

Changing Behaviour in Real Time

Advanced Metering in Singapore

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Senior Manager, Smart Water

SUEZ

at a glance

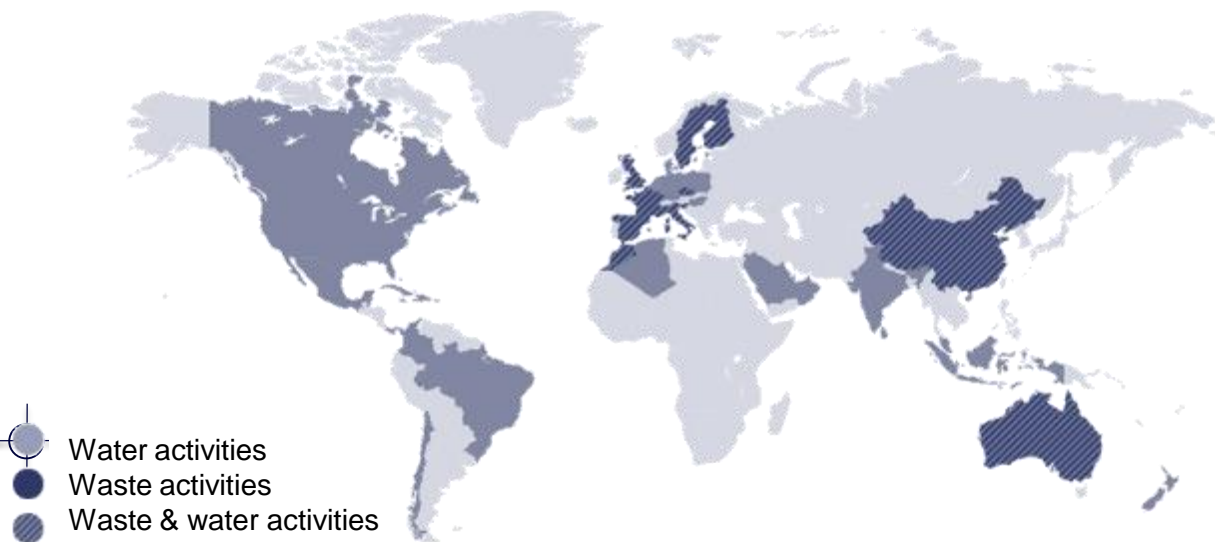
Water Management

Recycling

Waste Recovery

100,000
People

450,000
Customers



Smart Metering Deployments

6 M ++
smart meters
deployed

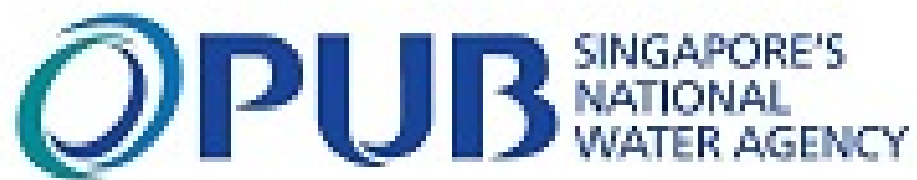


+11,000,000
planned

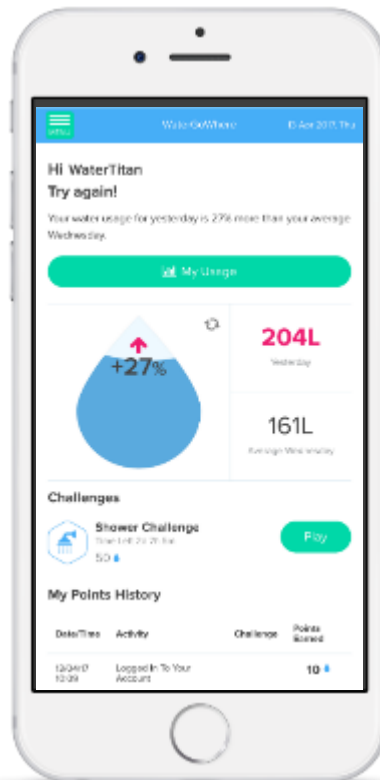
+ 10,000 new devices per day

+ China, Singapore, Chile, Indonesia, Colombia...





What's Next?



The deployment

2005



TRINITON

SONY

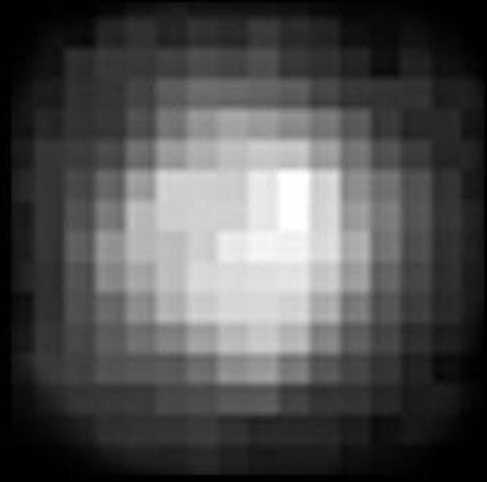
Model No. W20000 (1997)

Power On / Standby / Mute / Channel / Volume / Contrast / Brightness / Sharpness / Color / Sound / Sleep / Timer / Memory / Exit / OK / Enter / Arrow Keys





Pluto



(still a planet)



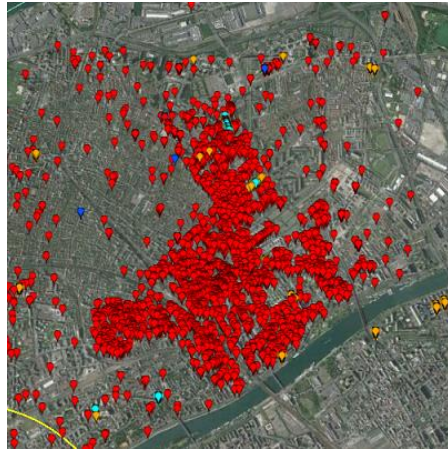
\$1





Technology Goals for Wise Alliance: (2005)

**Extremely
Long Range**



**Interoperable Suppliers
No Hostage Data!**



**>20 Year
Battery Life**



Trivia: Smart meters are the most deployed Industrial IOT device!



(prepare for bullet points)

Wize Alliance Platform

Wireless M-Bus mode N (EN13757-4)

Operating at 169 MHz.

Radio parameters:

- 2.4, 4.8, or 6.4 kbps data rate
- 6 channel options
- 12.5 kHz channel bandwidth
- 500 mW max output power (typically 100-200mW)
- Bi-directional, secure, encrypted



Traditional OSI model

Application Layer

Presentation Layer

Session Layer

Transport Layer

Network Layer

Data Link Layer

PHY Layer

WM-Bus basic stack

Application Layer

Data Link Layer

PHY Layer

Wize Alliance Platform

- “M-Bus” (Meter-Bus) – EU standard EN 13757, maintained by:
 - CEN (European Committee for Standardization),
 - CENELEC (European Committee for Electrotechnical Standardization), and
 - ETSI (European Telecommunications Standards Institute).
- “**Wireless M-Bus**” - Part 4 of this standard (EN 13757-4).
- CEPT (the EU telecoms coordinating body, the parent body to ETSI) specified 169 MHz as the formal recommendation for utility metering (ERC Recommendation 70-03).
- Wize Alliance - formed to promote open standard, implementation of Wireless M-Bus.



