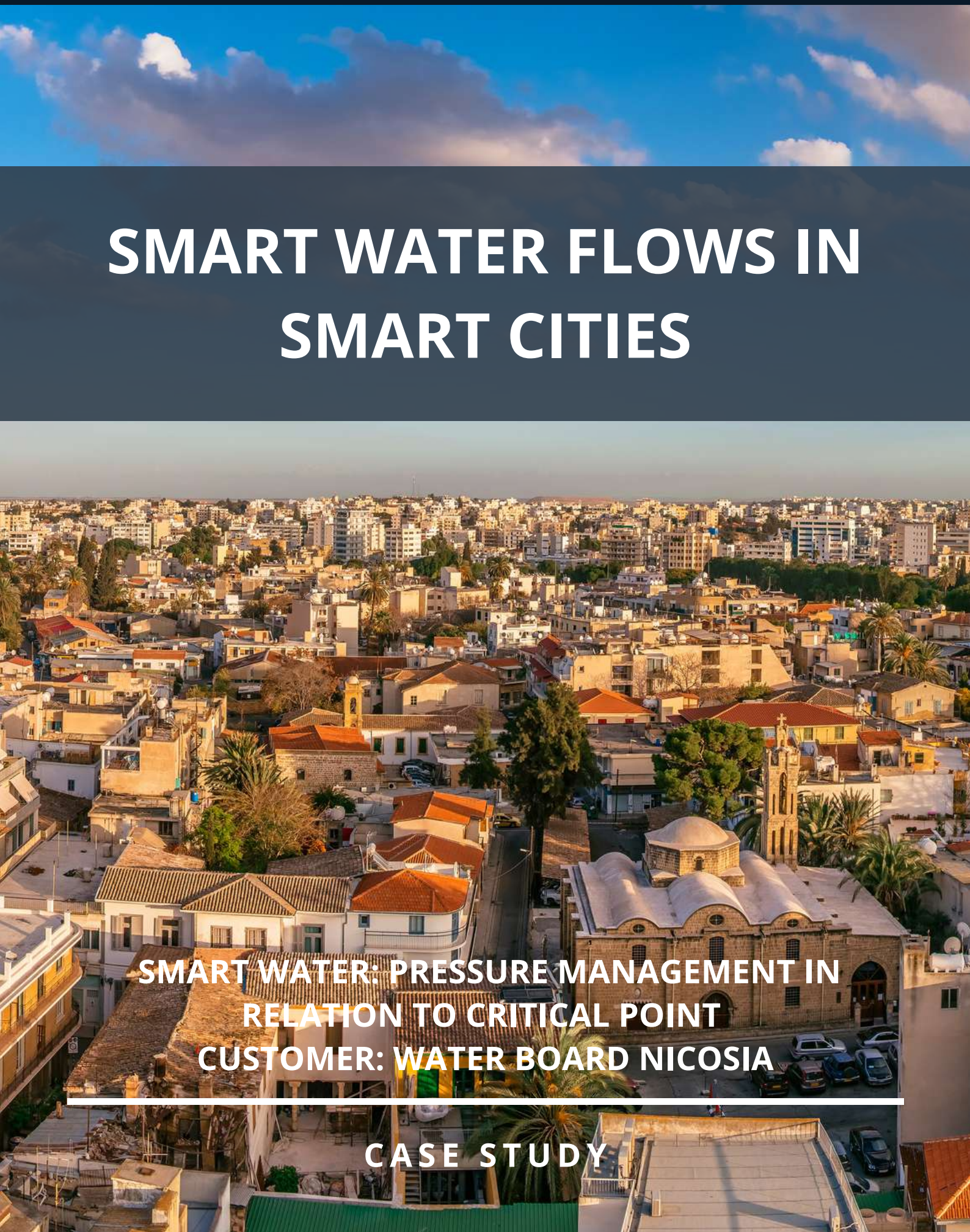
DOROT DIGITAL SOLUTIONS

SMART WATER FLOWS IN SMART CITIES



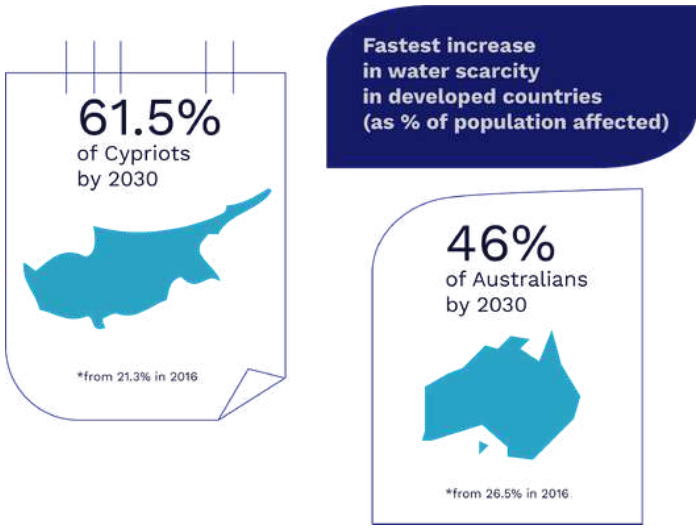
SMART WATER: PRESSURE MANAGEMENT IN RELATION TO CRITICAL POINT
CUSTOMER: WATER BOARD NICOSIA

CASE STUDY

BACKGROUND

Water Scarcity in Nicosia, Cyprus

According to Water Data Lab and their Water Scarcity Clock, water scarcity or water stress will not only affect less developed parts of the world.



It is already an issue in industrialized countries such as Australia and Cyprus. The share of these countries' population affected by water scarcity reached between 26.5% and 21.3% in 2016 and is expected to raise up to 46% and 61.5% by 2030, respectively.

(Source: https://medium.com/world-data-lab/announcing-the-water-scarcity-clock-world-data-lab-takes-on-sdg-6-d18dd3c0fb90)

Cyprus has a subtropical, semi-arid climate with very mild winters and hot summers. Rain occurs mainly in winter, leaving 8 months of dry summer. Cyprus is suffering from an ongoing water shortage.

The country relies heavily on rain to provide household water.
For many years and with very few exceptions, the average annual rainfall has continually decreased.
In 2008-2009 scarcity was so severe that it led to an intermittent water supply in Nicosia, Cyprus's capital and largest city.*

**Source: Water management Non-Revenue Water Reduction Management - (Drought climates and the case of Nicosia, Cyprus) - European Council of Civil Engineers, 2013*

THE REQUEST

