



LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

Sun. Water. Life.

Table of Contents

1. The Global Challenge

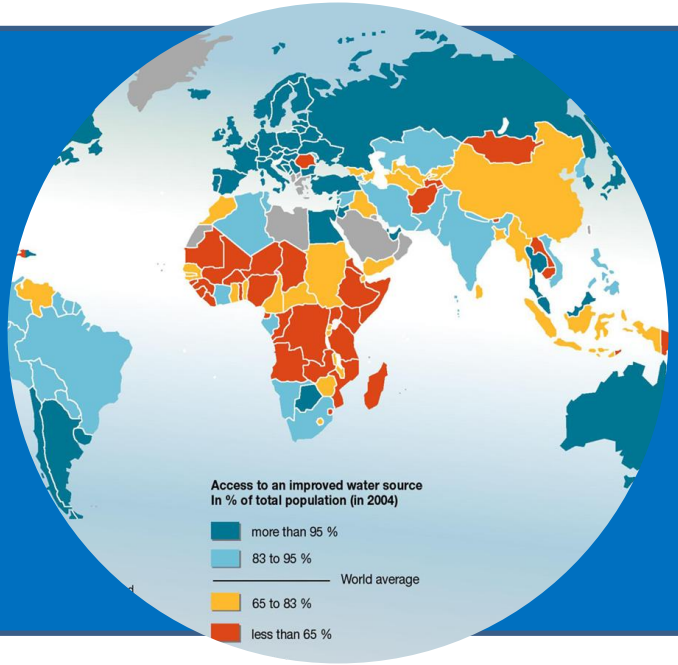




LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

The Global Challenge



Meeting the need for ubiquitous access to improved drinking water

Overcoming the barriers to success:

- ***Lack of maintenance and management***
- ***Funding***
- ***Community acceptance and education***
- ***High costs***
- ***Lack of transparency***

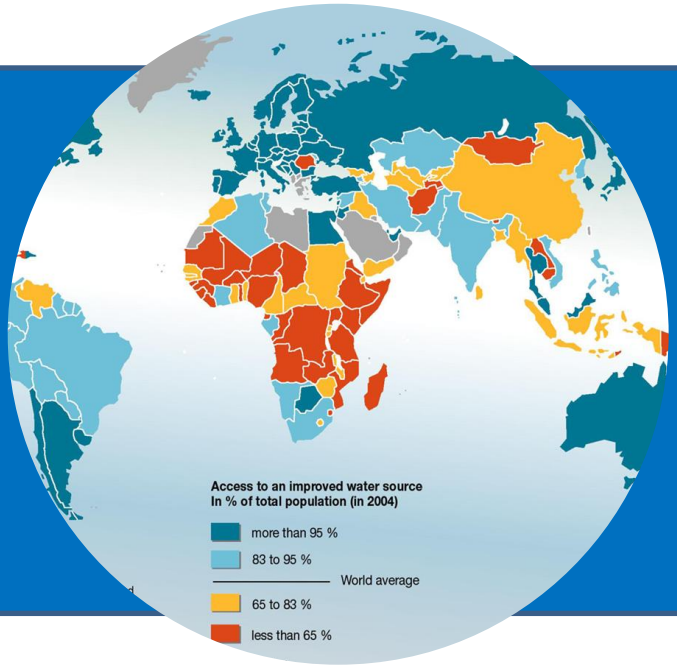
Driving Factors – Development Situation

- ***Donated water infrastructure without a sustainable monitoring and maintenance program in place will fail.***
- ***Beneficiaries need to pay for water services. Subsidies should help those who cannot afford to pay the full co***
- ***Subsidies must be designed to avoid incentives to over-consume water or to over-capitalize capital investments (UNW-DPAC).***

Driving Factors – Water Utilities

- *High levels of non-revenue collection water schemes*
- *Widespread need to reduce cost of water delivery*
- *Governments must increase access to water to meet health and social service standards*

These factors beg the question…



How can we bring water to communities in an affordable, accessible, sustainable and scalable way?

Sun. Water. Life.

Specifically, how can we deliver a solution that is…

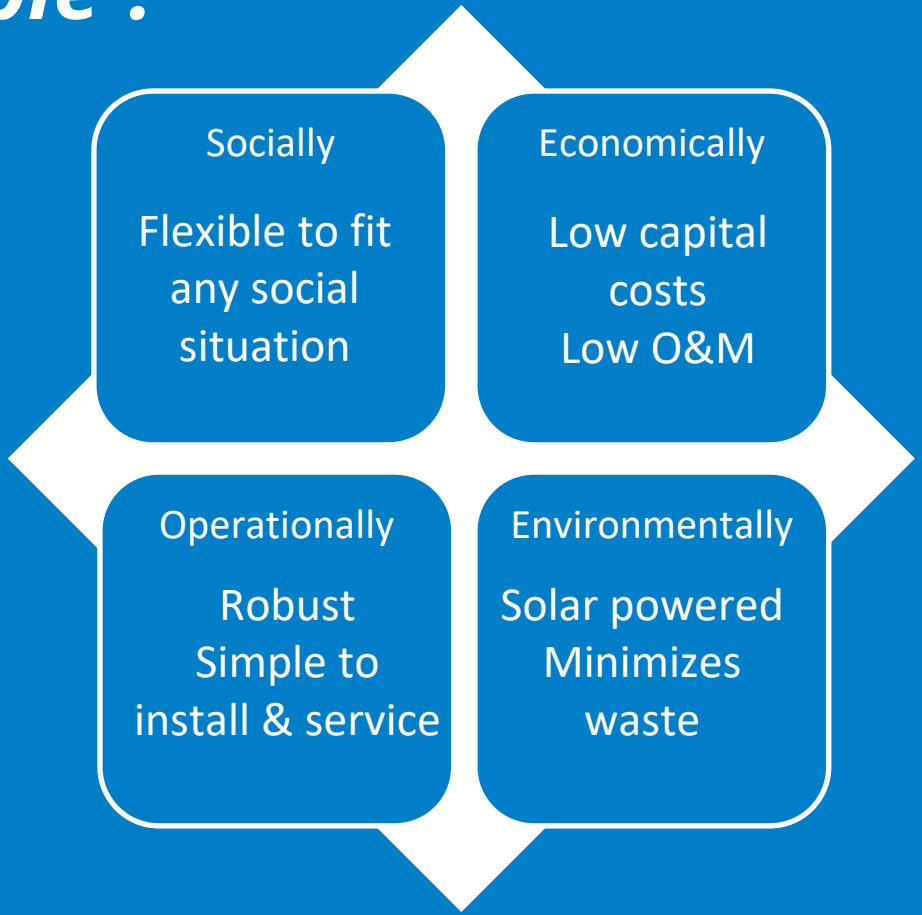
- *Cost effective – to maximise the number of people that can benefit*
- *Robust and fit for all environments*
- *Considers various social structures and local needs*
- *Is flexible for donor and commercial deployment*
- *Scalable and technically sustainable*

Sustainability

LORENTZ

Sun. Water. Life.

Sustainable ?



LORENTZ

Sun. Water. Life.