Deployment: Wize Alliance Platform

Open
Platform

Interoperable
Suppliers

By Utilities,
For Utilities



Deployment: Wize Alliance Platform

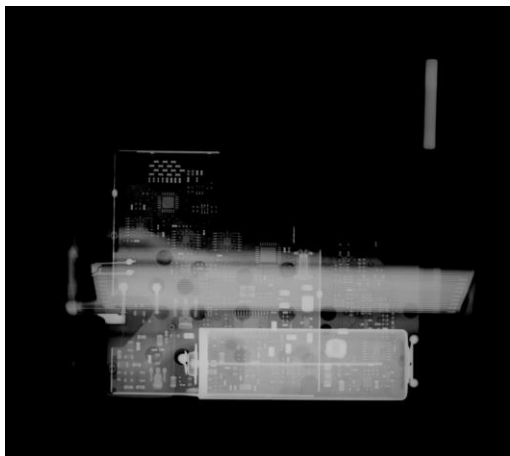


First deployment:

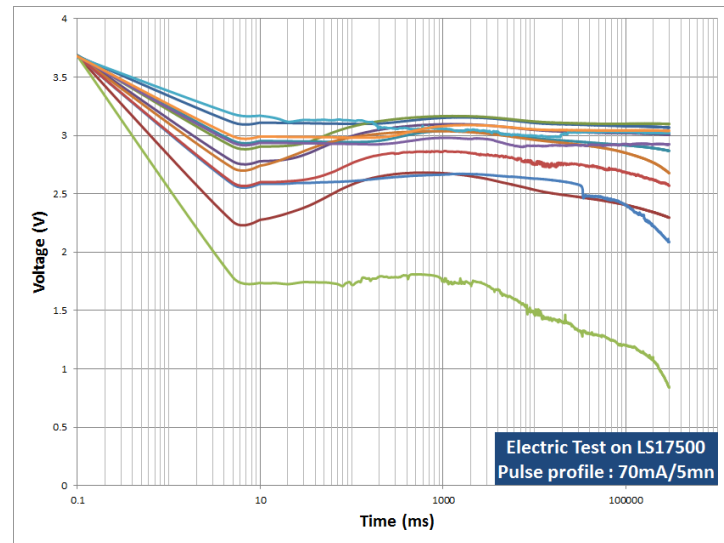
2005

20 Year Battery





Battery Autopsy



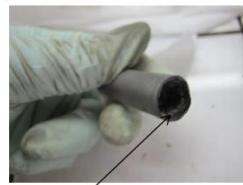
Electrolyte résiduel



