INNOVATIONS IN WATER TECHNOLOGY

SMART SOLUTIONS FOR INCREASED EFFICENCY RELIABILITY AND SUSTAINABILITY OF WATER AND WASTEWATER SUPPLY FOR DEVELOPING COUNTRIES

Callum Peck – Project Sales Manager Water Utility
Grundfos Pumps Philippines

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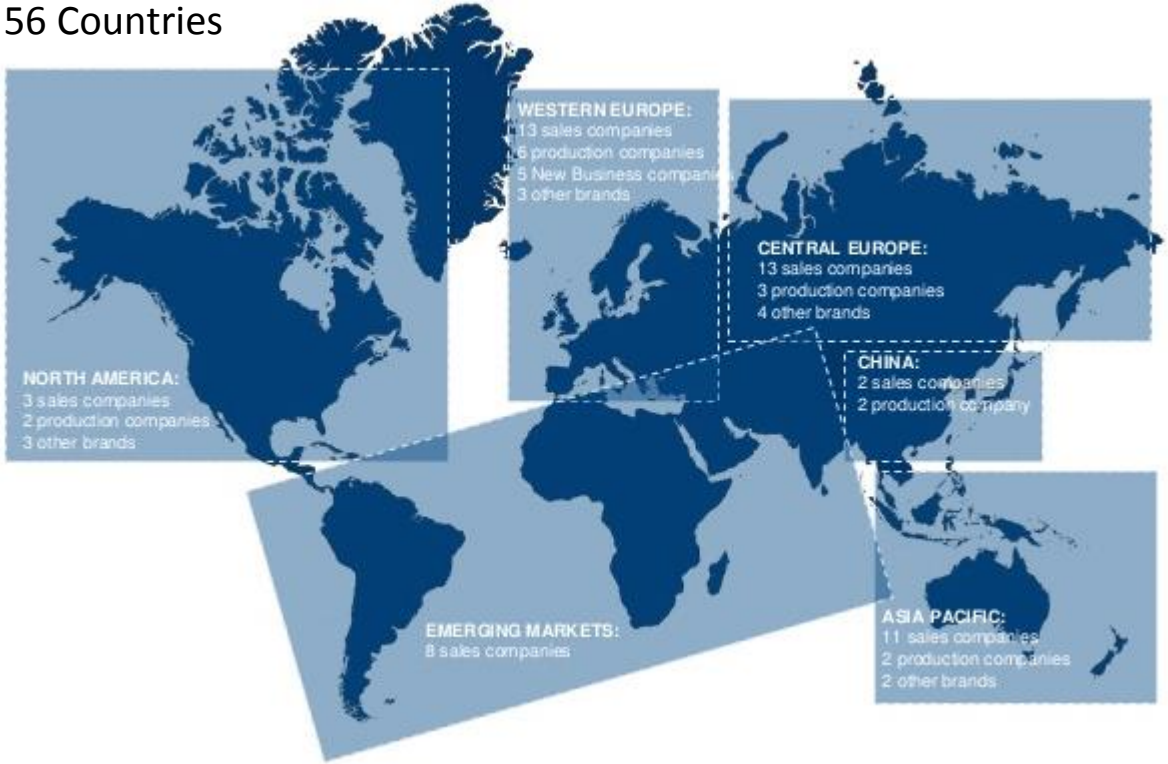
GRUNDFOS In Brief

Founded in 1945

World Leading Manufacturer of pumps and Water Solutions

More than 18,000 staff in More than 56 Countries



Challenges of Water Service providers in Developing Countries

Non Revenue Water – Developing countries lose between 14 - 30% of their water revenue as a result of commercial Losses