2. A Sustainable Solution – smartTAP Water Dispenser





LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

A Sustainable Solution – smartTAP Water Dispenser

The smartTAP solution is…

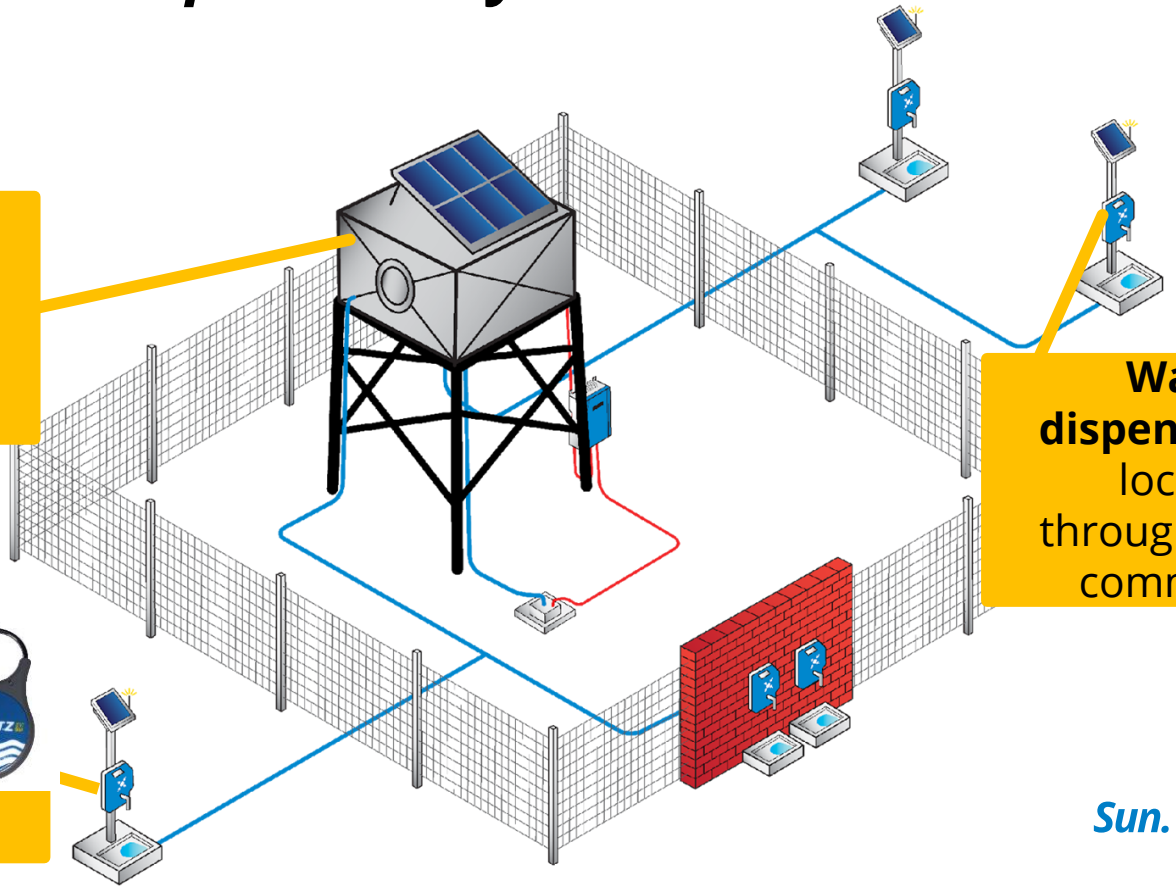
- *Affordable*
- *Robust for all environments*
- *Designed to be off-grid*
- *Secure*
- *Designed for low literacy levels*

& extremely scalable!

Sun. Water. Life.

smartTAP Water Dispenser – System Overview

Water supply - any piped water supply works



Water dispensers are located throughout the community

Users have a tag to access water services

Sun. Water. Life.

Three Principle Uses of smartTAP

Where revenue collection is required in public/shared areas to either provide or maintain infrastructure

Waste reduction – in any shared environment

Fair water entitlement for users – e.g. refugee camps, meeting government policies, etc.

3. smartTAP Component Overview





LORENTZ smartTAP Water Dispenser Solution

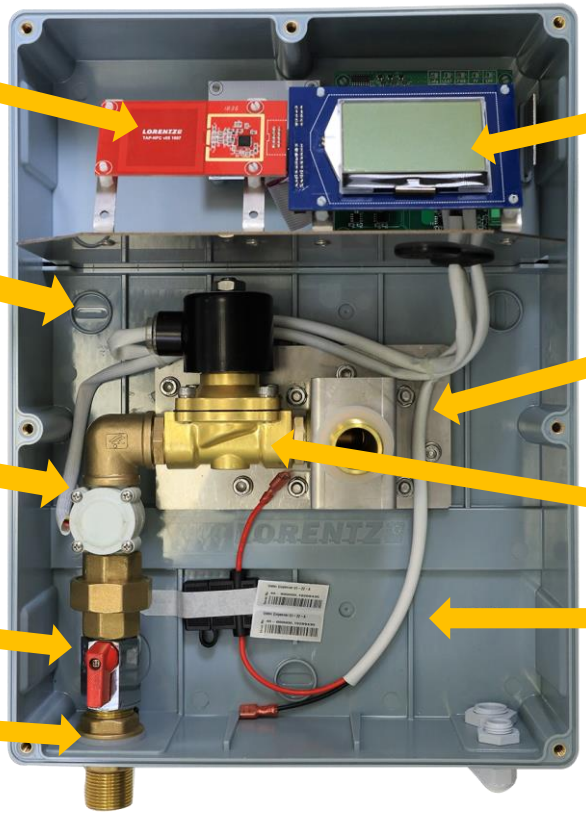
A sustainable solution for water delivery

smartTAP Water Dispenser Overview

- Self contained dispenser
- Solar powered with integrated charging
- High flow rate, low losses
- Simple to operate
- Informative screen
- Robust polycarbonate housing, security screws and anti-tamper features

Sun. Water. Life.

Flexible install and simple servicing



Color coded boards for simple servicing

Wall or pole mounting options as standard

Flow meter to measure water dispensed

Isolation valve for servicing

Incoming water connection area

LCD display with continuous back lighting

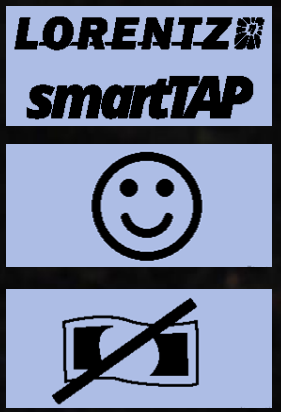
Hydraulic unit – easy to change with 4 screws

Robust full flow solenoid valve

Standard NP7-12 battery for 3 days operation

User Interface

- Intuitive graphical interface
- Learnt on first visit
- Usage animations
- No words, only numbers
- Symbol based, serving low literacy levels and all languages



Each smartTAP Water Dispenser comes with:

- A custom PV module, bracket and cable
- Silicone delivery hose
- Bluetooth communication for configuration and local data collection

