overhead may not be covered for extended periods of time)

02 SCALING BLUEPRINT

Investing Along Maturity Progression

01 Starting Up	02 Initial Growth	03 Proof of Concept
6-12 MONTHS	+ 1-3 YEARS	+ 1-3 YEARS

Business Milestones

1-3 kiosks set up Each selling 1'500 L / Day, reaching cost coverage of operations	At least **10 kiosks set up** >5 kiosks operating with full cost coverage	Proven scaling model with based on profitable unit economics of **20-30 Kiosks** operated at >**120% cost coverage**

Impact & Return

• **Basic services for up to 2K people** across all kiosks • Creation of **2 - 5 jobs**	• **Basic services for up to 10K people** across all kiosks • Creation of **10 - 15 jobs**	• **Basic services for up to 10K people** across all kiosks • Creation of **25 - 30 jobs**

Required Resources

US$50-100K typically self finance, award funding and/or start-up grants	**US$200-400K** likely a mix of public finance and grant funding/RBF, possibly combined with a service agreement with utilities	**US$300-600K** combination of grants / RBF public and/or debt finance

CapEx Investments

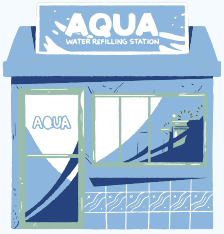
• Kiosk CapEx, including building, filtration system and initial rent • Investment in logistics assets (bikes, etc.) if you are delivering	• Investments into kiosk network expansion • In case of delivery investment into fleet expansion (purchase of additional bikes)	• Further capital for kiosk setup, inventory and fleet expansion, in case of delivery models • Investments into operational & technical efficiency, e.g., via billing platform, mobile payments, PAY-Go

Working Capital

• Location and community buy-in • Obtain permits, licenses & agreements • Initial team development and office rent • Establish a CRM system • Initial inventory finance for bottles • Trial and error to set up effective sale efforts to reach targets on market penetration, # of customers and volume of water sold	• Development of financial, technical/operational and M&E team • Enhance sales, marketing and branding • Establishing internal systems and processes to manage a growing team • Data collection on kiosk performance, operations and maintenance (O&M) • Replacement of bottles and additional inventory	• Inventory sourcing adaptations to shift towards sourcing locally • Setup customer response mechanisms • Replacement of bottles and additional inventory • Investment in expanding technical / operational, financial and M&E team • Systematic sales & marketing, efforts to drive market penetration, e.g., through competitions, incentives for operators, etc. • Roll out of additional products and services, like selling CNG bottles for cooking, porridge, selling water to farmers or water bowsers, offering hand pump maintenance or adding household connections, etc.

Value Chain

• Acquiring initial approvals & permits is tedious for the first kiosks, where no guidance is in place	• Potentially engage with government to establish awareness / sensitisation campaigns on safe water	• Possibly investments into capacities of partners to enable local sourcing of inventory • Potentially engage with government to establish awareness / sensitisation campaigns on safe water



04 Expansion

+ 2-3 YEARS

05 Profitability

+ 2-5 YEARS

Business Milestones

Geographical expansion with operations in at least two countries and annual growth rate of 20% - 30%

Enterprise reaches overall viability / profitability through optimisation and maintains steady growth

Impact & Return

- **Basic services for up to 20K people** across all kiosks
- Creation of **25 - 50 jobs**

- **Basic services for up to 250K people** across all kiosks
- Creation of **+200 jobs**
- Interest on debt funding & RoI on equity

Required Resources

Depending on expansion strategy & technology this stage could require around **US$1M**
Mix of grant, debt and equity, likely including >50% grant funding to facilitate growth

US$5M+ in (sub-)commercial debt and/or equity finance for Capex and equity for working capital

CapEx Investments

- Further capital for kiosk setup, inventory and fleet expansion, in case of delivery models
- Investments into operational & technical efficiency, e.g. via energy sourcing and management

- Further capital for kiosk network (and fleet) expansion
- Roll-out of proven investments into operational & technical efficiency across entire portfolio

Working Capital

- Corporate governance, including setting up a board of directors
- Continued investment into internal systems & processes
- Geographical expansion
- Investment in expanding technical / operational, financial and M&E team
- Systematic sales & marketing, efforts to drive market penetration, e.g., through competitions, incentives for operators, etc.
- Roll out of additional products and services, like selling CNG bottles for cooking, porridge, selling water to farmers or water bowsers, offering hand pump maintenance or adding household connections, etc.

- Adapt and align corporate governance to growth and expansion, including to new countries
- Tailor internal systems & processes to growth strategy

Value Chain

- Possibly investments into capacities of partners to enable local sourcing of inventory
- Potentially engage with government to establish awareness / sensitisation campaigns on safe water

- Invest into clarifying processes and creating conducive conditions in new target markets

Investment Model - KPI Targets

The scaling model for water kiosks depends on profitable unit economics. The scaling formula to reach profitability is composed of the # of kiosks, the market share and the consumption per month. Final targets depend on the context in which an enterprise operates, your pricing strategy, overhead costs for running kiosks via a central office, among others.