Revenue Collection: Inefficiency in revenue collection

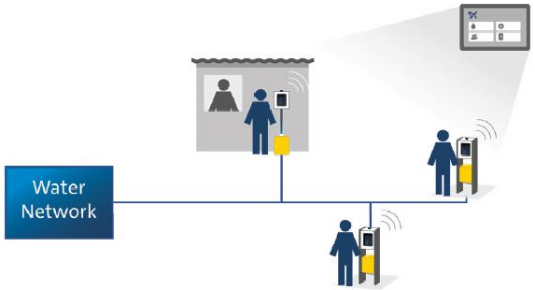
Stability: Keeping up with Demand from increasing Urban Population and Informal Settlements – Innovation needs to be Scalable

Water Service Management: Lack of Professional Management Tools / Skills Gap in Operation – Maintainece of equipment

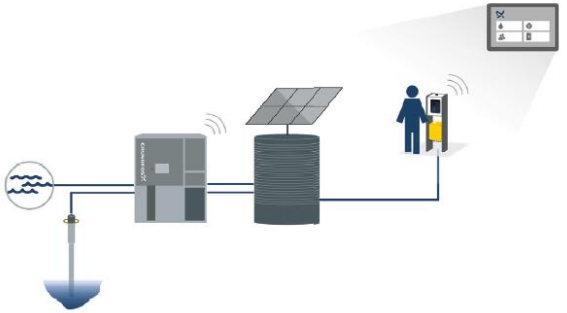
GRUNDFOS Lifelink

MINI-GRID OF WATER KIOSKS CONNECTED TO WATER SUPPLY

WATER KIOSK CONNECTED TO WATER NETWORK



WATER KIOSK CONNECTED TO WATER SUPPLY



GRUNDFOS Lifelink

FULL ADAPTABILITY

A MODULAR CONCEPT – Surface / Ground or Utility water supply

REMOVE

UNCERTAINTY IN REVENUE COLLECTION – Closed Payment System

ENSURE

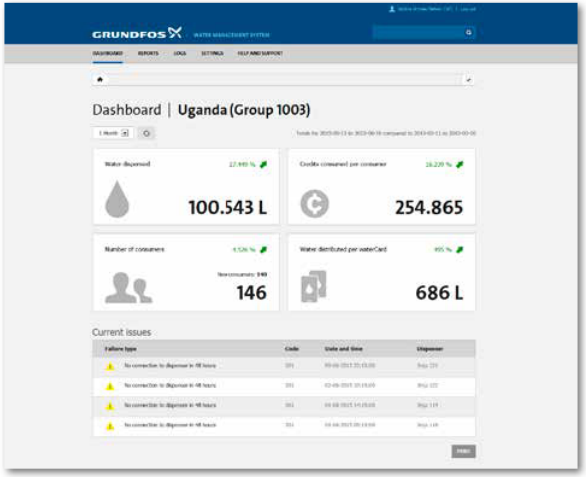
FINANCIAL TRANSPARENCY AND ACCOUNTABILITY – Billing amount ensures money available for Maintainece

Smart card revenue collection
– where water credits are stored on WaterCards

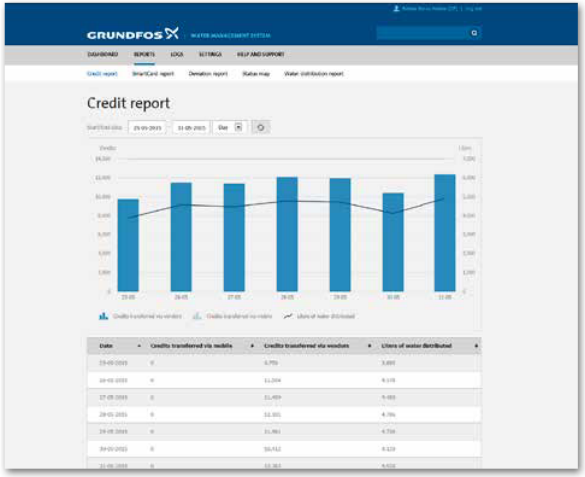
AQtap dispenser unit
– where water is tapped and credits managed

Water management system
– where data from transactions and operations are processed and published

TOTAL CONTROL AND INCREASED EFFICIENCY FOR WATER SERVICE PROVIDERS – Using Intelligent Connectivity



The **dashboard** provides an overview of the performance of your group of dispensers, including a trend indicator of the water dispensed and a list of current alarms and warnings.