Rondelle supérieure et séparateur de flanc présents



Clou



Lithium résiduel

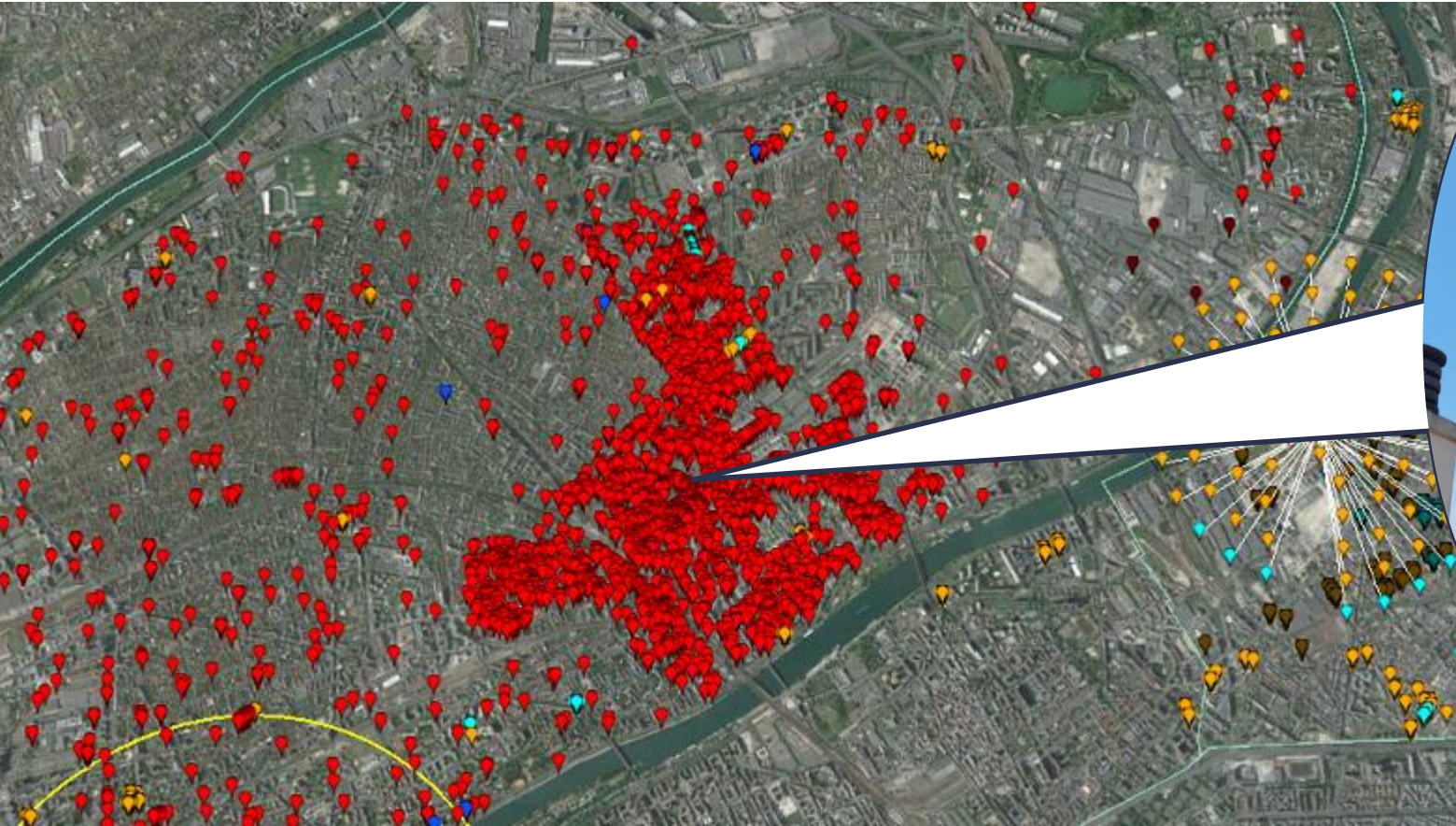
Installed: 2008

Autopsy: 2016

Remaining Life: 13.6 Years

Deployment: Wize Alliance Platform

Long Range: 1 Receiver, 50,000 meters

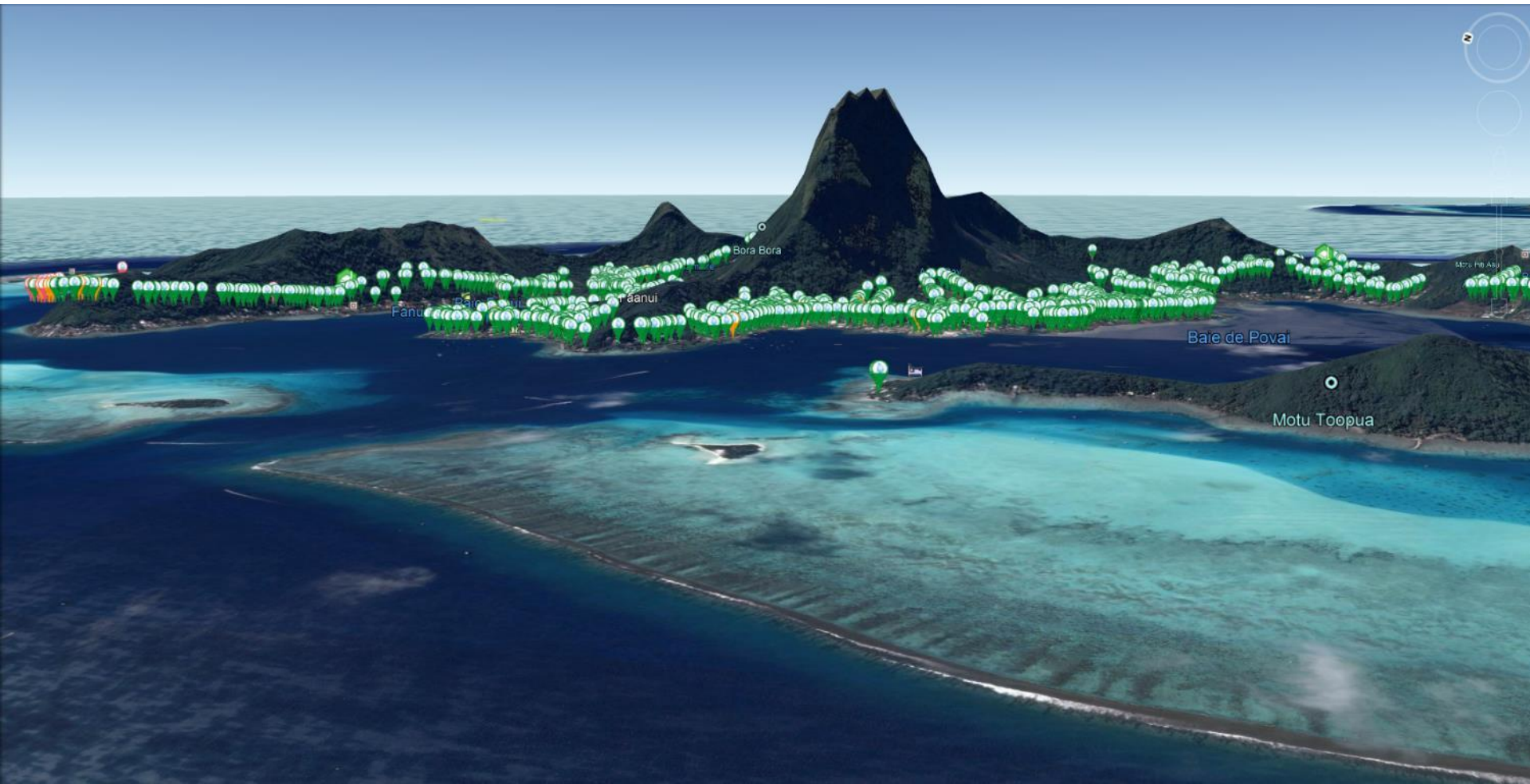


Deployment: Wize Alliance Platform

Antenna:



e.g. Bora Bora!



