waterfall
the intelligent water solution

DAY ZERO: WAKING UP TO WATER SCARCITY

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In the developed world, our water supply has been reliable and safe for so long that the vast majority of us take it for granted. You could argue that water companies across the developed world have done too good a job, in that most of us will only think about our water supply for 8 minutes a year. That's two minutes when each quarterly bill lands on the doormat.

In fact, it is not as simple as they make it seem. Water resources are becoming more and more stretched by the needs of an increasing population using more water per person. As an example, the population of the UK is expected to rise from 67 million in 2018 to 75 million in 2050. Research commissioned by the Committee on Climate Change (CCC) estimates a shortfall of between 1.1 billion and 3.1 billion litres per day in England by the 2050s, depending on the extent of climate change and population growth.

WHAT IS THE PROBLEM?

"So what?", you might say. The common lore insists that the British Isles are afflicted (or blessed, depending on your perspective) with constant rain. It is therefore hard for anyone to imagine that we might 'run out' of water in this green and pleasant land.

But climate change is driving extreme weather which may mean simultaneously higher annual average rainfall with increased risk of drought.

We also see strong regional variations in rainfall and temperature that are at risk of being cancelled out by considering only averages - London and the south east, for example, are considerably more vulnerable than other regions. By 2040, more than half of our summers are expected to be hotter than the 2003 heatwave, when 450-year records were broken, and temperatures soared to 38.5°C in Kent (a record that was notably broken in July 2019).

We currently use 14 billion litres of clean drinking water every day in England and Wales. In 2018-19, average daily consumption per person in England was 143 litres - a figure that has risen each year since 2014-15. For now, water companies can provide slightly more than we need in some areas. However, in others there is no surplus. Just three years of low rainfall would leave most of our cities facing serious shortages.

This is what happened in Cape Town in 2017-18, when the city found itself weeks away from 'Day Zero' being declared. Municipal water supplies would have been switched off when the water level of the major dams supplying the city reached 13.5%. Residents would have had to collect a daily ration of 25 litres of water per person from one of 149 collection points. The crisis was narrowly averted by drastically limiting usage to 50 litres per person per day in February 2018.

How would our everyday lives be affected if emergency plans such as these were set in motion in the UK? Temporary use bans would likely escalate into intermittent availability before household supplies were turned off. Those of us who are old enough to remember standpipes in the streets in the summer of 1976 can imagine all too well, but we are still guilty of complacency in the present. And make no mistake, it will be the poorest and most vulnerable people living in the most overcrowded areas who will be first and hardest hit. Water poverty will be the new fuel poverty.

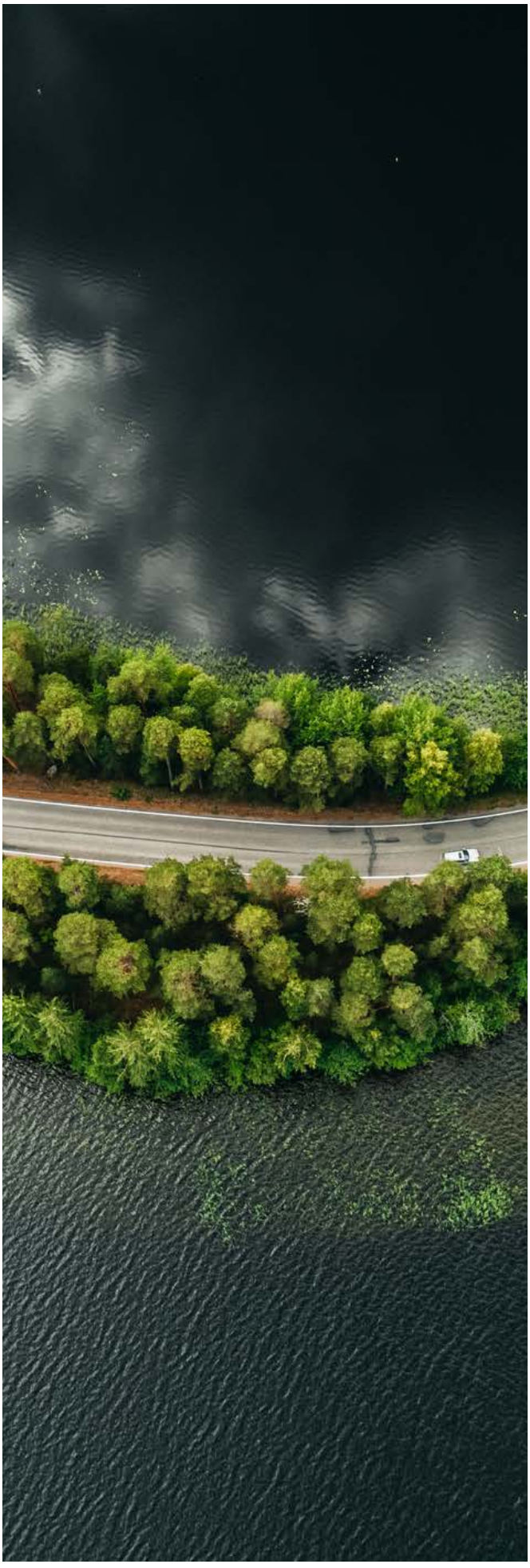
Day Zero events may not be as far off as you think. The combined pressure of the COVID-19 pandemic and low rainfall in England in spring 2020 has seen some water companies resort to bringing in tankers and bottled water stations to supply customers in the Midlands, South East and South West.