The reduction of leaks and pipeline bursts at a limited budget quickly became Nicosia's top priority.

A tender was opened by WATER BOARD NICOSIA with funding from the European Union through the WATERNERGY program.
The tender consisted of an NRW (non-revenue water) project in a DMA (District Metered Area) in Nicosia, where the largest university campus in Cyprus is located.

The demand was for a solution that would intelligently reduce pressure throughout the DMA while maintaining a minimal pressure at the critical point – the highest point within the DMA.

By reducing pressure across the DMA in relation to the critical point, the leakage rate drops automatically while keeping the desired level of service for all customers.

Our customer, "A4", had been a long-time partner of Dorot in purchasing hydraulic control valves. Learning of our new Smart It Up initiative and smart water product offerings, they realized that Dorot may be their one-stop-shop for solving this challenge and submitted a bid.

THE SOLUTION

In 2019, following a thorough evaluation conducted by WATER BOARD NICOSIA, “A4” won the bid with end-to-end Dorot products.

Having background knowledge of the 300 series valve, the “A4” proposal included a 4” hydraulic control valve with an “EC” control trim, locally controlled by Dorot Digital Solution’s ConDor along with the Critical Point’s pressure sensor datalogger with cellular communications.

Dorot’s superior products combined with years of expertise, deep hydraulic knowledge and renowned technical support, were the key factors in making this decission.