30 km²



~2,000 devices

Motu Mute

Tevairoa

Motu Piti A'au

Bora-Bora Lagoonarium

Bora-Bora

To'opua

Motu Piti A'au

Récif du Motu de Bora

Matira Point

Motu Mute

Tevairoa

Motu Piti A'au

Bora-Bora Lagoonarium

Faanui

Bora-Bora

Vaitâpê

Nūnū'e

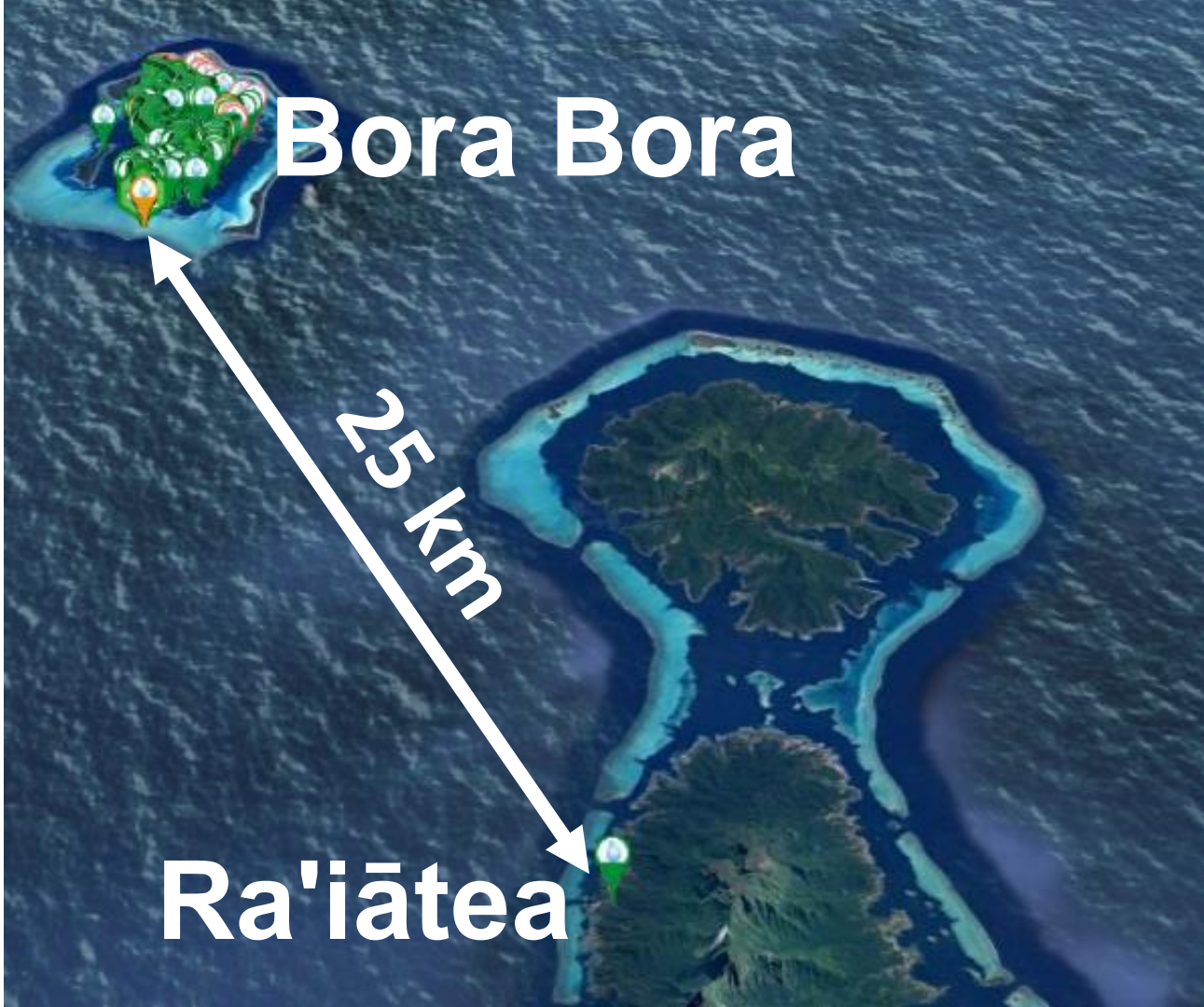
To'opua

Motu Piti A'au

Récif du Motu de Bora

Matira Point

3 receivers



Bora Bora

25 km

Ra'iātea

Barcelona

3.2 M
people

1.4 M
Smart meters



Longest Running Open Network

WIZE Alliance

2005 2010 2015 2020



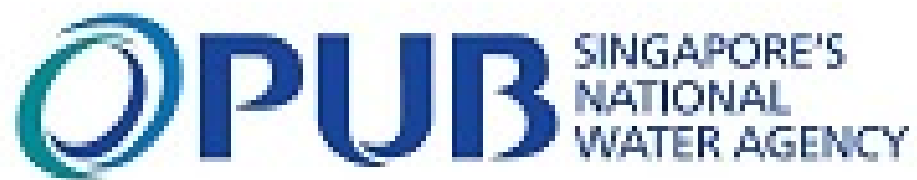
Best Technology

- ✓ 20 Year Battery
- ✓ Long-Range
- ✓ Very Deep Indoor Coverage
- ✓ Zero IP Licensing

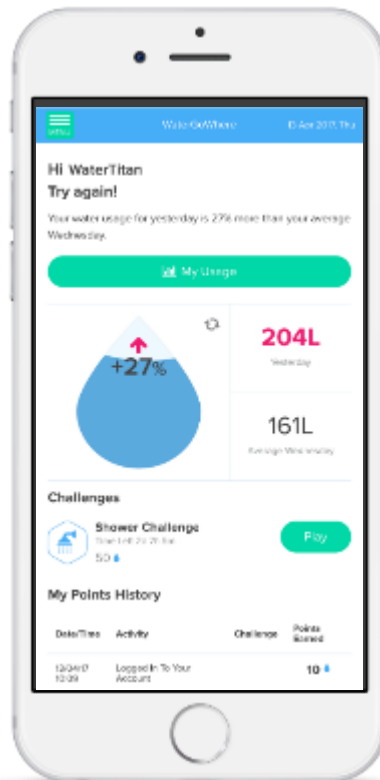
Largest Partner Network



2015

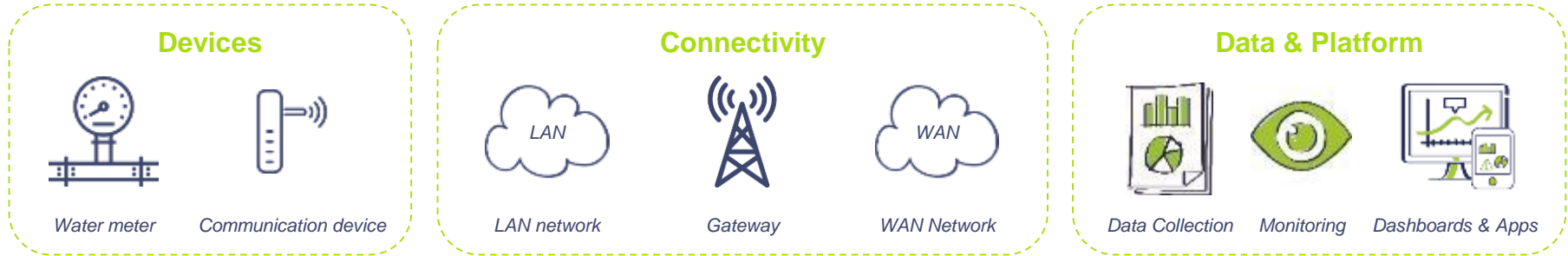


What's Next?



Singapore Deployment: Full Stack

A Smart Metering solution is a complete **value chain**



CHOICE OF CONNECTIVITY

Operation model
Infrastructure required
Proprietary vs open technology
End to end service

IMPACTS ALL ASPECTS OF TCO

Obviously...