The following overview provides KPIs for water kiosk models and provides EXAMPLES of targets and target ranges that we compiled based on insights from the Stone Family Foundation, 1001fontaine (Africa/Asia), Jibu (East Africa), drinkwell (Bangladesh), Swiss Fresh Water (Senegal), Naandi (India), Iriba (Rwanda), and UDUMA (West Africa).

Consumption per Sales Point

Targets for water sales per kiosk typically range from 60K to 90K liters per month for financially viable operations.

With water ATMs, drinkwell sets a minimum target of 80K liters per month to cover OpEx, but has a benchmark of ~200K liters per month and water ATM.

To meet sales targets, drinkwell - who operate water ATMs in urban areas - also sets the target of selling 70 pre-paid cards per ATM and month, which can be seen as a proxy indicator for additional customers gained.

Number of Customers

The # of customers highly depends on the target market. In urban target markets, water kiosks can serve up to 200 customers per day (equivalent to ~1K beneficiaries). In India, Naandi has been serving 125 to 145 daily customers per station in less densely populated rural areas.

Water kiosks typically need to be located in settlements of 1000+ households to be able to access a sufficiently large pool of customers to ensure minimum sales volumes (Dalberg, 2017).

Pricing

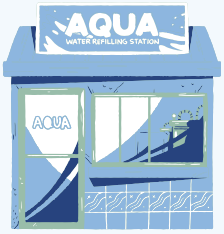
To live up to the ambition of being an impact-oriented water enterprise, water kiosks need to make access to safe drinking water affordable to the Base of the Pyramid (BoP). Water prices should enable customers to purchase drinking water for direct consumption (approx. 2 liters per person per day) for <3% of the available income.

Purchase power of clients varies significantly between urban, peri-urban and rural areas, thus influencing princing and financial models.

As a result, tariffs range from 0,02 USD/20 L to >1,5 USD/20 L (Dalberg, 2017).

Unit Profitability

In Jibu's scaling model, an average **net profit per kiosk unit of 20%** provides the basis for CapEx repayment under concessional revenue based loans.



Investment Model - Other Parameters

Consumption per Customer

Based on the consumption targets per sales point and the number of customers, each client need to purchase between 8 and 15 litres per day, depending on the market and context.

UDUMA sets targets of selling at least 8 litres per customer per day, which matches sales estimates by Swiss Fresh Water of 240 litres per family per month.

Market Penetration

For financial viability, water kiosk models typically need at least 20% market share (market penetration) in target markets.

A key challenge for water kiosk model is low customer loyalty. To increase market penetration (as well as consumption per kiosk and # of customers), the product must be brought as close as possible to the customer.

Asset Utilisation Level

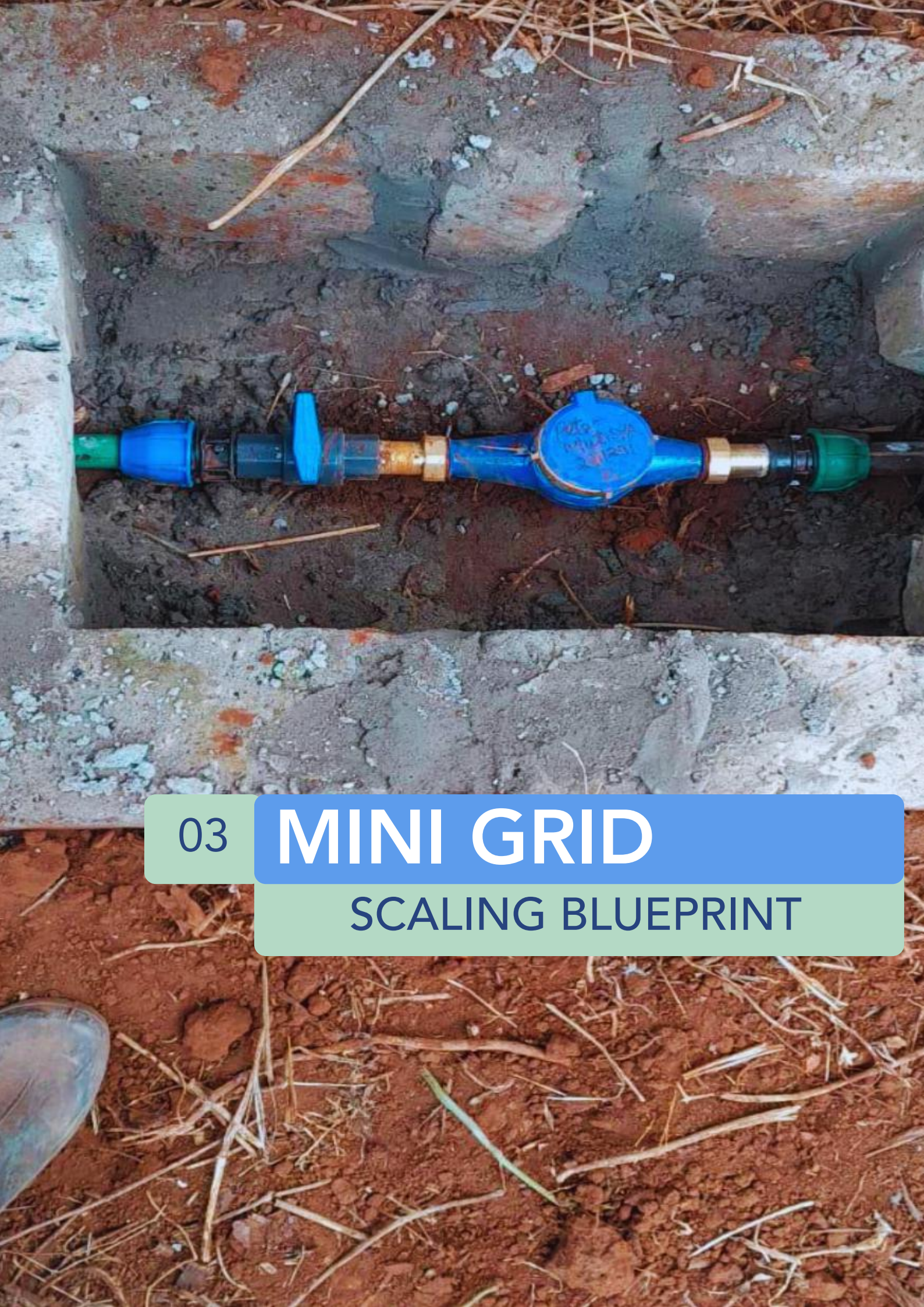
Costs for production & treatment infrastructure make up a large share of the CapEx of water kiosks; it is therefore crucial to reach a high utilisation level (sweating kiosk assets) for a viable scaling strategy: Performance should at least be above 50% and ideally around 70% of the available production capacity.