With the notification function, you can set up the system to broadcast alarms and warnings by email or text messages to you, your service team and/or partner.

Reports show the distribution of credits over time, consumption of water over time and consumption patterns according to consumer type.

OPTIMISED WATER DISTRIBUTION

Reduce leakage loss and energy costs
with Demand Driven Distribution

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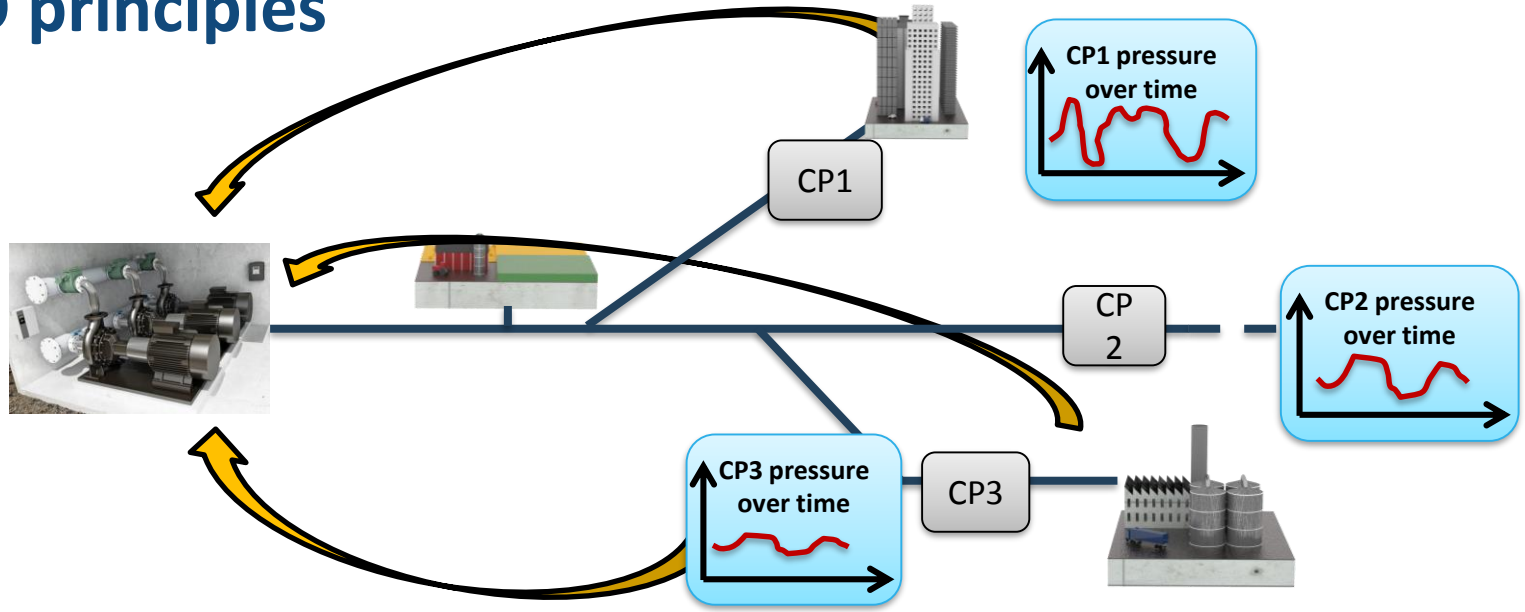
Common challenges in a distribution system

- Secure a stable water supply for the end user (or critical point)
- Scarce water resources
- Pipe breaks
- Leakage - NRW
- Operation costs
- Demand is never Constant

Main DDD principles



- Remote pressure sensors (data loggers) are installed at critical points (CP)
- DDD creates a model of the distribution network pipe system
- Each CP contributes with its own pressure profile
- Profiles are logged, and sent daily to pumping station (SMS messages)
- Pumping station optimizes control curve based on updated sensor data using control