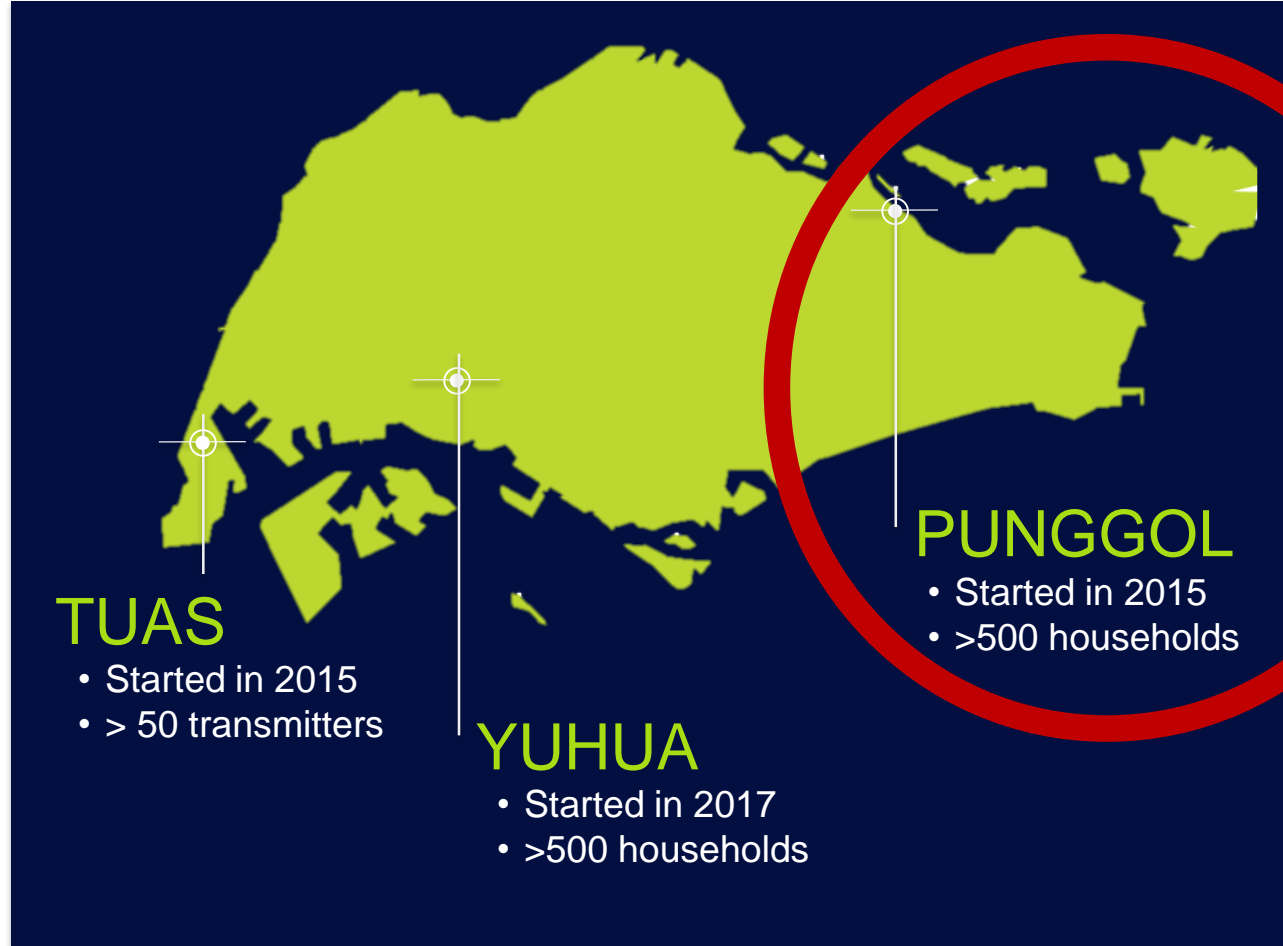
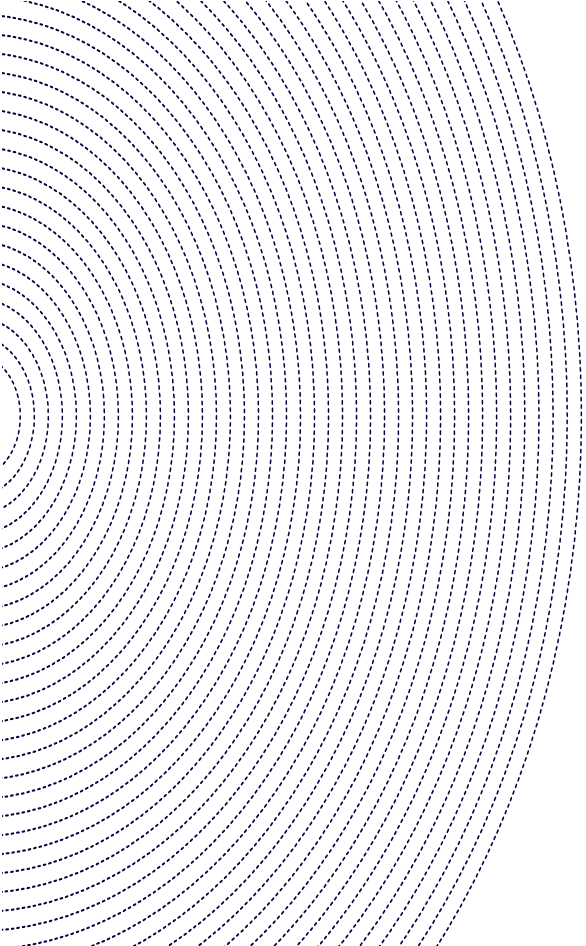
Costs of devices and network +

...but also

Time to Market
Fit for Purpose
Deployment
Security
Control

Monitoring
Maintenance
Reversibility
Sustainability
Upgradability

Deployment: Location



TUAS

- Started in 2015
- > 50 transmitters

YUHUA

- Started in 2017
- >500 households

PUNGGOL

- Started in 2015
- >500 households

Deployment: Customer Brand



WATER
GO WHERE
Make Every Drop Count

Deployment: Keeping Residents Engaged



The Study

The Study: Customer Experience

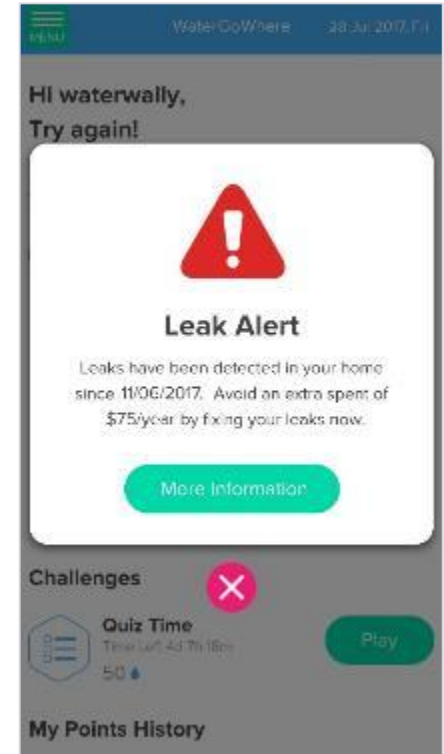
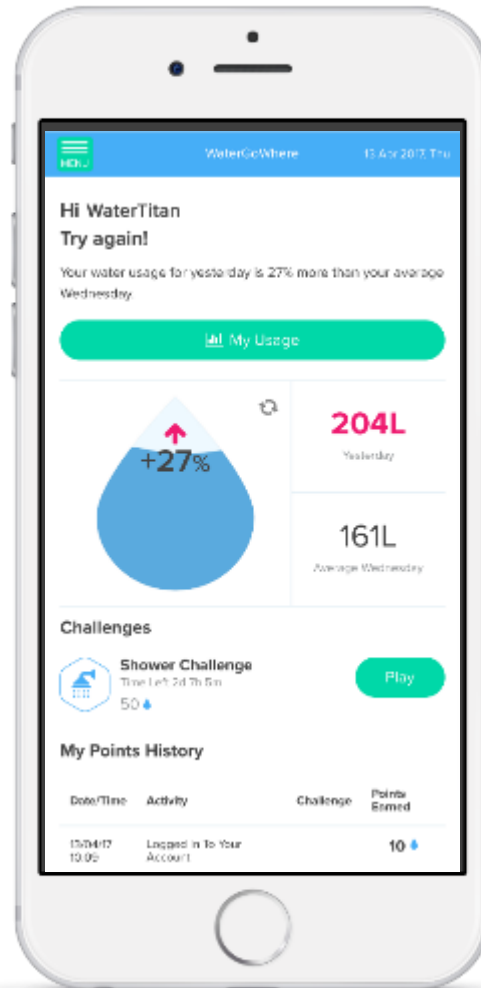
525 Residences, 6 months (2H 2017)