Dalberg (2017) showed that many kiosks use less than 20% of their production capacity. Often 2 hours of production a day could service the sales targets. Establishing a hub and spoke model allows reaching higher utilisation levels.

Time for CapEx Repayment

Depending on the technology, pricing model and target market, repayment for CapEx investments into water kiosks can range from 2.5 to 6 years (based on insights from drinkwell and Jibu).

Dalberg (2017). The untapped potential of decentralized safe drinking water enterprises. Dalberg Global Development Advisors on behalf of Aqua for All, Danone Communities, The Stone Family Foundation, Osprey Foundation and Conrad N. Hilton Foundation.

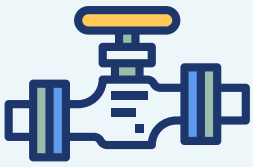


03

MINI GRID

SCALING BLUEPRINT

03 MINI GRID



BUSINESS MODEL

A mini grid is a decentralized water supply system that runs in a small town or collection of villages (between 500 and 5K connections). It uses its own water source, pumps to storage, treats and distributes water through a variety of delivery options (including household connections but sometimes also collection points, delivery, or bottled water). The infrastructure, maintenance and management models can vary, but normally include water pumping from underground or surface water, treatment, delivery and maintenance through in-house or external service providers.

Water delivery from mini grids adds value to customers by allowing them to comfortably access larger quantities of water at home. The value proposition evolves more around convenience than water quality. The success of mini grid models depends heavily on the volume of water that is consumed, billed and collected. Mini grids can be managed as individual schemes or via holding structures that manage multiple schemes to leverage economies of scale.

BUSINESS MODEL VARIATIONS

- We distinguish two variations of mini grid models that vary in scale: At small scale, entrepreneurs operate single systems (or a very limited number) whereas larger enterprises act as consolidators / holding companies that manage several mini grids. The former model focuses on optimising operations and expanding them in a given service area. The latter further creates centralised structures and consolidated services, reducing costs and leveraging economies of scale to reach profitability across a portfolio of schemes.
- The conditions for private operators of mini grids heavily depend on the policy and regulatory context and licensing conditions. Regulations and agreements influence the operator's level of control, defining asset ownership, responsibilities and planning periods. Regulations on tariff-setting equally affect the viability of business models.

REQUIREMENTS

- Water extraction permits and service provision licenses for extended periods (ideally > 10 years)
- License is ideally exclusive (to avoid competing investments) and either provides control over assets or offers payments for O&M services
- Tariff regulations should provide for 15% profit margin or give enterprises (some) influence on tariff setting
- Purchasing power difference of rural or peri-urban clients affects the financial model
- Water sources influence CapEx requirements (drilling, rehab, treatment technology)

TYPE OF IMPACT

- SDG 6.1: Safely managed services via HH connections and basic services via sales points

FINANCING NEEDS

- Public finance, grants and concessional loans to develop or upgrade piped systems (CapEx)
- Grants/concessional loans for working capital to cover viability gap until break even
- Debt and potentially impact finance to invest in household (HH) connections
- Micro finance for end-user contribution to connection
- Debt finance for efficiency investments

03 SCALING BLUEPRINT

Investing Along Maturity Progression

01 Starting Up	02 OPEX break even	03 Credit worthy scheme
1-2 YEARS	+ 2-6 YEARS	+ 1-3 YEARS

Business Milestones

At least one mini grid under operation with all required licenses. **<100% OPEX Coverage**	Viable operations through investments to increase # of connections, consumption and efficiency. **Full OPEX Coverage**	Eligibility of bank loans through credit-worthy operations, availing capital for investments & expansion. Agreement with banks that avails access to loans

Impact & Return

• Provision of improved services to: **1K - 12K people per scheme**	Improved services: **1'500 - 20K people per scheme**	Provision of improved services to: **2K - 30K people per scheme**