S300 4" EC Valve

IP 68 ConDor

INSTALLATION


Training


Commissioning


Critical point Data Logger Set up


Configuring hydraulic control function


IP 68 ConDor with cellular communication


300 Series, Electrically Controlled, 4" valve

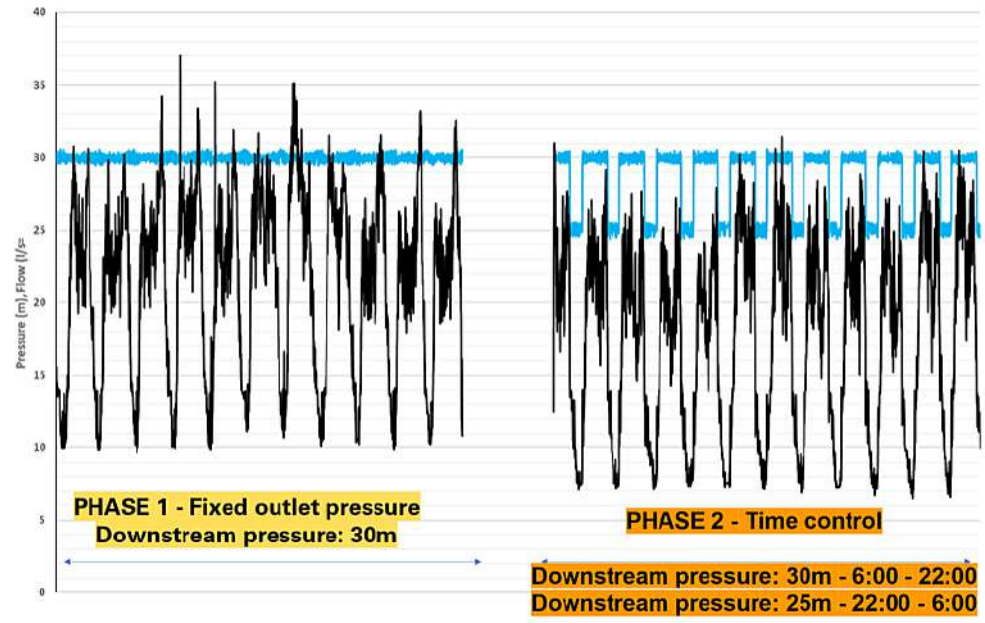
THE RESULT

Phase 1

The ConDor was configured to reduce pressure to a fixed downstream set point.

Phase 2

The client implemented two staged day and night set points **reducing flow by 40%**, which resulted in a significant reduction in NRW.