Features Tested:

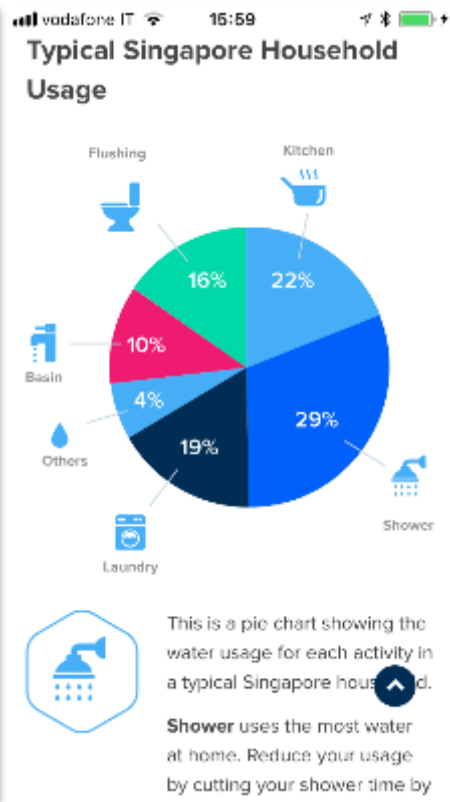
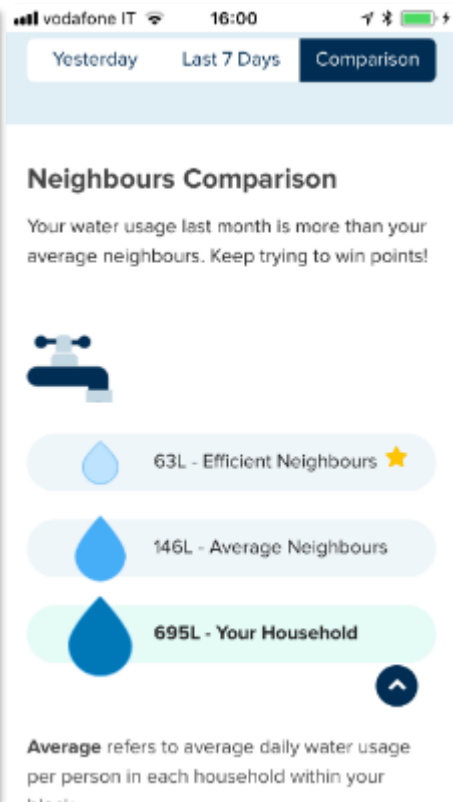
- Leak alerts
- Usage reports
- Challenges (daily / weekly / monthly)
- Peak period notices
- High consumption alarms
- “Points” + “Status” + “Prizes”

(Offline groups engaged as well)

UX Design: Colours, Calls to Action,
Simplified Data, “10 year old customer”



WaterGoWhere



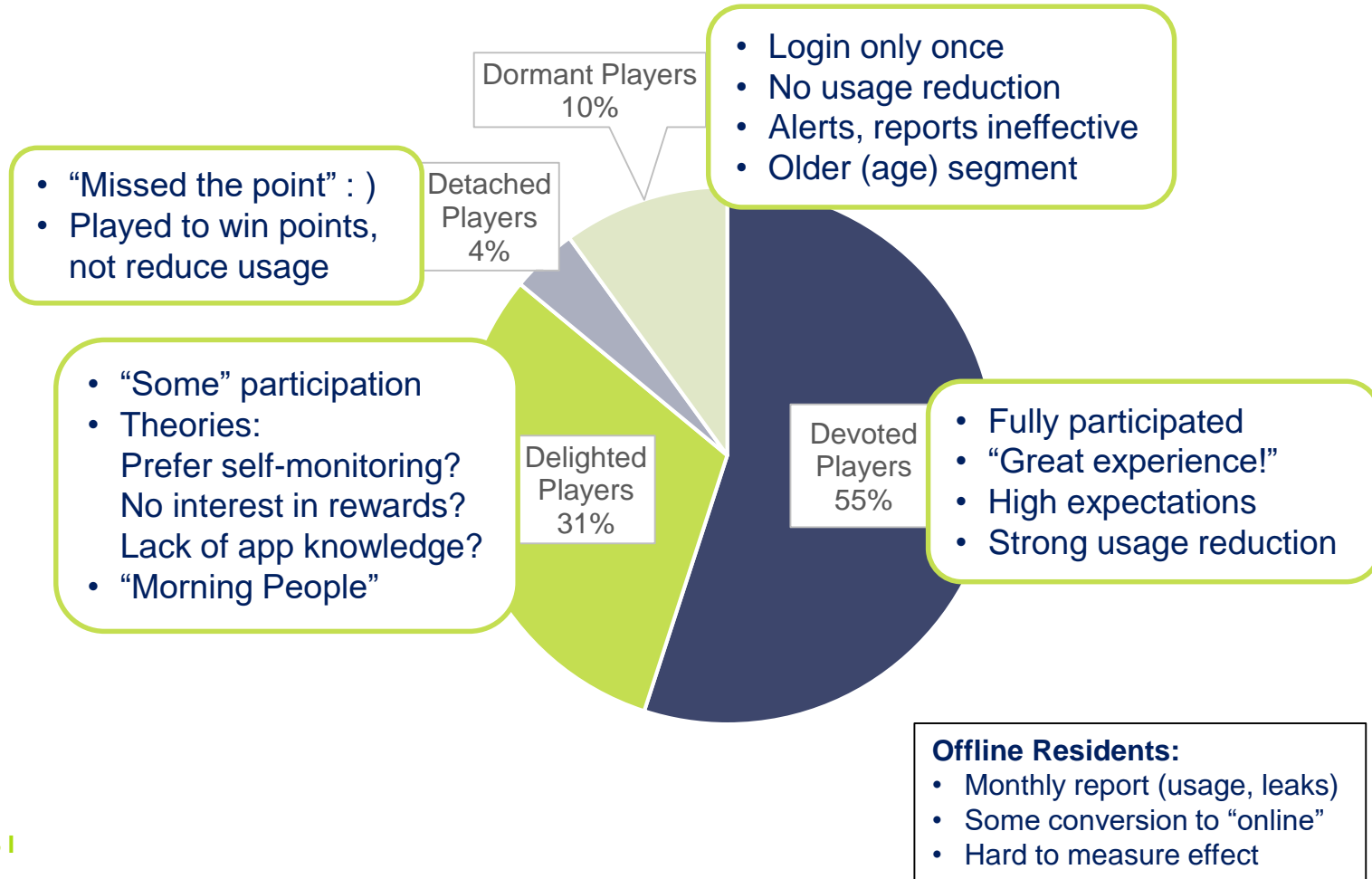
The Study: Highlights!