Required Resources

US$250-500K depending on the size of the system this could be **up to US$ 1M,** typically via public finance or grants for CapEx and start-up grants for working capital	**US$250-500K** plus ~US$75K per annum for viability gap finance (likely public finance, RBF and concessional loans for CapEx and grants for working capital)	**US$250-500K** per mini grid /scheme plus ~**US$100K** per annum for viability gap finance (transitioning to debt and concessional finance for CapEx investments)

CapEx Investments

• Bulk of CapEx for investments into water source, storage, treatment and primary network development • Limited investment in secondary network and funding for initial connections off the existing network to generate revenue.	• Secondary network extension • Funding for household connections programme • Setting up billing and revenue software and investment in energy management / cost reduction (e.g., via solar systems)	• Additional pumping, storage, treatment capacities and further investments into distribution • Final investment in connections and tertiary extensions within existing network area • Upgrading systems and processes to drive efficiencies

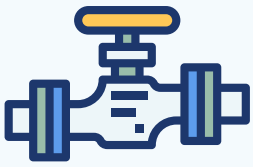
Working Capital

• For viability gap finance during start-up phase • Obtaining commission, permits & license • Funding for initial technical & financial management team	• Organisational development, development of management, sales and marketing team • Development of sales & marketing approach	• Setting up governance structures, including a board of directors • Resources to prepare and raise finance for scaling phase

• Inventory finance: Funding equipment for installation

Value Chain

Where needed, clarify the licensing process and support the setting up of required entities at local governmental level (e.g., water boards)	Ensure integration of operations into national and local governance structures	• Establish a case for lending to utility operators with local banks



FOR CONSOLIDATOR MODELS AND HOLDING COMPANIES

04 Scaling Model

+ 2-4 YEARS

FOR CONSOLIDATOR MODELS AND HOLDING COMPANIES

05 Economies of Scale

+ 2 - 5 YEARS

Business Milestones

Establishing an evidence-based pathway to viability and scaling with **3-10 economically viable piped water schemes**

Centralised structures and consolidated services reduce costs, yielding profitable investments opportunities

Impact & Return

Provision of improved services for up to: **100K people per scheme** across all **3-10 mini grids**.

Provision of improved services to: **>1 million** with expanded network of mini grids
+ Interest on debt funding & RoI on equity

Required Resources

US$ 300K - 1M per mini grid / scheme usually via public finance and concessional loans plus **~US$200K per annum for viability gap finance** depending on available funding via grants, RBF, debt and/or equity

CapEx amount depends on size and number of schemes: **US$200+K of Working Capital per annum.**

CapEx Investments

- Finance to purchase new schemes or greenfield investments in new mini grids
- Upgrading systems and processes to drive efficiencies

- Finance to purchase new schemes or greenfield investments in new mini grids
- Investment in energy & pressure management / cost reduction (e.g., via solar systems)

Working Capital

- OPEX subsidies of new mini grids until they break even
- Start setting up centralizes systems and processes
- Further improving governance structures, roles and responsibilities to growing business operations

- Investment in centralised operations and financial management team
- Continued development of centralised systems and processes and accompanying organisation development

Value Chain

- Engage government and lobby for service contracts for operations / extension in(to) commercially non viable areas

- Securing licenses and contracts

Investment Model - KPI Targets

The viability of mini grids depends on the volumes of water sold. This translates into a scaling model composed of market penetration (through connections) and the level of consumption. In a consolidator model, it is necessary to determine the number of profitable mini grids required to finance the centralised structures. Besides the consumption, factors such as the capital expenditure (CapEx) per scheme, the costs per connection, non-revenue water (NRW), and energy costs also affect the viability of mini grids.

The following overview provides KPIs for water kiosk models and provides EXAMPLES of targets and target ranges that we compiled based on insights from KWASH (Cambodia), UDUMA (West Africa), Water4 (Uganda), Max Tapwater (Bangladesh) and Safe Water Network (Ghana).

Market penetration

In areas where assets are installed, a rough benchmark for piped water enterprises is to establish direct connections to at least 50% of HHs. For this purpose, it is key to invest in densifying the number of customers within the network area. This can lead to connection ratios of up to 80% of households in the service area.

Consumption per Connection

In **rural** areas, targets for consumption are around **5 m3** per connection per month. In **urban** areas, mini grids typically aim at **>7 m3** (ideally 10 m3) of water consumed per HH connection and month.

Industrial, business and institutional clients often have significantly higher levels of consumption. This makes them attractive customer segments to move towards viable operations. At the same time, a bias towards these clients effects the business model's impact.

Cost per Connection

- <200 USUS$ is typically considered commercially viable cost for HH connections
- at 200 to 300 USUS$ viability depends on context
- >300 USUS$ is non viable, requiring impact finance

Connections for customers that are commercially non viable provide a strong case for impact financing. The SFF, for example, established a revenue-based loan facility to expand connections to such clients in Cambodia.

CapEx per scheme

300K USUS$ - 1 million USUS$ for larger systems, highly depends on whether existing systems are upgraded or operators make greenfield investments.

Depending on size Max Tapwater requires approx. 20K USUS$ CapEx for very small systems (<100 connections) projecting CapEx recovery within 9 years.