Blue Line: Downstream Pressure (m) **Black Line: Flow (l/s)**

40% **reduction of nighttime volumetric input**

Night flow

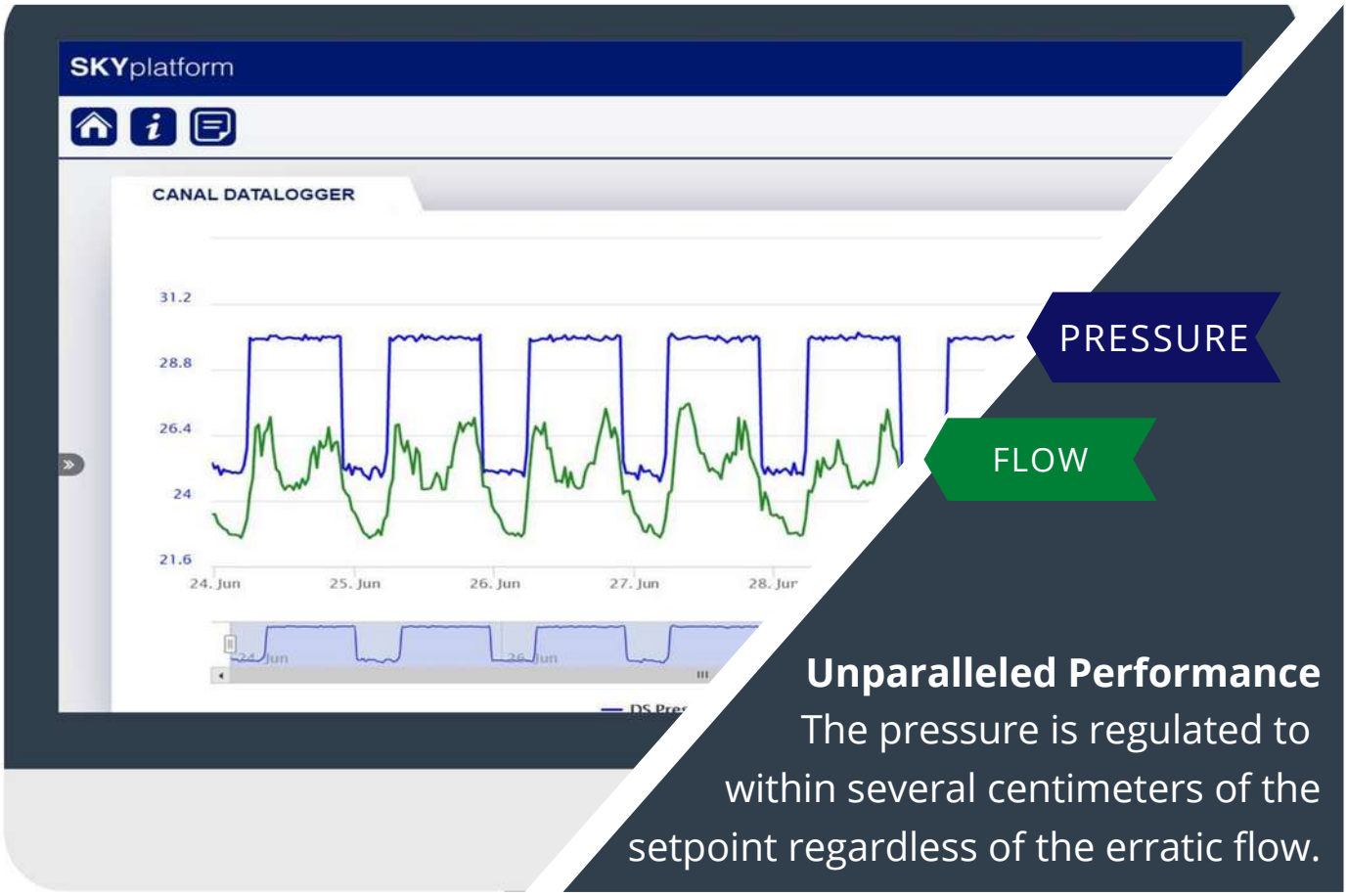
PHASE 1: 11,77 l/s

PHASE 2: 8,38 l/s

RECONFIGURATION OF THE HYDRAULIC FUNCTION AND SETPOINT CHANGES WERE ALL DONE REMOTELY

THE RESULT

- Reduction of night flow and leaks in the sector
- Reduction of average sector pressure and burst frequency
- Remotely controlled from the utilities' office
- Dynamically and precisely maintained downstream pressure in relation to flow
- Provides continuous hydraulic data - in this case flow and pressure
- Real-time visualization of the sector's operation



Unparalleled Performance
The pressure is regulated to within several centimeters of the setpoint regardless of the erratic flow.

RETURN ON INVESTMENT

OUTPERFOM DEMAND

- After installing and commissioning the ConDor system worked perfectly resulting in an almost constant pressure.
- Reduction of the pressure during the night reduced the amount of water lost, caused by pipeline leaks.
- **NRW decreased from -33,39% in 2019 to -30,56% in Q1, 2020**

2400 m^3/ year saving in water consumption

- In phase one, fixed outlet pressure of 30m was changed to time control regulation.
- **This resulted in a reduction of the minimum night flow from 7.4 m^3/h. to 6.1 m^3/h**

4000 m^3/ year saving in water consumption

- In phase two, except the time control regulation, FLOW REGULATION was implemented .
- **This resulted in a further reduction of the minimum night flow from 6.1 m^3/h to 5.3 m^3/h.**

2400 m^3/ year saving in water consumption

8800 m^3 saved water

10.560 € saved yearly

NEXT PHASE

NEXT Replicate this solution in additional DMAs across the city and country.

"(...) We wanted an integrated system to remotely control hydraulic valves and optimize their performance. Another request was to have different pressure values during the night, therefore minimize the losses caused by leaks in the system.
The supplied solution was installed in an existing pit of area 15C and the critical point was selected to be the highest point of the area, which is opposite to the University of Cyprus (one of our major consumers).

After installing the valve and ConDor all needs were met. The communication with the Dorot team was great. Also, they gave us more advantages with what the ConDor can do. By night we can reduce the pressure by a little bit more and we managed to save extra money from the NRW. (...) All results were as expected it all works fine and we look forward to continue our collaboration!"

TESTIMONIAL FROM OUR CLIENT,
CHRISTOS IORDANOU, SENIOR TECHNICIAN AND NRW MANAGER AT WATER BOARD NICOSIA