DDD benefits

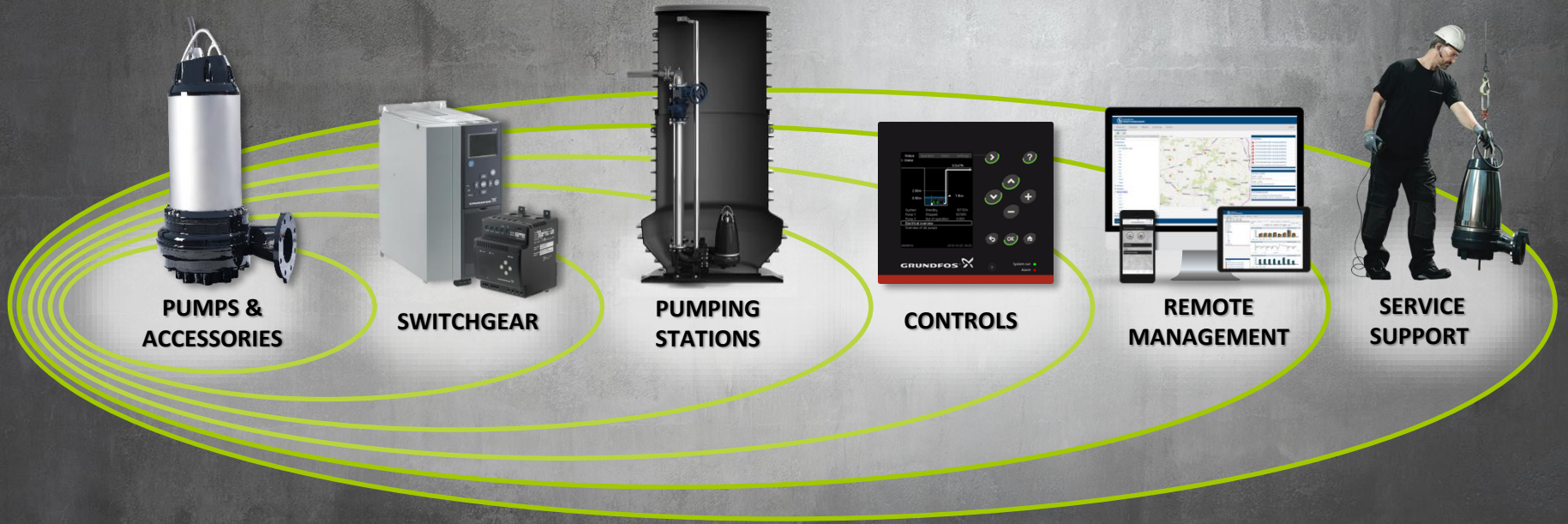
- Increases availability of water in some cases from 2 hours per day to 24 hours per day
- Saves Energy as pressure is lowered on average Takeo Water saved approx 20% on Energy Costs
- Reduced leakage due to lower pressure In this case 14% Reduction in Water supplied into the Distribution system which also means less water taken from lake and less chemicals used in treatment process
- Minimizes the risk of pipe bursts due to more stable pressure
- Minimizes manual work related to changes in the weather and water demand