Investment Model - Other Parameters

Water Sold per Scheme

Viable sizes of mini grids typically range from **500 to 5K connections** per system. With the above consumption targets, such mini grids should achieve sales between minimum **2'500 m3/month for small and 40K m3/month** for large systems. Mini grids can, however, be as small as 100 connections or less.

Revenue per Connection

The key to profitable operations is ultimately the revenue generated per connection. Depending on the context and water tariffs, the average monthly consumption fee per household connection is expected to range **from US$4 to US$10+ per month**.

of connections to break even

Profitability of consolidator / holding companies can be expected **starting from 35K - 50K connections** across the portfolio of mini grids.

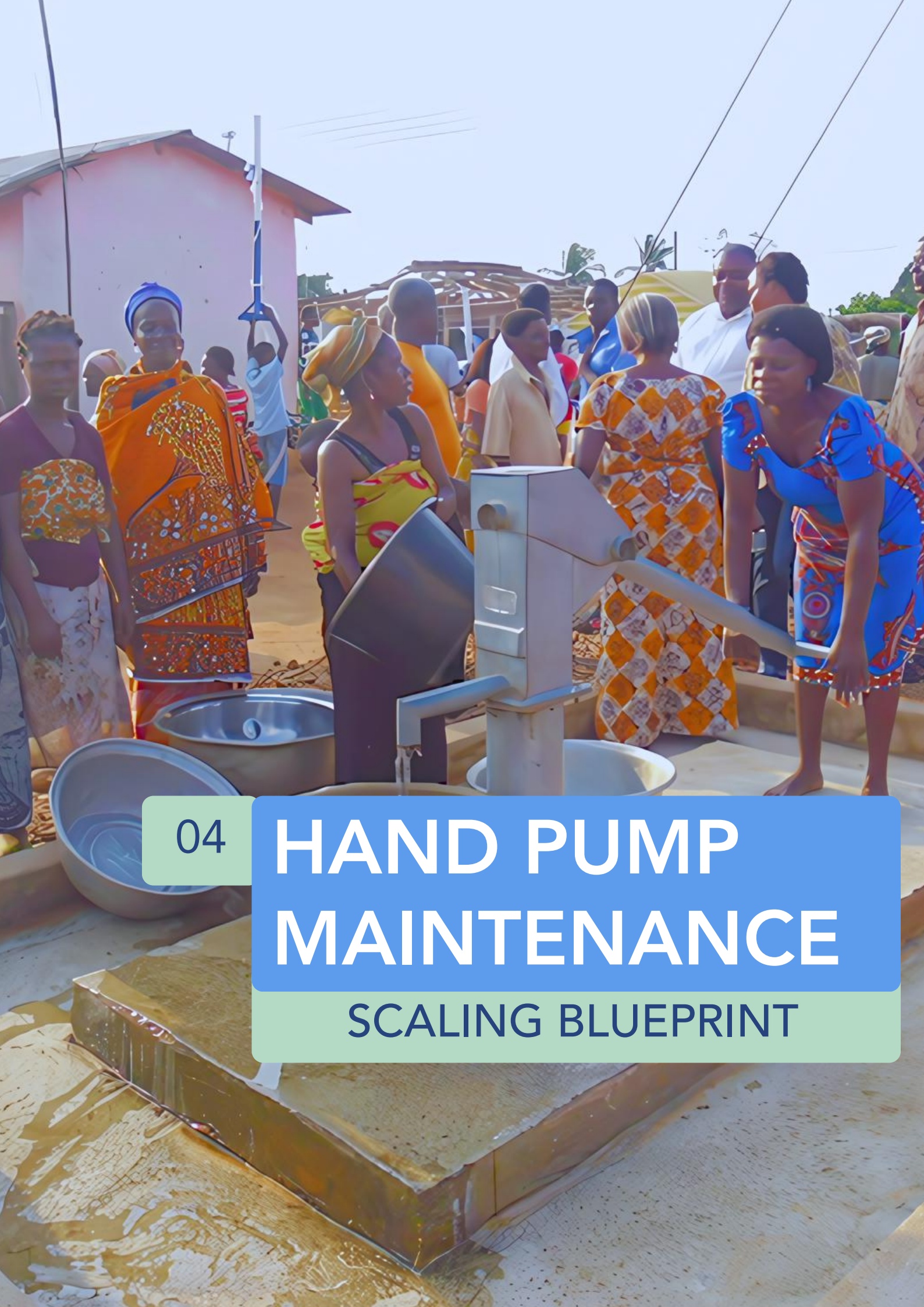
Non Revenue Water (NRW)

NRW is the portion of water produced that is lost before it reaches the customer, either through leaks, theft, or meter inaccuracies, resulting in no revenue for the water utility.

NRW has a direct influence on the revenue that can be generated from the water that is being produced. The World Bank suggests 25% or less NRW as a reasonable level.

Margin

To move towards financial viability, mini grid operators should strive to achieve an operational cost coverage ratio of 120% (according to Aqua for All and IRC WASH).

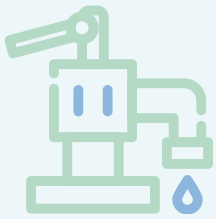


04

HAND PUMP MAINTENANCE

SCALING BLUEPRINT

04 HAND PUMP MAINTENANCE



BUSINESS MODEL

(Preventive) hand pump maintenance models are based on pre-paid user contributions, performance-based contracts and remote monitoring. They provide a professional and rapid maintenance service for community water supply systems (maintenance subscription / micro insurance). Enterprises' services typically also include refurbishing / upgrading water points to facilitate continued services, but usually do not include the development of new hand pumps or other water point infrastructure (boreholes, etc.).