- 52% of households “interested,” downloaded the app
- 34% of households viewed their usage, participated in challenges at least weekly
- Positive feedbacks (email, social). Requests to join from residents in other estates!
- Engaged ‘tough customers with leaks’ where traditional method had not worked :)

Water savings: > 5% (6.9 LPCD)



The Study: Behavioural Segments



The Study: Areas of Strong Effectiveness



**Neighbour
comparison**



Rewards



Trends

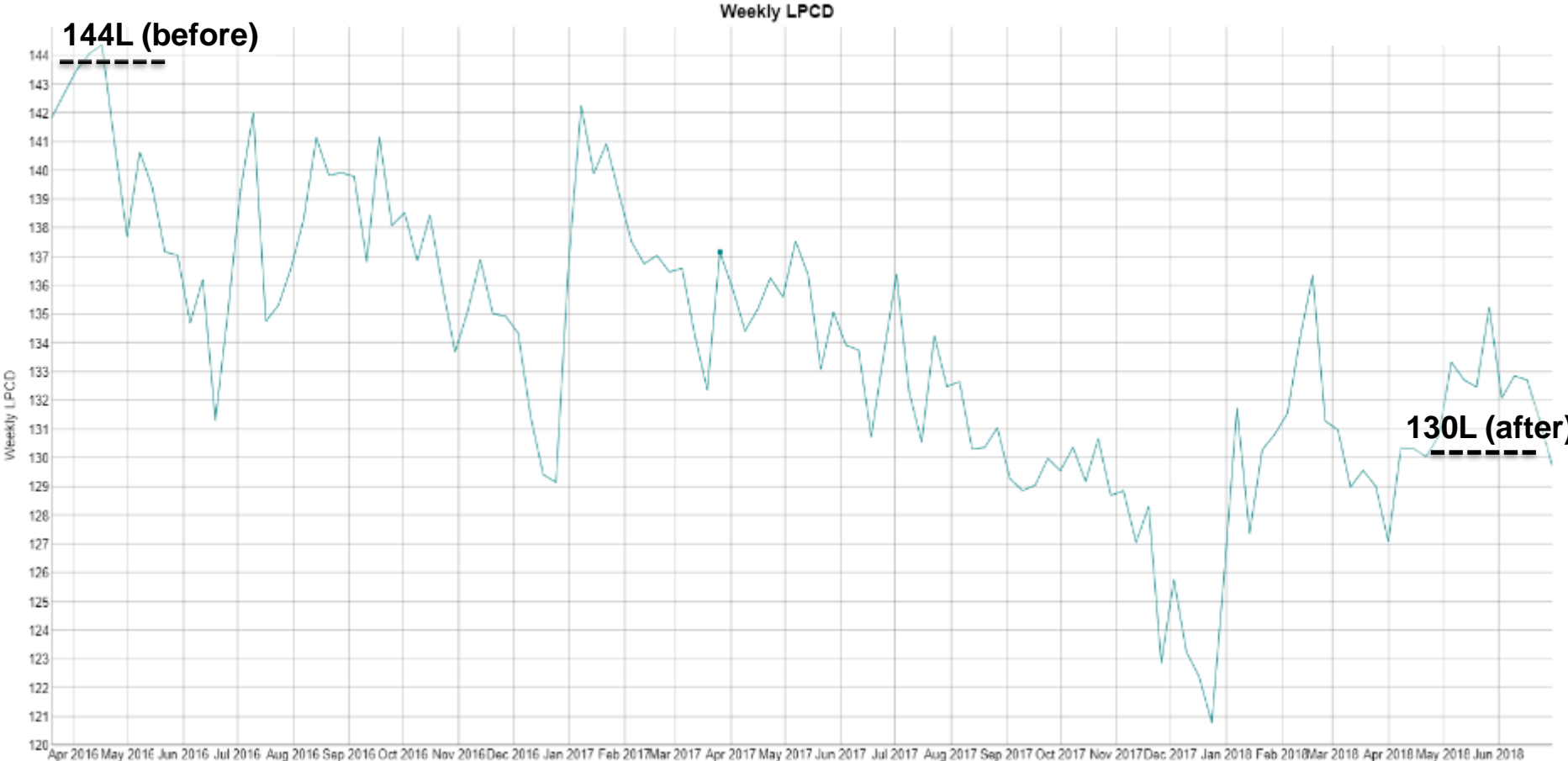


Meetups



**Free
Services**

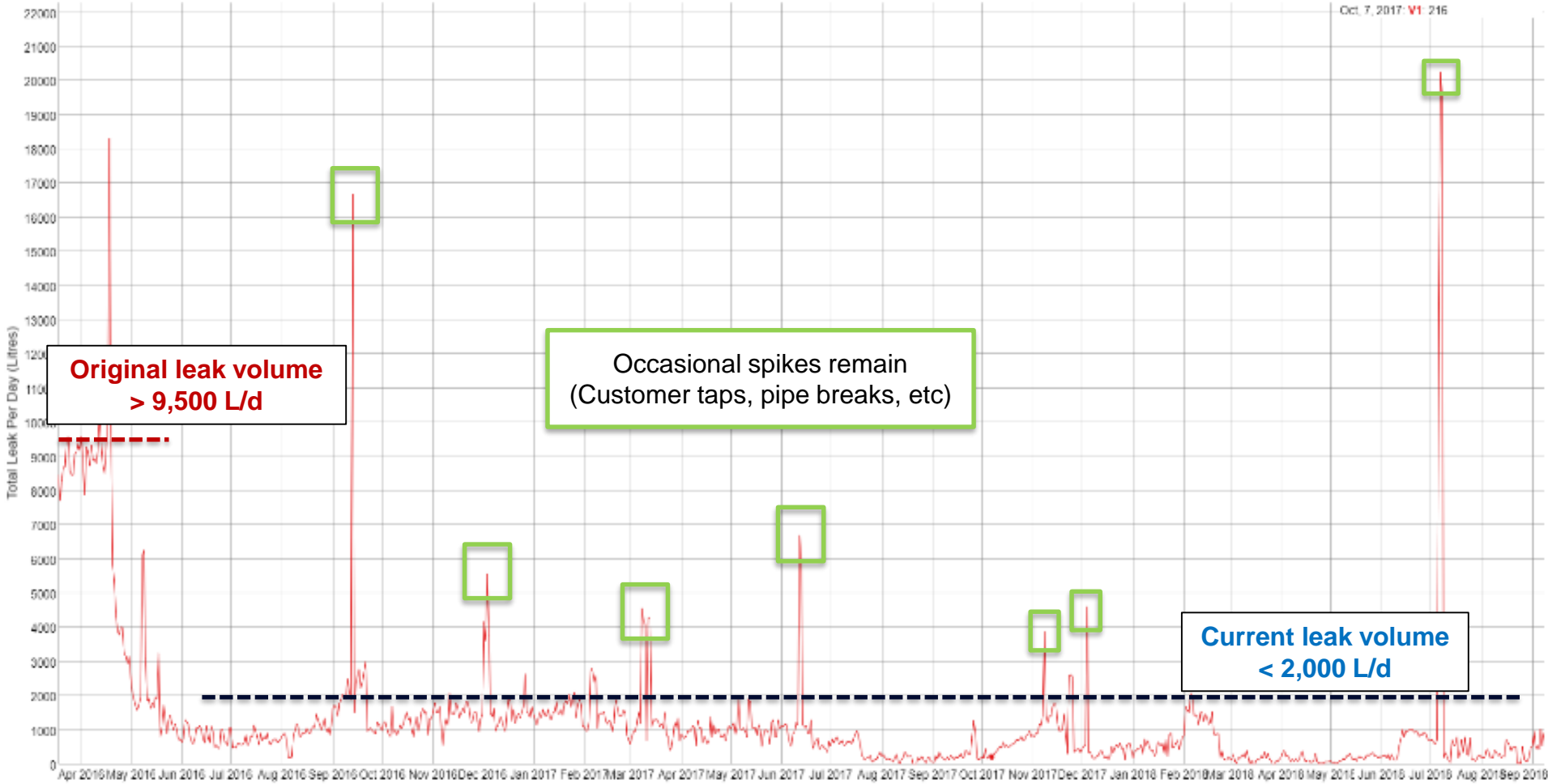
LPCD decline by >7% since April 2016



Leakage Rate reduced by ~80%

Leak Volume Per Day (Punggol)

Oct. 7, 2017 V1 216



Next Steps:

- Stage 3 (Yuhua) Complete
 - Older
 - Varying Ethnicity, No English
 - Success!
- Drive Engagement:
 - Digital “Clinics”
 - Ambassadors
 - Home Visits
- Expand Project
 - 300,000 homes
 - Energy?
 - Waste?





WATER
AND WASTE

DOWNLOAD OUR
BILE APP FOR FREE!

...and more...
...and more...
...and more...

...and more...
...and more...
...and more...

...and more...
...and more...
...and more...



suez

for
the resource
evolution

All brands of the group
are powered by SUEZ

Backup: Other Example Deployments

Case Study: Malta

CHALLENGE

Conserving and accurately managing the island nation's limited water resources, offering new services to customers while encouraging a responsible behaviour towards water consumption.

SOLUTION

Deployed AMI to allow access to hourly readings to monitor water consumption and quickly identify abnormal consumption and leaks at any time.

RESULTS

Increased customer satisfaction and engagement, improved commercial cycle efficiencies, improved network management, proactive demand management and better environmental performance.