END-TO-END SYSTEM DESIGN

A NECESSITY FOR WASTEWATER NETWORKS

SYSTEM WIDE THINKING

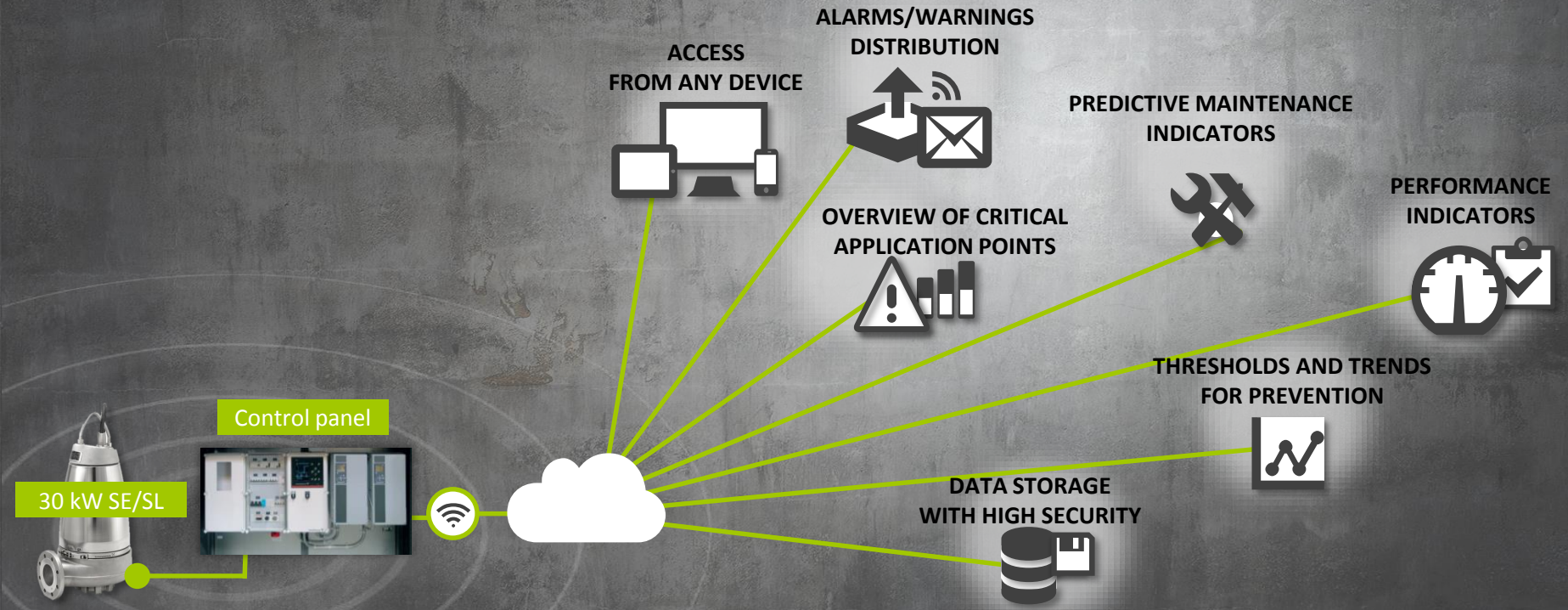
FOR INTELLIGENT WASTEWATER NETWORKS



FAST SOLUTION FOR WASTEWATER NETWORKS PREFABRICATED PUMPING STATIONS

- A modular approach for customisation with all components designed for complete compatibility
- Much faster Completion time than traditional In Situ Concrete Lift Stations Installation time reduced by up to 80%
- Less Footprint than a Traditional Lift Station making Land Acquisition Simpler
- Hydraulic Design optimised for Efficiency when pumping Waste water and sewerage for reduced energy and more resilient and sustainable operation
- Less Civil work required bring overall cost of implementation down by up to 20%

iSOLUTIONS BRINGS TOGETHER INTELLIGENT PUMPS, MONITORING AND DATA MANAGEMENT



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INCREASE RELIABILITY

OPTIMISING THE CONTROL PHILOSOPHY

- **Continually optimise your system** with Dedicated Controls and a variable frequency drive
- **Automatically adapts pump speed** of the system according to varying demands, saving energy
- **A scalable system** that grows as requirements in the pit, system and network change
- **Prolong the system life** of all pressurised equipment with timely service from a continuous overview of pumping efficiency

SMART CONTROL
FOR IMPROVING OPERATIONAL RELIABILITY

Substantially reduced blocking risk:

- The pump reverses automatically the next time the pump starts
- Or the pump flushes the pressure pipe at pump start

Reduced sedimentation:

- Daily flush of pipes and pit reduces sedimentation
- Start level variation automatically stops debris settling in the pipes, pit and pump