The focus on service provision to rural (and sometimes peri-urban) areas results in high impact and low profitability. As a result, hand pump maintenance models depend on subsidies and results-based finance to bridge time to reach cost coverage through saturation / economies of scale. CapEx expenditures are typically covered by government or donor financing to limit the financial burden on rural communities.

BUSINESS MODEL VARIATIONS

- Hand-pump maintenance is usually based on a fixed monthly tariff / subscription. Some service providers, like Sunda in Uganda, have developed pre-paid solutions to implement models for customers to pay-by-volume of water consumed.
- Logistical requirements for hand pump maintenance may outweigh the ability to pay of rural communities in different contexts. As a result, there may be a need for government to provide paid (performance) contracts for service providers.
- In cases where the prospects for viable operations are insufficient, restructuring service providers into two entities may be required: A non-profit entity that raises funds to subsidize O&M services in commercially non-viable service areas and a profitable O&M service provision enterprise.

REQUIREMENTS

- A concise and consistent framework for operation and maintenance in rural water supply
- Clear contracting provisions to obtain service licenses
- System for mapping of assets and O&M responsibilities
- Control of collected tariffs by service provider
- Compliance of NGOs & donors with O&M responsibilities
- Depending on the context, remuneration for O&M service by government or RBF contracts may be required to achieve cost coverage

TYPE OF IMPACT

- SDG 6.1: Basic water supply via water points
- IRIS+: Water supply service hours (uptime / water point functionality)

FINANCING NEEDS

- The growth of maintenance service providers, necessary to leverage economies of scale, requires long-term results-based or viability-gap financing
- Working capital to set up agreements and operations in service areas
- Public and/or grant finance for the rehabilitation of hand pumps
- Funding for infrastructure upgrades (piped water points / pre-paid water points)

04 SCALING BLUEPRINT

Investing Along Maturity Progression

01 Starting Up	02 Piloting	03 Establish a mngt. entity
6-12 MONTHS	+ 1-2 YEARS	+ 1-2 YEARS

Business Milestones

Business model developed, key processes tested & piloting agreements established

System for performance payments of local technicians established to service.
~20 water points based on service agreements facilitating uptake of model into local structures

System to monitor and make performance payments for O&M services for **100+ enrolled water points established, yielding at least 40% OpEx/CapManEx coverage with collected revenues**

Impact & Return

Entrepreneurial engagement in rural water supply triggered

Maintaining basic services for up to: **5K people**
+ Creation of 3 - 7 jobs

Maintaining basic services for up to: **25K people.**
+ Creation of 10 - 15 jobs

Required Resources

US$**20K** awards, start-up grants and self financing.

US$60-100K grants (ideally RBF) and potentially revenue from service contracts

US$60-100K grants and RBF and potentially public finance

CapEx Investments

- Investments in motorbikes, tools and equipment

- Investments into fleet extension and additional tools and equipment

- Investments into fleet extension and additional tools and equipment
- Developing electronic visit tracking and data management system

Working Capital

- Development of business model, internal systems and processes
- Setting up the initial management and technical team, including recruitment and training of technicians
- Development of financial management and M&E systems

- Continued development of internal systems and processes, including SOPs
- Invest into the development of technical, operational, financial, and M&E capacities and teams
- Data collection
- Finance spare part inventory

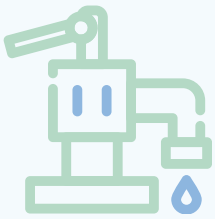
- Establish internal systems and processes for RBF management
- O&M for motorcycle fleet
- Setting up governance structures
- Problem solving to create conducive service conditions
- Testing different incentives and sanctioning mechanisms to increase payment compliance

Value Chain

- Capacitating local government entities to understand performance payments approach for water point maintenance

- Mapping of water points, functionality and service responsibility in target areas
- Where needed facilitate the setting up of local entities (like water boards)

- Invest into the development of a spare parts supply chain or partnerships to import and store bulk quantities



04 Service Area Expansion

+ 2-3 YEARS

05 Cost Covering Service Model

+ 2 - 5 YEARS

Business Milestones

Increased # (>500) & density of enrolled water points in at least 3 service clusters. Reduction of viability gap to <50%. 20% - 40% efficiency gains through route optimisation

Efficiency gains through growth & optimised density of clients; **10%-15% annual growth; >70% cost coverage through revenue**

Impact & Return

Basic services up to **100K people with all kiosks.**
+ Creation of 25 - 100 jobs

Maintaining basic services for at least **1.5 million people**
+ Creation of 100 - 500 jobs

Required Resources

US$50-200K grants and RBF and potentially concessional debt for specific assets and efficiency investments

~US$600K per annum (based on the UPTIME cost estimate of total cost per beneficiary of ~1 US$ per year and a viability gap of 40%), likely through a mix of RBF, grants and public finance

CapEx Investments

- Investments into fleet extension and additional tools and equipment
- Route optimisation, giving structure to circuit riders and increasing logistical efficiency
- Infrastructure upgrades, depending on status of assets with the objective of increasing the share of profitable systems