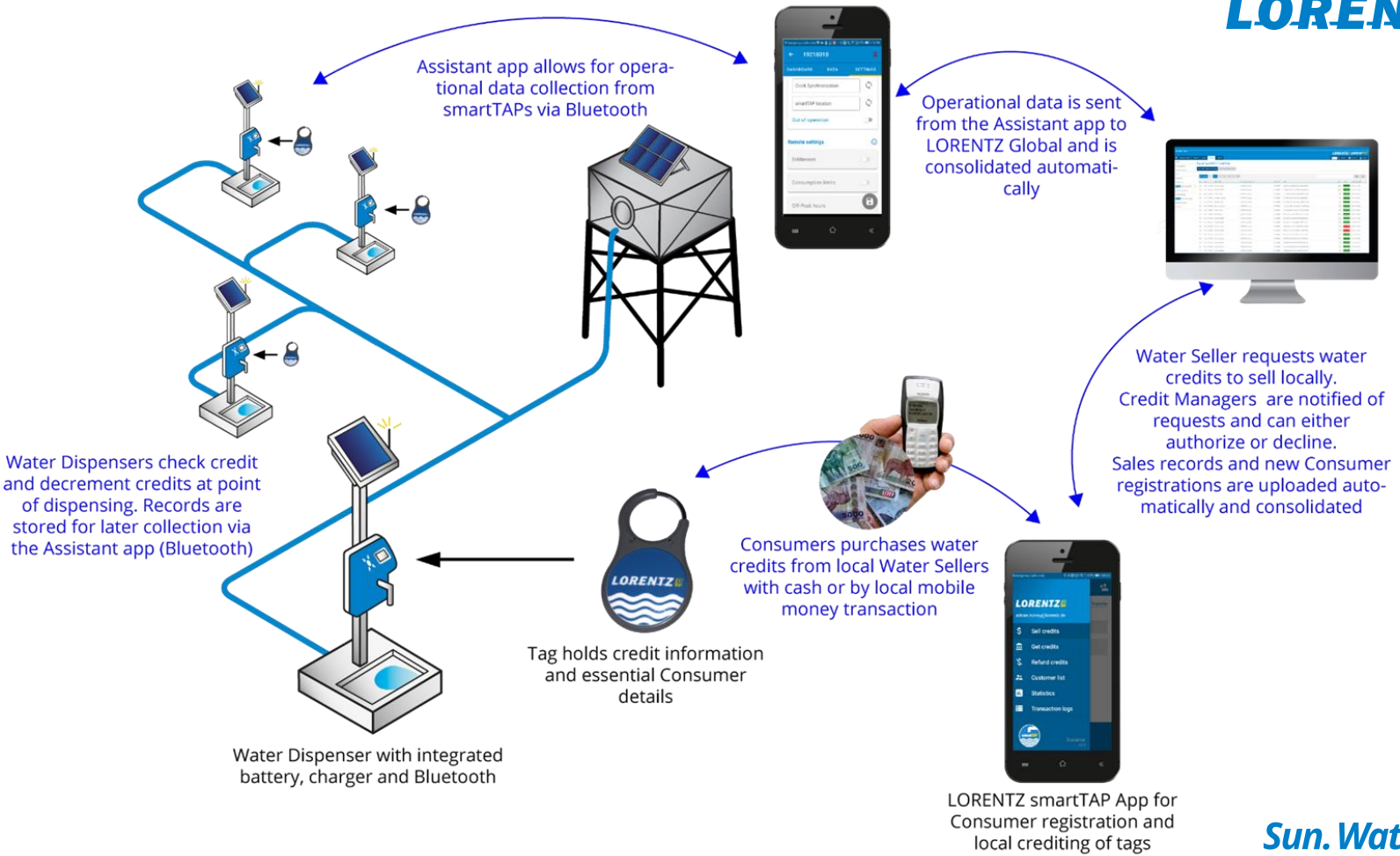
4. smartTAP Operation





LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery



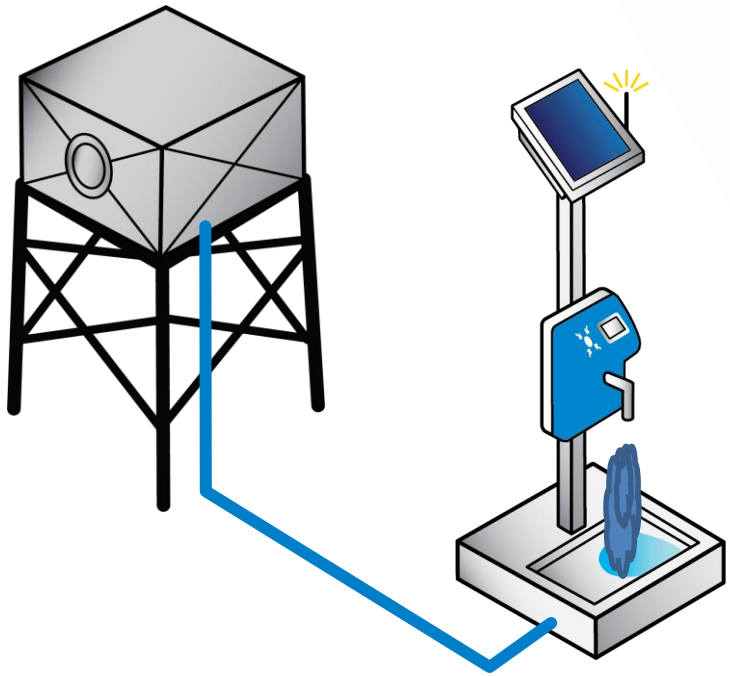
Sun. Water. Life.

smartTAP Autonomous operation – credits

User adds credit at local water vendor

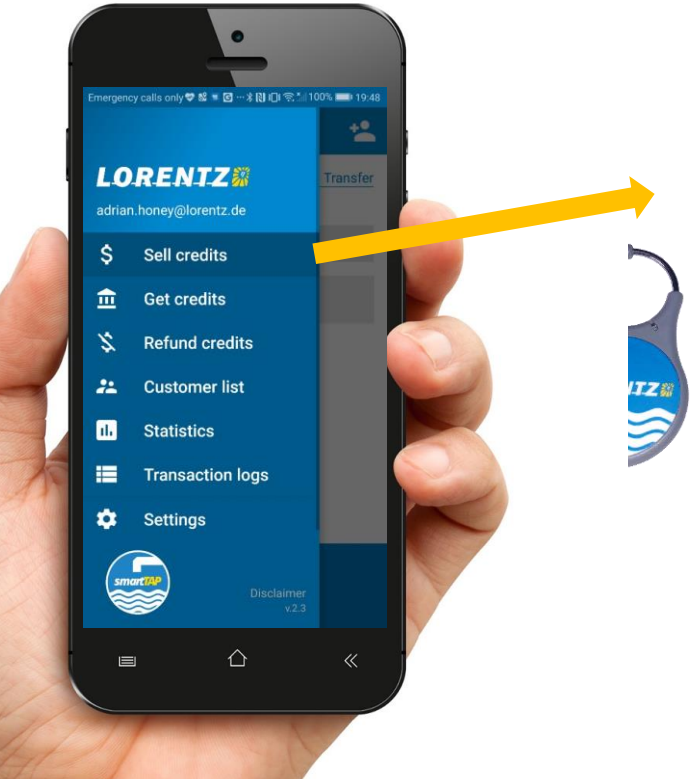
Tag is held close to smartTAP Water Dispenser

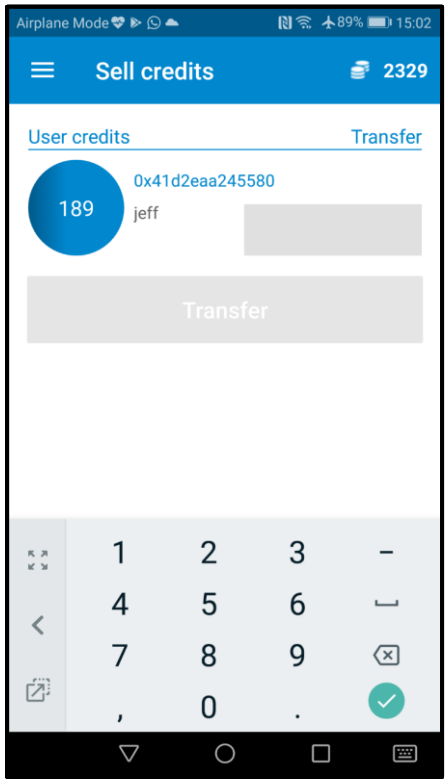
Credit is checked, water is dispensed, credits are decremented



Sun. Water. Life.