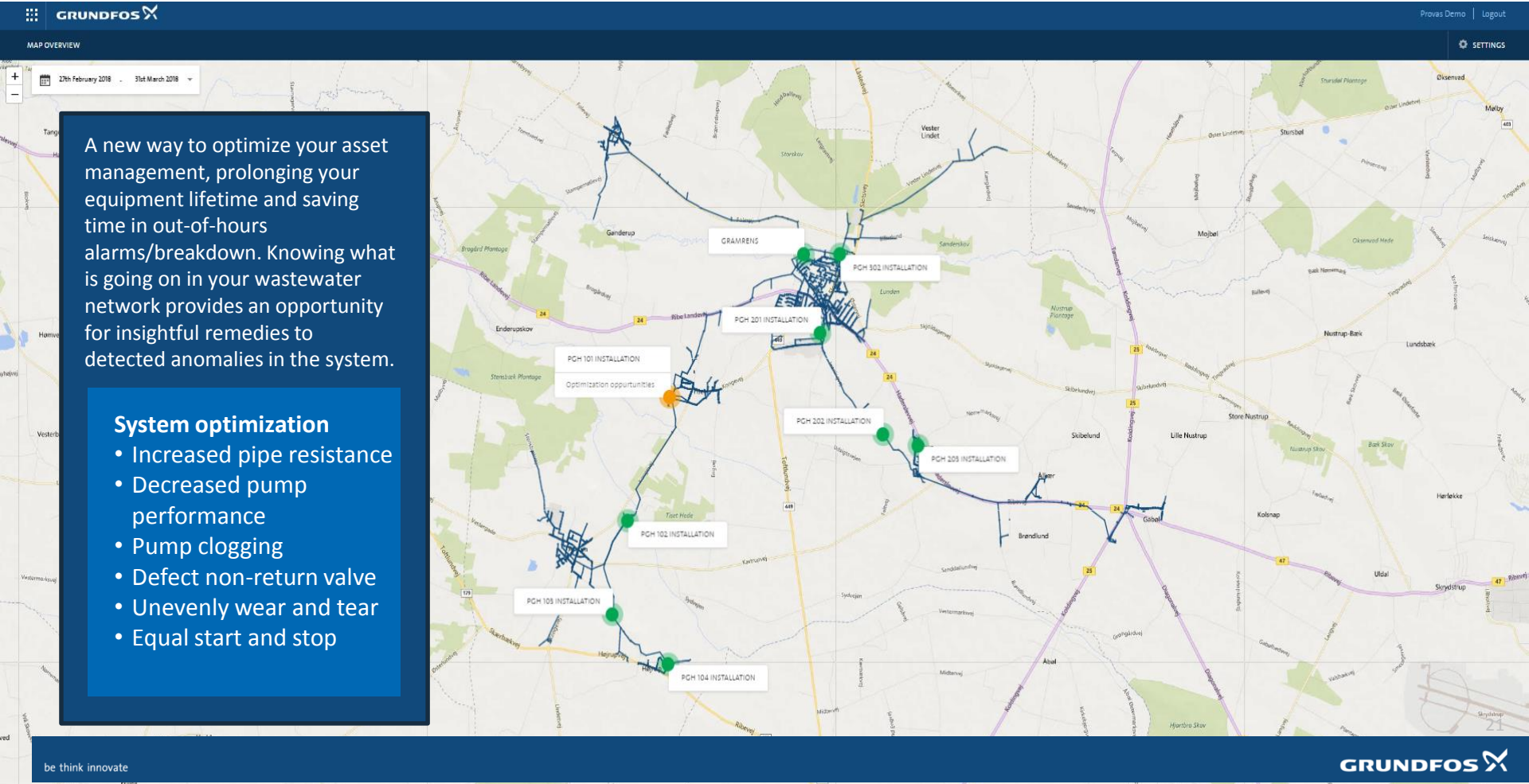
Provas | Water utility in Haderslev, Denmark

Strategic Collaboration

Co-creation solutions for a water utility to find new ways to deal with energy savings, infiltration, overflow and asset management

The first five solutions launched today are based on shared insights and real time data from a part of the Provas wastewater network

PREDICTIVE MAINTENANCE | Asset management & system optimization



A new way to optimize your asset management, prolonging your equipment lifetime and saving time in out-of-hours alarms/breakdown. Knowing what is going on in your wastewater network provides an opportunity for insightful remedies to detected anomalies in the system.