Working Capital

- Potentially pre-financing of bulk imports of spare parts
- Testing different incentives and sanctioning mechanisms to increase payment compliance
- Whave, a Uganda based social enterprise, estimates that approx. **600KUS$** of RBF are required to achieve break-even in a Ugandan district with **1K hand pumps** financing the viability gap of services over a period of **5 years**

Value Chain

- Invest into the development of a spare parts supply chain or partnerships to import and store bulk quantities
- Lobby for the introduction of service contracts with government / donors paying subsidies for O&M services
- Lobby for the establishment of contractual RBF / transfers for subsidies of O&M services from government

Investment Model - KPI Targets

The viability of hand pump maintenance models relies on having suitable service areas with an adequate number of water points and service fees. This translates into a logistics model where reducing costs necessitates efficient logistics, achieved through customer density and route optimisation. Payment compliance and collection efficiency are also critical factors. To ensure the cost coverage of the maintenance model, these elements must be optimised. By determining the optimal number of serviceable water points and ensuring efficient fee collection, the model bears potential to attain full cost coverage. Since maintaining rural water supply in developing countries has to date been heavily subsidised the model bears an interesting case for impact financing.

The following data points provide targets for KPIs of some of the most advanced hand pump maintenance models compiled based on insights form Uptime, Water for Good (Central African Republic), Whave, Sunda and Uganda Water Project (all Uganda)

Costs per Customer

Water for Good (> 3'500 hand pumps enrolled) estimates average costs per hand pump and year to be approximately 370 USUS$, despite having to collect user fees in cash.

Whave determined costs at low economy of scale (100 water points per district) to be approx. 470 USUS$ per hand pump and projects costs to be as low as 260 USUS$ at scale.

Uptime estimates average costs for maintenance services per water user to be between 1 USUS$ to 1,20 USUS$ per year.

The availability of mobile payment infrastructure, density of customers, optimisation of routes are some of the factors influencing maintenance costs.

Revenue per Hand Pump

For a community of 50 families sharing a hand pump, monthly payments of 100K UGX - 150K UGX (25 USUS$ - 40 USUS$) are generally accepted fee levels.

In contexts, where cost coverage cannot be achieved with customers fees, paid service contracts are needed for viable operations.

Hand Pumps per Technician

To ensure that the capacities of technicians are fully used, Water for Good aims to enroll approx. 150 to 220 hand pumps per (team of) technician(s). Water for Good also sets daily targets of 5-6 hand pumps technicians should visit and service during longer (21 days) maintenance missions.

UWP aims to have technicians working at 90% of their capacity to reach OpEx/CapManEx coverage.

Density of Hand Pumps

Whave is targeting 4K enrolled water points in each service cluster to establish cost covering operations.

Investment Model - Other Parameters

Uptime of Hand Pumps

The target for uptime of hand pumps is at least 96% functionality (Uptime global).

Ratio of Hand-pumps to Automated or Mechanised Water Points

To move towards cost coverage, entrepreneurs can upgrade selected systems to make them profitable. These profits can be used to subsidise maintenance of non-viable areas.

- Pre-paid hand pump systems can increase revenue collection and reduce costs for service providers. In Uganda, Sunda offers such systems (approx. 1K USUS$ / pump).
- Upgrading hand pumps to mechanised, gravity-fed stand posts improves convenience of services for customers and increases willingness to pay.

Costs for Enrollment of Communities

For efforts to expand the service area of hand pump maintenance models, costs for enrolling new communities need to be duly considered. Analysis by the Uganda Water Project put these costs at 1 Mio UGX (equivalent to ~250 USUS$) per community.

Time for Repairs

To ensure continued use of hand pumps and willingness to pay at least 90% of breakdowns should be repaired within 24 hrs and all breakdowns should be repaired within max 48 hours.

Uptime and repair time are key to the value proposition of hand pump maintenance models.

05

RURAL UTILITY

SCALING BLUEPRINT

COMING SOON IN THE DIGITAL PUBLICATION

COMING SOON IN THE DIGITAL PUBLICATION

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06

ANNEX

FINANCING ENTERPRISE DEVELOPMENT

06 External Financing for Enterprise Development

Water supply enterprises rely on external finance to develop approaches to increase their impact and financial viability and ultimately scale their operations to maximize their social and / or environmental impact. Access to external funding can have different effects, enabling them to expand their reach, invest in infrastructure, and navigate financial uncertainties. This ultimately empowers growing enterprises to achieve their mission while ensuring financial sustainability.

Product & Business Model Development

Finance plays a vital role in product and business model development by providing entrepreneurs with the essential resources needed for idea validation, prototype development, market research, and product refinement or diversification. It also enables the hiring of key talent and experimentation with revenue streams, laying the foundation for sustainable growth and attracting additional investment.

Unit Profitability

Achieving unit profitability is crucial as it proves the viability and sustainability of a business model at its core. By leveraging investments to enhance efficiency and drive innovation, a water enterprise can demonstrate its potential to generate financial and impact returns and mitigate risks. This, in turn, positions the enterprise to attract additional investment and support future expansion.