smartTAP App – sell credits





A tag is presented to water seller

The tag is read, name and available credits are shown

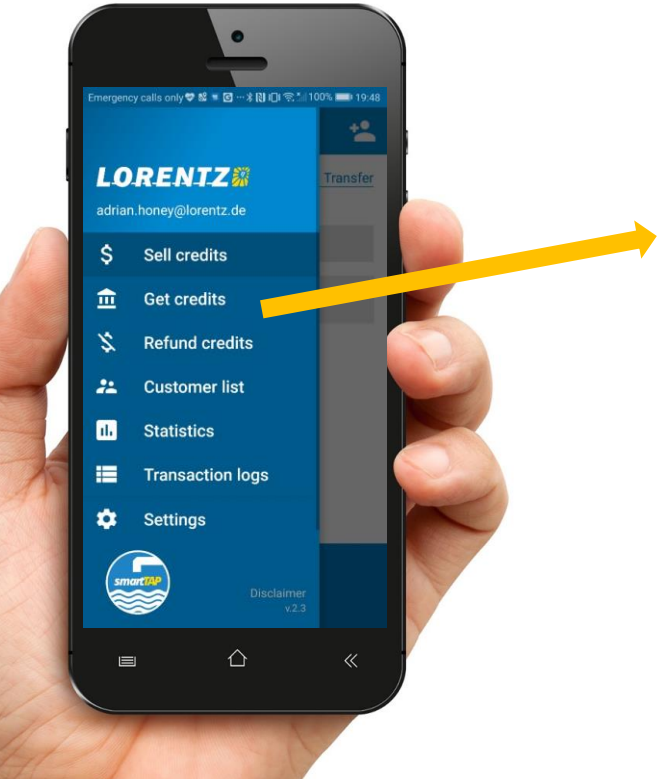
User buys 20 credits (20l)

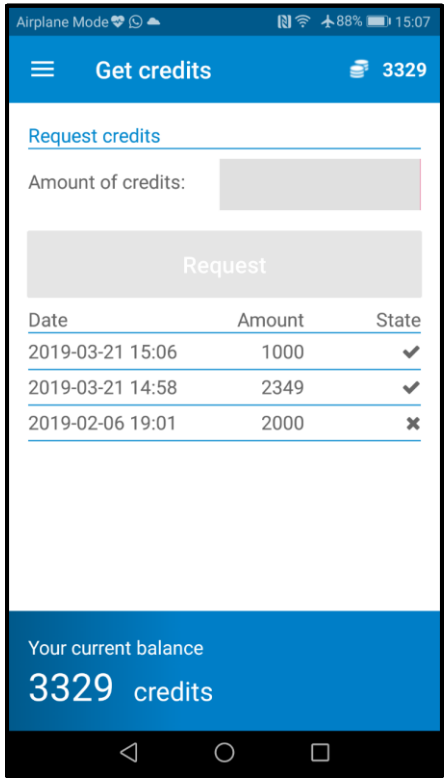
Water seller confirms

20 credits are written instantly to the tag (NFC)

Sun. Water. Life.

smartTAP App – get credits





Water Sellers request new credits to sell

Water seller requests 1000 credits (wholesale)

Confirm request

Request is pending approval

Request is approved (following payment)

Sun. Water. Life.

5. Managing schemes and collecting data





LORENTZ smartTAP Water Dispenser Solution

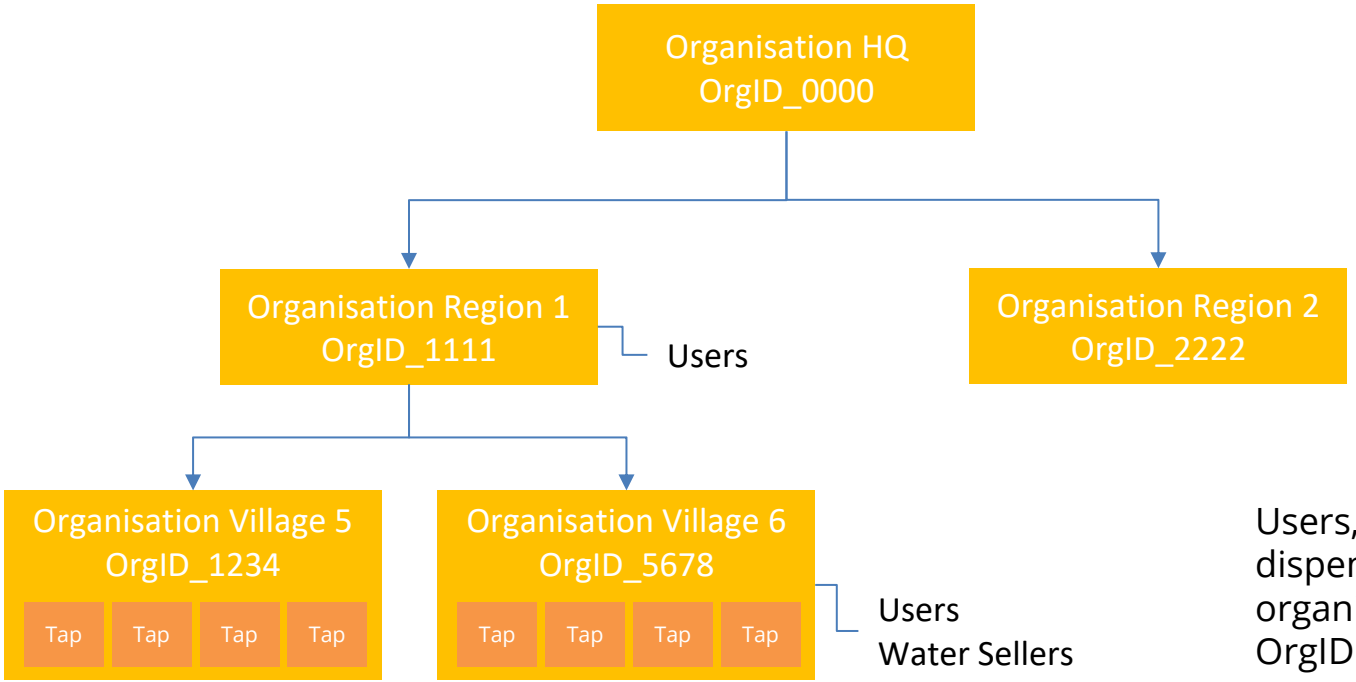
A sustainable solution for water delivery

Principles

- Hierarchy of organisations should be defined upfront as best as is foreseeable
  - To allocate water sellers to an organisation
  - To link tags to an organisation (sub organisation)
- The dispenser holds the data of which tags can dispense water
- We can combine / extend dispenser groups
- Splitting of dispenser groups is possible (with some consideration)