System optimization

- Increased pipe resistance
- Decreased pump performance
- Pump clogging
- Defect non-return valve
- Unevenly wear and tear
- Equal start and stop

1. PREDICTIVE MAINTENANCE - Data-driven optimization suggestions which lead to documented decisions Improve not only standalone pump stations but the entire Network

2. OVERFLOW WARNING - Act to prevent the overflow situation

3. ACTUAL FLOW - Get actual flow data of your sewer networks and pits, help to prioritize redesign were the biggest impact will be felt

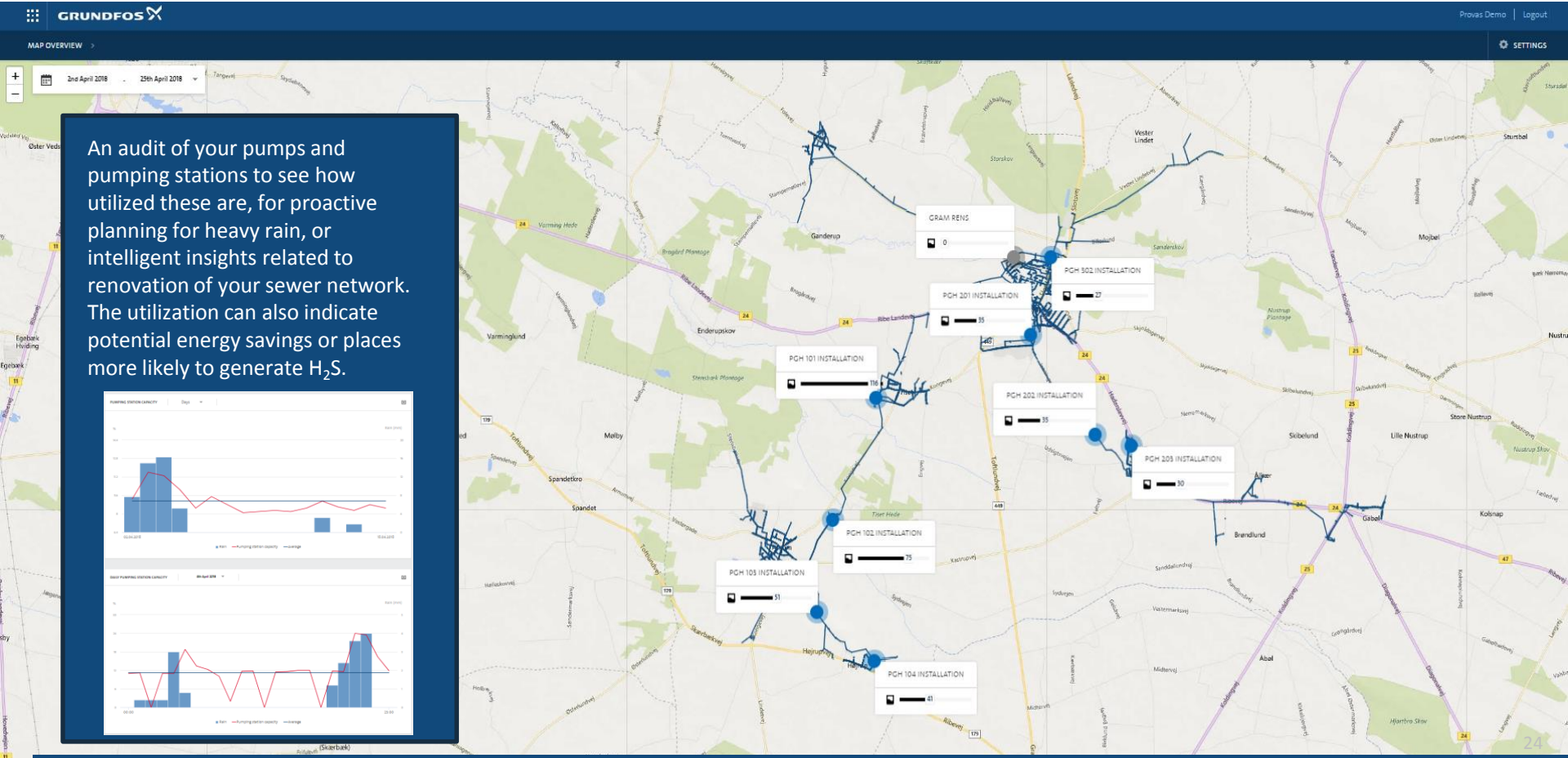
4. INFILTRATION FLOW - Differentiate between rain-dependent infiltration and groundwater infiltration using real data from your wastewater network – Save money on Moving and Treating Infiltration Water