Replicating Units / Scaling

Funding for CAPEX allows water enterprises to replicate their service delivery units, such as piped water schemes and water kiosks. Traditionally, debt and/or equity financing is utilized for these infrastructure investments. In cases of particularly high-impact projects, enterprises may also receive grants that provide the necessary liquidity to purchase additional assets, construct new water stations, and launch operations in new markets.

Covering Operational Costs

For early-stage or financially less viable water enterprises, various forms of external financing can help achieve stability by covering operational expenditures (OpEx) and addressing outstanding financial needs. This support can come in the form of subsidies to bridge viability gaps for service providers or by allocating resources towards operational expenses and efficiency improvements to stabilize day-to-day operations.

Demand Creation & Market Expansion

External financing can drive demand and expand customer bases by enabling price reductions, particularly in BoP (Base of the Pyramid) markets, or by facilitating investments in network expansion and increasing the number of connections. In this way, various forms of financing enhance the accessibility and affordability of clean water, thereby stimulating demand and fostering sustainable growth within communities.

06

Types of Finance

Different types of funding vary in their suitability for achieving specific milestones. Below is a mapping of selected funding types to key areas of enterprise development.

Seed funding

Initial funding, e.g., from founders or start-up awards, supports entrepreneurs in refining business ideas, creating prototypes, and establishing a viable business model, fostering dedication, higher survival rates at early stages and ideally follow-up investments.

Results-based funding

RBF provides funding to water enterprises in exchange for the delivery of pre-agreed and verified outcomes, such as water supply, maintenance services, or CO2 emission reductions. It is often used to bridge viability gaps in service and business models. This type of financing can subsidize initial services, helping to cover OpEx. Additionally, it can support the expansion of offerings to target groups with limited ability to pay or fund after-sales services that can be provided while monitoring results.

R&D funding

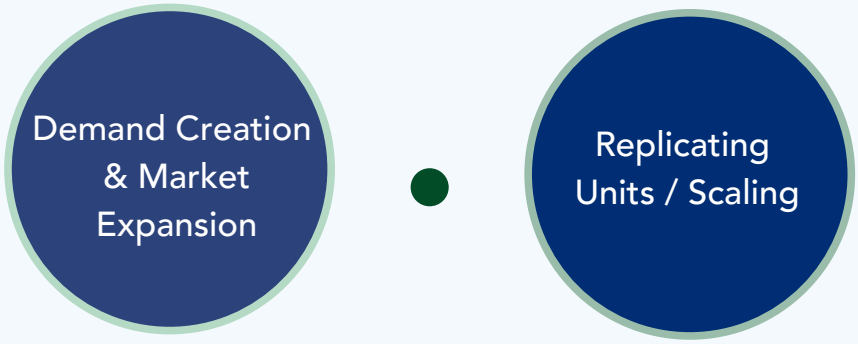
R&D funding backs the creation of innovative, impact-oriented products and services, typically lasting 6 months to 3 years. It often comes from development agencies and impact investors to refine products and business models.

Efficiency investments

Efficiency investments in water supply enterprises in developing contexts are typically funded through grants and debt finance. These investments aim to enhance efficiency by reducing costs or increasing revenue generation. Measures may include implementing customer tracking systems, CRM or ERP systems, investing in sales and marketing, lowering energy costs (e.g., through solar solutions), adopting smart metering, digital billing and invoicing solutions, or improving revenue collection via mobile banking integration. All of these efforts contribute to reducing the costs associated with revenue collection.

Catalytic funding

Catalytic funding provides resources designed to mitigate risk and enhance the overall viability or impact of an enterprise. It can be used, for instance, to test new business approaches, optimize operations, or improve cost coverage and impact. The goal is to facilitate scaling and attract new investment for development objectives. A key aim of catalytic funding is to validate underlying assumptions, enabling enterprises to secure or leverage additional funding based on achieved results and the evidence generated to support their business model.



Impact-linked / revenue-based loans

A revenue-based loan offers debt funding in exchange for a share of future revenues. Impact-linked loans, similar to uncollateralized SME loans, tie interest and principal repayments to the achievement of impact goals. These innovative debt financing options account for factors such as seasonality and impact value in their repayment terms, specifically tailored for water enterprises. They facilitate the expansion of piped schemes or the replication of units (e.g. water kiosks), while also helping enterprises build a track record and enhance their creditworthiness.

Infrastructure investments

Infrastructure investments involve providing capital to develop new infrastructure or acquire profitable assets. Investors often extend performance-based contracts for ongoing operations to the enterprises responsible for these developments. This type of financing supplies the necessary capital to invest in new assets and replicate critical infrastructure, thereby expanding services to new target markets.

End-user / pre-financing

Microfinance allows customers with limited purchasing power to access market-based water solutions, such as household water filters, that might otherwise be unaffordable. Additionally, it provides pre-financing for end-user solutions, such as household connections, enabling entrepreneurs to cover initial investments, which are then gradually reimbursed by customers. These end-user financing methods are crucial for stimulating demand and effectively penetrating new markets with entrepreneurial offerings.

About this Guide

Thank you for taking part in this informational journey toward empowering WASH entrepreneurs and businesses from early stages to growth and development. To support you further, we work closely with local partners globally to develop programmes that are tailored to the need of each region and provide continuous support to scale up, we also create a variety of tools, best practices and resources that are all available on Cewas' website.

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