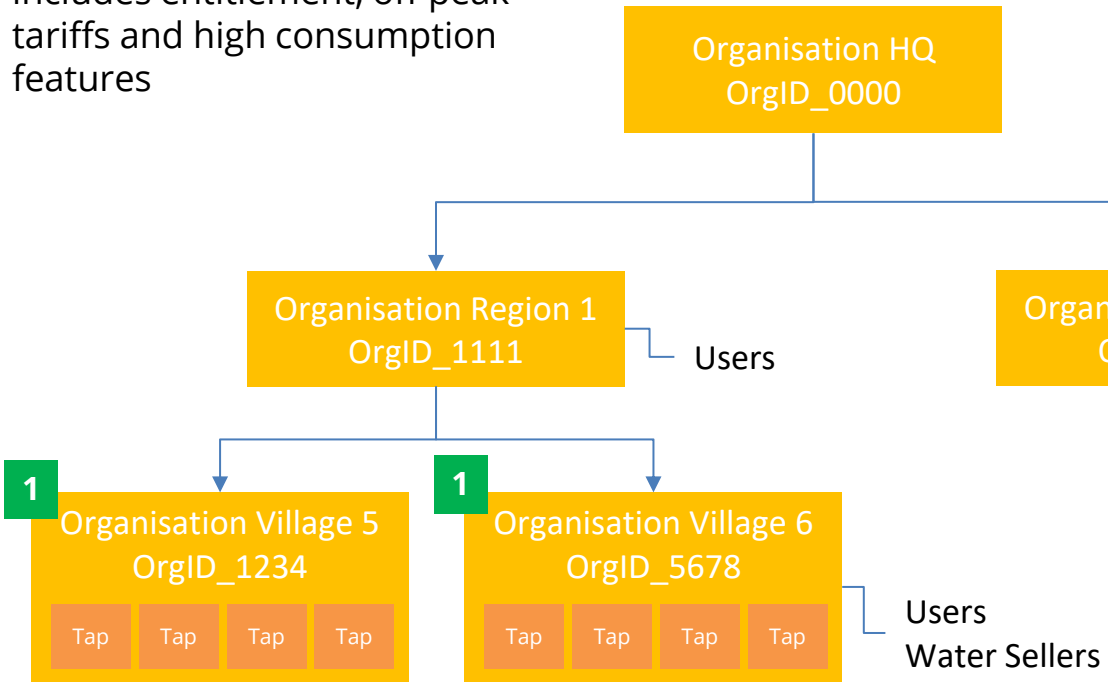
Topology

Organizations and have many child organisations
Organizations can represent regions, departments, franchises, shops etc



Users, water sellers and dispensers (taps) are linked to organisations and a specific OrgID

Commercial Schemes
Commercial schemes define how the dispensers operate, this includes entitlement, off peak tariffs and high consumption features



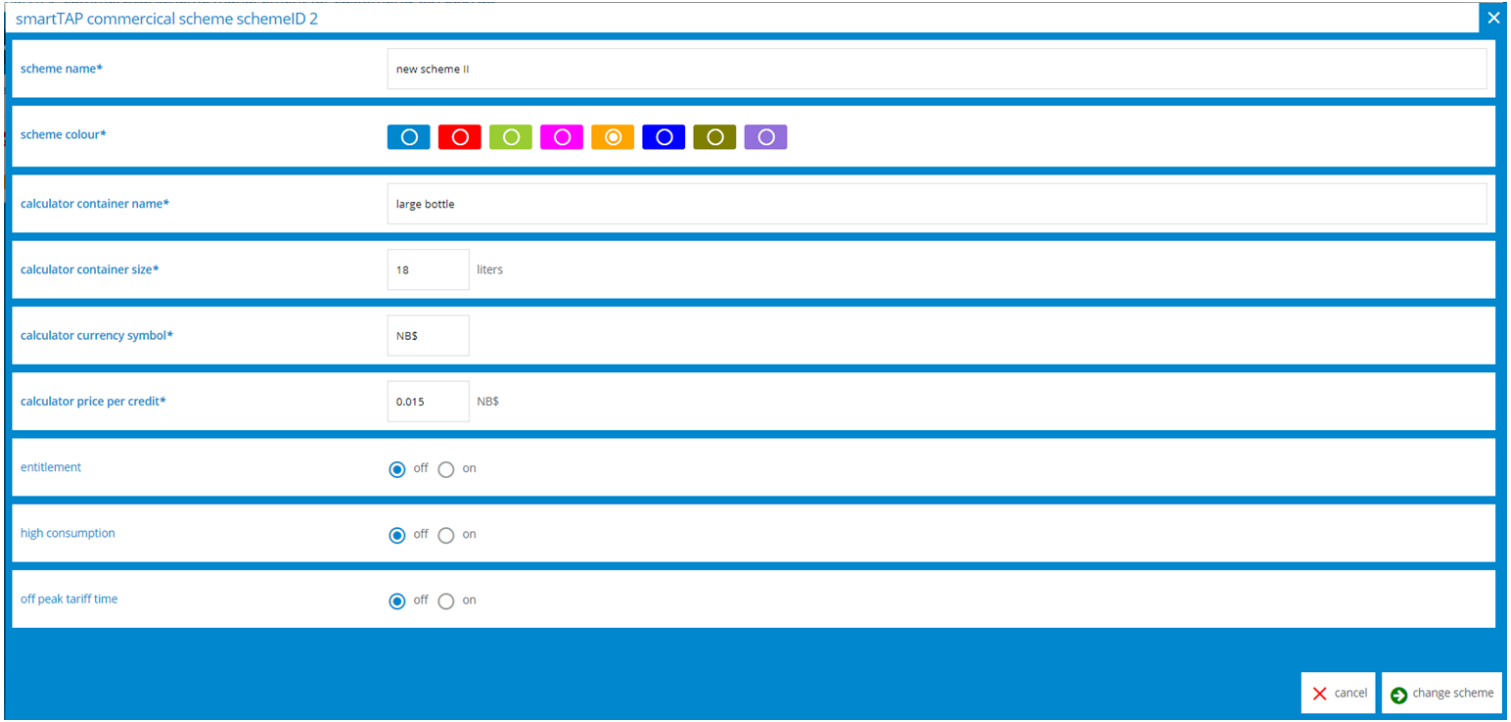
Commercial scheme **1**

10 litres free per tag per day
No off peak tariffs, no dispense limits

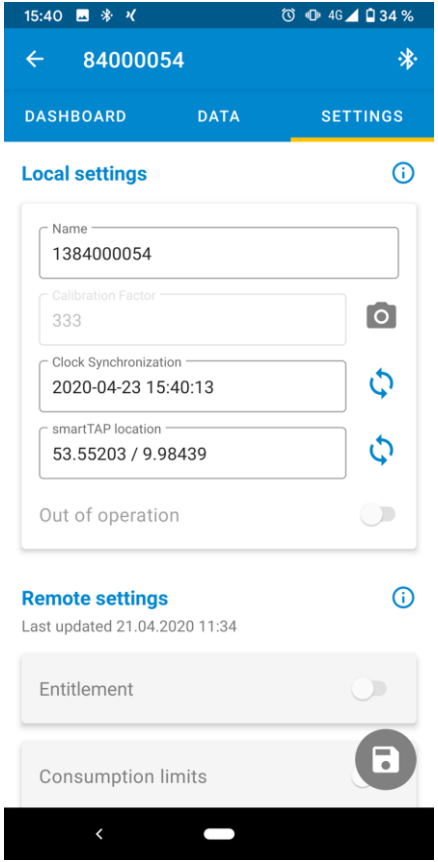
One commercial scheme can be associated with each Organisation
Many schemes can be created