5. PUMPING STATION CAPACITY UTILISATION - Know which is the size of your pumping station and what needs to be optimized (asset management)

INFLITRATION | Actual infiltration flow

Pumps and sensor flow data correlates with a precipitation profile to categorize flow as fast/rain or slow/groundwater infiltration.
The categorization adds insights in advance of an extreme weather event so you are better prepared, or for sewer renovation strategy, so you are aware of effects on groundwater levels.

UTILIZATION CAPACITY | Utilisation of your wastewater pumps and pits



An audit of your pumps and pumping stations to see how utilized these are, for proactive planning for heavy rain, or intelligent insights related to renovation of your sewer network. The utilization can also indicate potential energy savings or places more likely to generate H_2S.

OVERFLOW WARNING | Proactive waning to overflow situations

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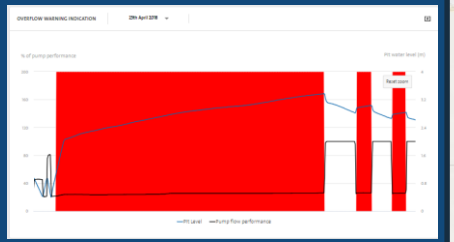
Provas Demo | Logout

MAP OVERVIEW

SETTINGS

1st March 2018 - 30th March 2018

A proactive warning for overflow, which helps avoid the potentially costly and serious consequences of overflow events. The overflow function gives you a warning in advance of a high water alarm with indication of where the pumping system does not operate optimal, which means that you can change the potential overflow situation.



GRAM RENS

PCH 302 INSTALLATION

PCH 201 INSTALLATION

PCH 101 INSTALLATION

Over flow events

PCH 202 INSTALLATION

PCH 203 INSTALLATION

PCH 102 INSTALLATION

Over flow events

PCH 105 INSTALLATION

PCH 104 INSTALLATION

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ACTUAL FLOW | Actual flow in sewers and pits

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Provas Demo Logout

MAP OVERVIEW

SETTINGS

1st April 2018 - 17th April 2018

Pumps and sensor data generates actual flow in pits and pipes. Know the flow at any given time and day for insight into the operational situation of the network to become more proactive, but also to plan renovation of sewers and calibrate hydraulic models. This also helps your understanding of the load at your wastewater treatment plant.

GRAMRENS 0

PCH 302 INSTALLATION 7

PCH 201 INSTALLATION 0.3

PCH 101 INSTALLATION 0

PCH 202 INSTALLATION 0

PCH 203 INSTALLATION 2.1

PCH 102 INSTALLATION 6.6

PCH 103 INSTALLATION 0.5

PCH 104 INSTALLATION

Vester Lindet
Ganderup
Mojbøl
Nustrup-Bæk
Skibelund
Lille Nustrup
Store Nustrup
Brøndlund
Kolsnap
Uldal
Åbøl
Stursbøl

Thank You