250,000 smart meters

430,000 inhabitants



Case Study: Paris

CHALLENGE

Improving metrology (reducing under-registration) and increasing revenues by replacing meter fleet with static meters.
Improving an already very high network yield by combining real-time water distribution network management with AMI data.
Ability for Eau de Paris to operate the system independently & direct access to multiple vendors. Fast roll-out

SOLUTION

Improve existing AMI system by choosing one fixed-long range system operated by SUEZ.
Innovation: static meter with embedded long-range connectivity.
Stringent roll-out planning.
15-years of battery life.

RESULTS

Improved meter data availability.
Reduced operations & maintenance costs.



2 M
inhabitants

95,000
smart meters

Case Study: Barcelona

CHALLENGE

Empowering the customer with tools for a better water consumption control, improving network leakage detection and thus optimising the overall metropolitan area water needs.

SOLUTION

Deployment of an AMI solution providing 24 hourly readings per day.

Integration of AMI data in customer web and app, as well as alerting the customer in case of anomalies by SMS or e-mail.

Integration of AMI data in network management tools.

RESULTS

Better Customer engagement and water awareness, reduced leaks, better customer service, a more digital customer communication

Enriched knowledge for network management teams.



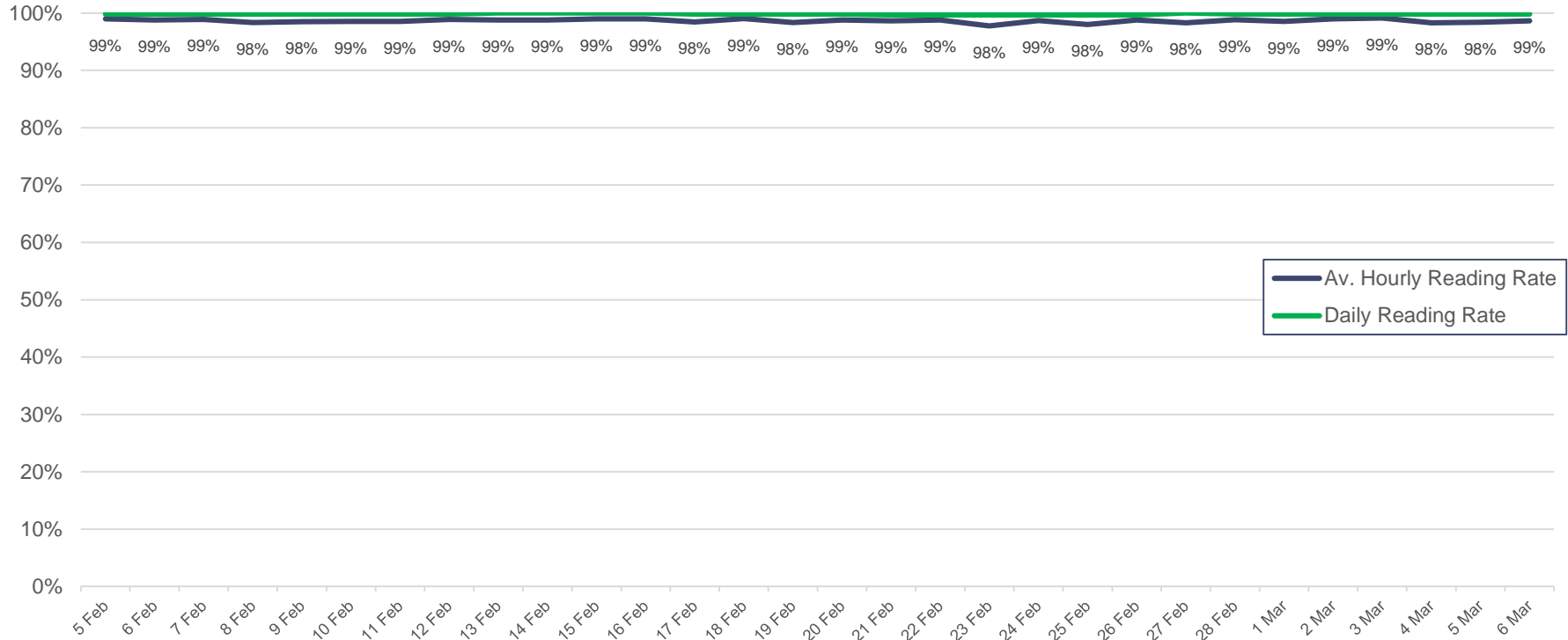
3.2 M
inhabitants

1.4 M
Smart meters

Already 350,000
operating units

Backup: Technical Outcomes & Analytics

System Availability:



(includes radio performance + planned maintenance)