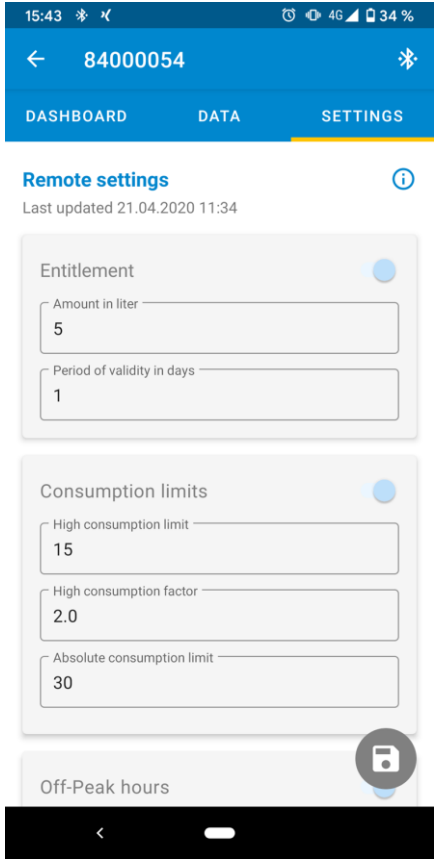
Commercial schemes

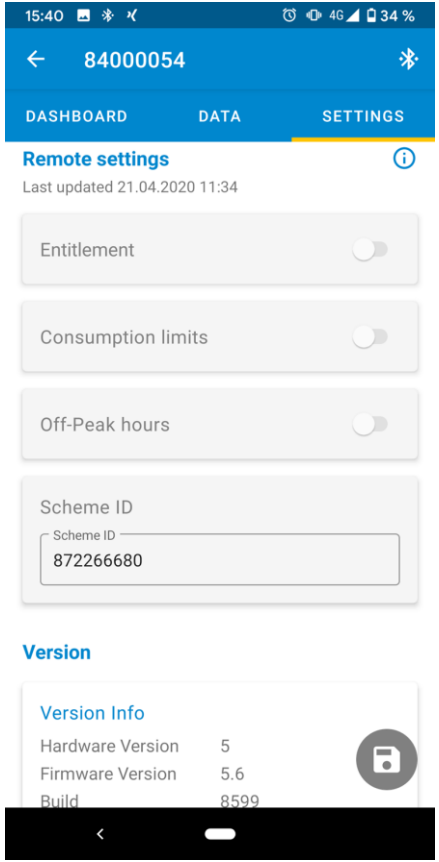
- A set of attributes for a scheme including:
  - Entitlement
  - Happy hours
  - Peak tariff restrictions
- Special role of “Scheme manager” to administer schemes
- Schemes are defined and named (one is necessary and will be defaulted)
- Scheme can be applied to any part of the organisational hierarchy (tick tree)
- Default will be to one global scheme for simplicity, more can be added



Sun. Water. Life.





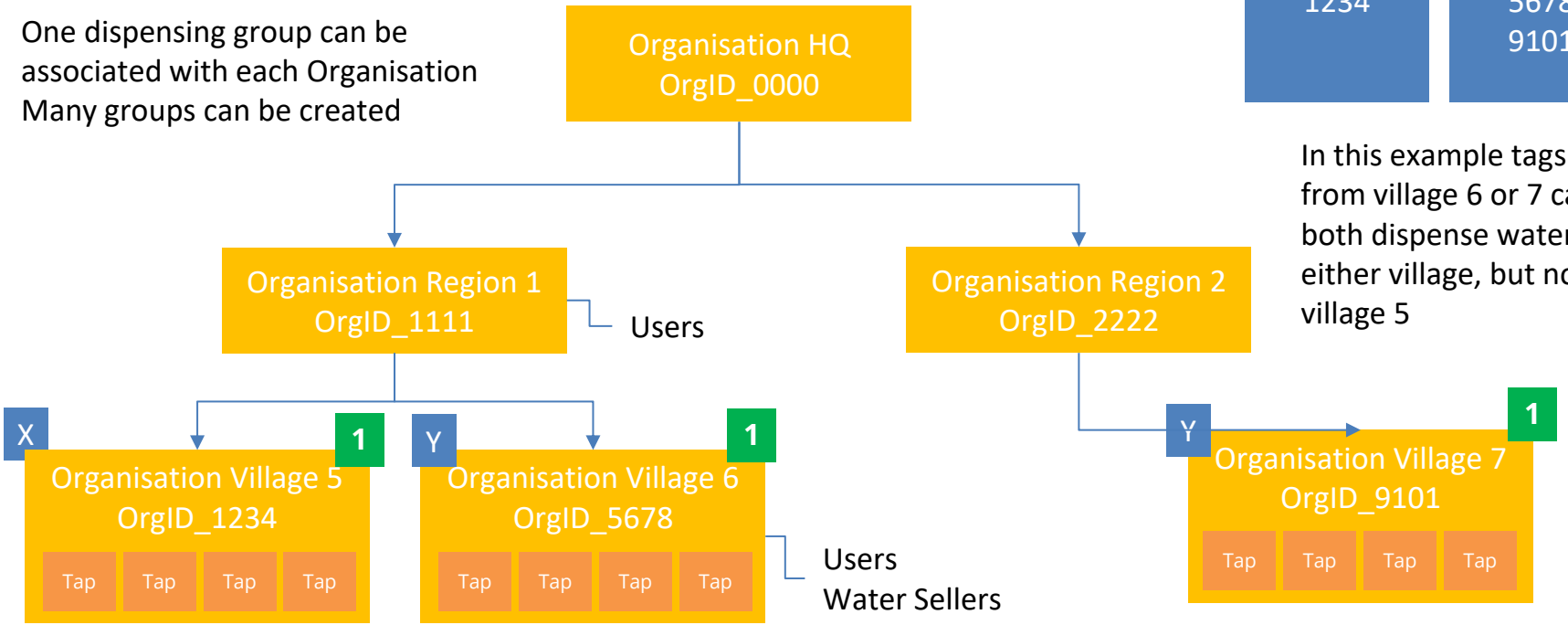


Sun. Water. Life.

Dispensing groups

Dispensing groups allow water to be dispensed across multiple dispensers in different organisations

One dispensing group can be associated with each Organisation
Many groups can be created



Group X	Group Y
1234	5678 9101

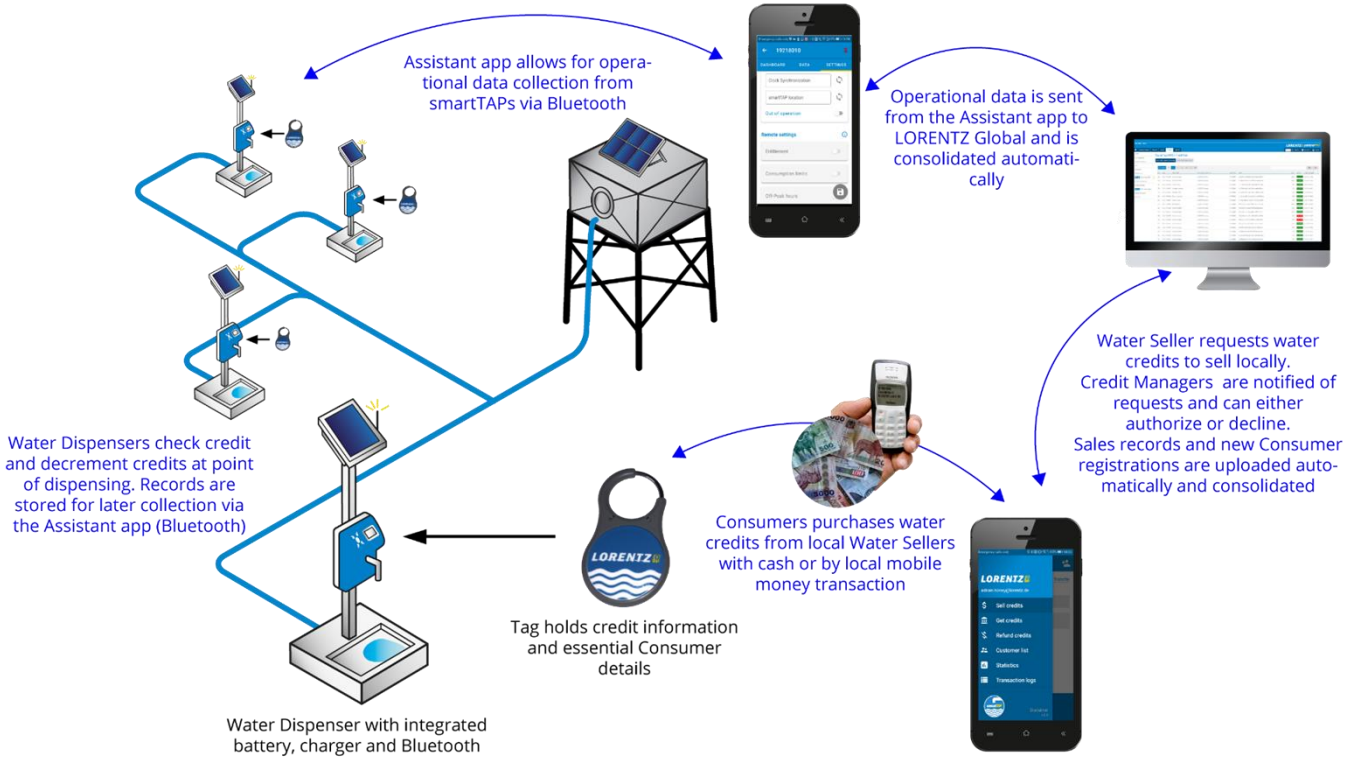
In this example tags from village 6 or 7 can both dispense water in either village, but not in village 5

Sun. Water. Life.

Dispensing groups

- Managed by the “Organization manager” role
- Group organisations into dispensing groups
- All tags belonging to any dispenser in the group can tap water

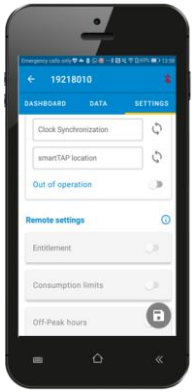
Collection of data from sites

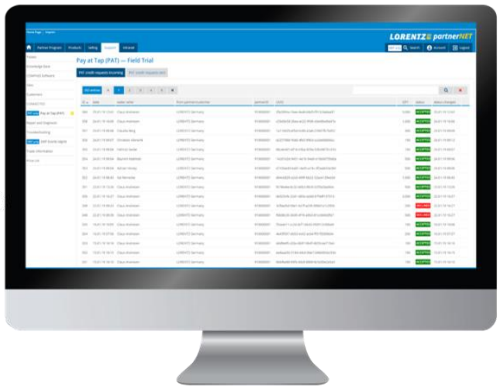


Sun. Water. Life.

Collection of data from sites

- Data is collected by the Assistant app
- Android phone connects via Bluetooth and sends all operational data to LORENTZ Global
- Transaction data is read by the app and forwarded, no local reading is possible
- “Uberization” of data collection, no need for GSM modems, Sim cards or future liability of such





Sun. Water. Life.

6. smartTAP Stakeholders & Value Propositions





LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

Roles in the system

Water Operator

- The organisation that has fiscal and operational responsibility for the system

Water Seller

- An agent / shopkeeper or employee who sells water credits to the local community

smartTAP Provides Value for Everyone

Community Water Project Leaders

- Fair & equitable revenue collection
- Water sellers are part of the solution
- Self funding maintenance and network growth

Water Utilities

- Sustainable solution to collecting revenue from shared water points
- Meet government requirements
- Removes opportunity for fraud

Refugee Camp Management

- Enables daily user entitlement (liters per day)
- No wasted water
- Empowerment of women & children, and care for vulnerable populations

End Users

- Water available 24 hrs per day
- Reduced queuing times
- Faster fixes
- Fair for all users

Value for Community / Committee Run Water Projects

- *Fair and equitable for all customers*
- *'Hybrid entitlement' possible – smartTAP solution can be used in combination with other commercial models*
- *Water sellers are part of the solution*
- *Assurance of collection opens up lines of credit*
- *Self funding maintenance and network growth*

Value for Refugee Camp Management (entitlement)

- *Daily user entitlement (litres per day)*
- *No wasted water and improved capacity planning*
- *Empowerment of women and children with personal tags*
- *Identify vulnerable users*

Value for Water Utilities

- *System to collect revenue from shared water points and in informal settlements*
- *Meet government requirements while covering cost*
- *Fair and equitable for all customers*
- *Removes fraud*
- *Self funding maintenance and network growth*

Value for End Users

- *Water 24 hours per day*
- *Reduced queuing times*
- *Faster fixes (or operator does not get paid)*
- *Fair for all users – pay for what you use*
- *No local manipulation of prices*

7. smartTAP Real World Application & Opportunities





LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

Real World Application

Real World Application

Sun. Water. Life.

Business model example

Charging for water to recover operating costs and capital investment

This is an example full cost recovery model, includes drilling borehole, pumps, storage, pipe infrastructure, smartTAPs, monitoring, payment collection, install, training and lifetime service / replacement. This would be deemed worst case scenario for infrastructure

Customer pays (per 20l container)

Community of 2000 people – served with 4 taps – Capital investment $39k

On-site servicing / management

Equipment (capital repayment)

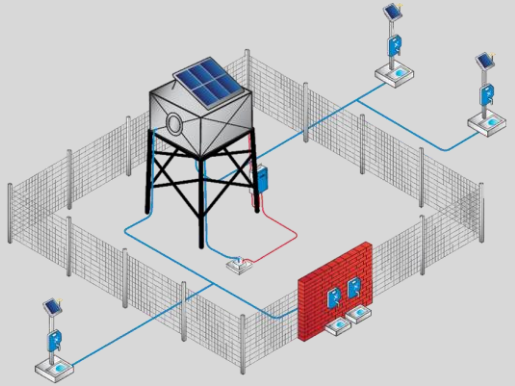
Payment and service charges

0.043 USD

42%

45%

13%



Immediate Opportunities

- *Water Audits – End to end transparency*
- *Digital Identity – Tag use can be extended to multiple services*
- *Hybrid Water Delivery Model - Work with host communities in an entitlement / pay for water hybrid model*
- *Waste reduction and fair distribution*

Considerations when searching for Water Dispensing Solutions

- *Ease of deployment*
- *Ability to scale*
- *Security – Funding and future income rely on security*
- *Is it supportable for the long term – skills, parts, network, technology*
- *Resources and focus for continued development – you are building an island utility*

8. smartTAP Planning

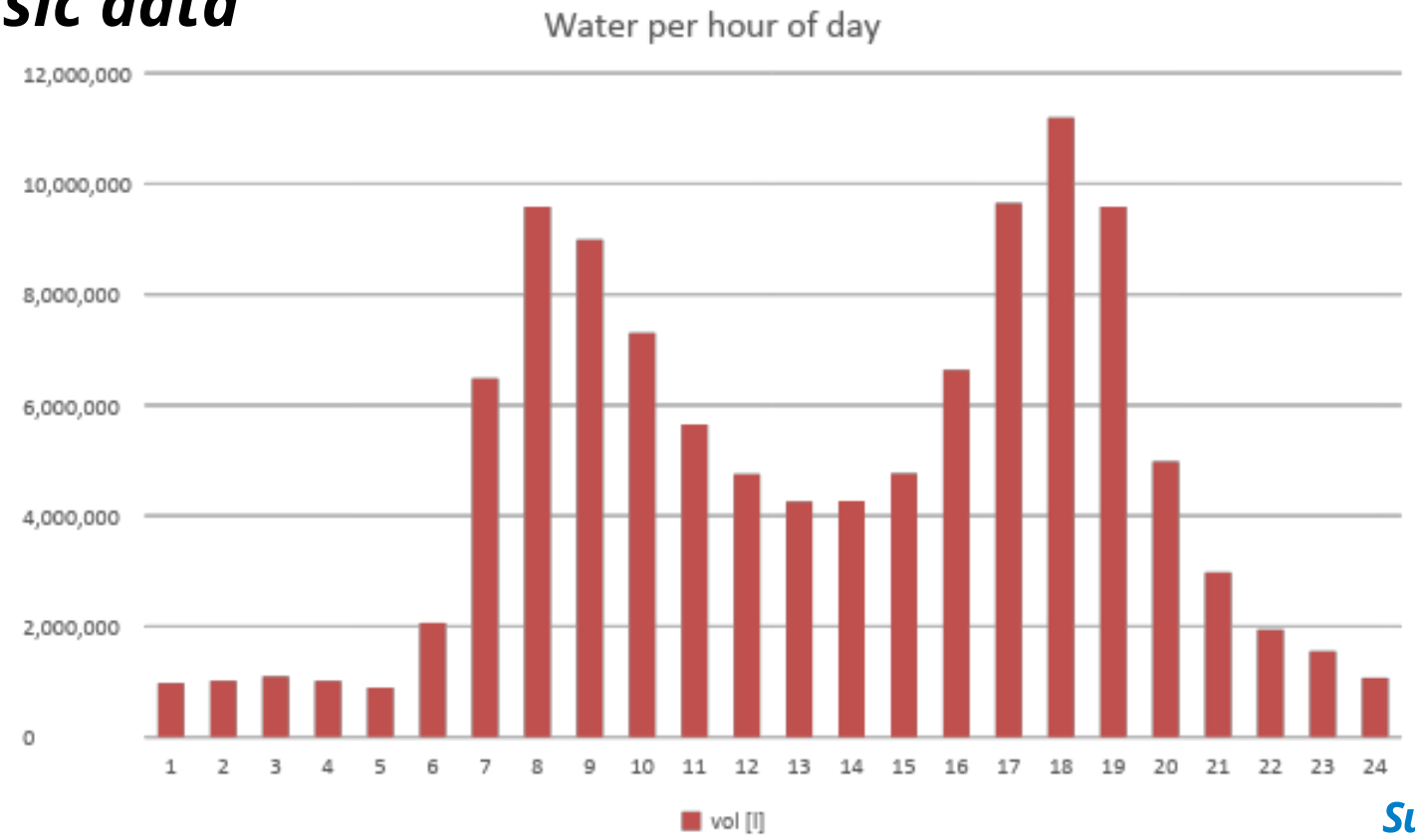




LORENTZ smartTAP Water Dispenser Solution

A sustainable solution for water delivery

Basic data



Planning – Dispensers and Tags

- How many people **1200**
- How many families **200**
- Average water per day **15 l (4 USG)**
- Pressure of water supply **1 bar (14 psi)**

Water per day = 1200 people x 15 l
=
18000 l

Pressure v flow

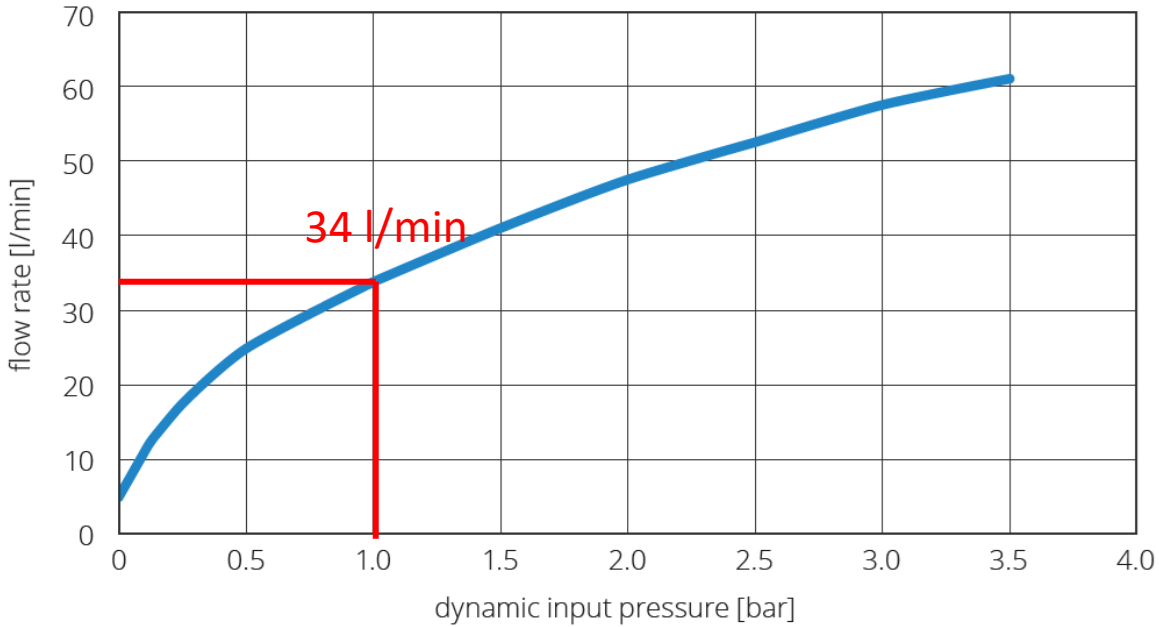
TECHNICAL DATA

DC Input Umax	24 V DC
Max. pressure	3 bar
Min. pressure	0.1 bar
Flow at 0.2 bar	19 l/min
Flow at 3 bar	54 l/min
Accuracy	> 95 %
Battery	NP7-12 lead acid

This device contains the following:

LoRa radio	RED 2014/53/EU
Bluetooth	FCCID:QQQBT127

HYDRAULIC PERFORMANCE



Planning – Dispensers and Tags

- How many people **1200**
- How many families **200**
- Average water per day **15 l (4 USG)**
- Pressure of water supply **1 bar (14 psi)**

Water per day = 1200 people x 15 l

=

18000 l

Assume max 6 hours dispensing per day

6 hours x 60 mins x 34 l = 12,240 l per dispenser

2 dispensers provide good user coverage, small queues

200 tags are required – 1 per family

Financial planning

Costs (list prices) **

- smartTAP dispensers (x2) **2000**
- smartTAP tags (x200) **1000**
- Installation / ancillaries **500**
- Total **3500**

** Import duties, taxes, transport etc will vary prices ☹
Volume, project planning and scale will also influence prices ☺

Financial planning

- Think about
  - Where there is currently no revenue – no ROI needed
  - smartTAPs do not have pockets
  - Rural water is expensive – we can do better
  - Use of smartTAP will reduce waste to zero

- Supporting vulnerable people
  - Daily entitlement
  - Allowances / prescribed water

Planning - social

- The move from beneficiaries to customers
  - If customers pay then they have higher expectations

- What service is being replaced
  - Water tanker, kiosks
  - Can you make them part of the new solution?

- Is there a good social structure to support roll out
  - Water committee, mosque, church, school etc

Planning - operational

- Water sellers
  - Employed, independent agents,
- Flow of money
  - All pre-paid or pre-financed to water sellers
- Repairs and service
  - Train technicians, spare parts availability

Local planning – Dispenser location

- Studies show <200m improves use
- Logical to install in areas that are close to other services (shop / kiosk)
- Separate dispensers to reduce cross contamination
- Avoid areas that are permanently shaded for the PV module

Non realtime v realtime data

- Realtime monitoring is less critical
  - People are always around dispensers
  - Knowing how much is “tapped” is interesting at the end of the day or end of the week
- Realtime monitoring of money flow is important
- “Uberize” data collection
  - Less expensive and future proof

Thank you for your attention!