WHAT ARE WATER COMPANIES DOING ABOUT IT?

Conventionally, water companies have increased supply to match growing demand, but fresh water is a finite resource and it is an approach that is simply not sustainable. Over-abstraction from rivers, reservoirs and aquifers is already causing environmental degradation on a huge scale, a case in point being the UK's precious and unique chalk streams.

Some have proposed building new reservoirs, but not only are they expensive and disruptive, they are not drought resilient and potentially environmentally damaging in themselves. Aquifers may take hundreds or thousands of years to be replenished, again dependent on rainfall. Desalination of seawater is another expensive process and only practical in coastal areas. Redistribution of water between regions is again costly and unsustainable, not to mention the carbon and energy impacts.

Currently, at least 20% of our fresh water is lost to leakage - the equivalent of 3 billion litres every single day. In the short term, leakage reduction and increased water reuse will be key strategies to ensure our future water security, along with behaviour change and reduced consumption. The construction of new reservoirs, desalination plants and redistribution schemes should be considered alongside these efforts, rather than taking priority.



The current targets set by most water companies for PCC reduction are simply not ambitious enough to match the scale of the issue we are facing, or the crisis we will inevitably face if we do not take concerted national action. In a consumer-driven society, asking people to use less may be anathema, but the way the tide of public opinion is turning against single use plastics stands as an example that it can be done. And in this case, there is the added incentive to the customer of saving money.

WHAT CAN WE DO ABOUT IT?

Water Event Metering will be indispensable in the drive to reduce domestic consumption. This is a new breed of meter technology beyond "Smart". These are true IoT devices that make full use of cloud analytics and artificial intelligence to give instant user feedback. Consequently, they make consumer education possible using nudge methods, but also they identify excessive use and vulnerable users, and can be used to implement new types of water tariffs that reward frugal users. They also provide near-real-time leak detection, both in the home and, through third-party modelling systems, in the network. Less water is wasted as leaks are detected faster and rectified more easily.

Presented with ways to understand their behaviour, consumers can then be nudged to change their consumption patterns for the better. Water companies can use this insight to understand their customers and create further nudges that cement this behaviour. Integrating sensor data with an engaging mobile and web applications will give both parties actionable insights to reduce water consumption and leaks. The two imperatives for consumers are simple: 1. Maintain a water-tight home and 2. Use less water, but still maintain a comfortable and healthy life. When they are presented with the facts and with simple, day-to-day changes that they can make, people are empowered to take action. That might mean installing water saving devices like cistern bags at one end of the scale, taking shorter showers or choosing a garden micro-irrigation system, to (at the opposite end of the scale) using your hot tub less frequently.

It is hard to overstate the importance of instilling water saving habits in new generations of children. Teaching them not to waste water is one of many actions we should be taking now to ensure that they inherit solutions rather than an even bigger problem. Mobile phone apps which introduce an element of gamification and fun are one way for water companies to directly engage this hard to reach group.

On its own, using Water Event Metering to gain PCC reductions will not solve this increasingly global issue, but it will buy us more time to come up with additional answers. It is easy to install and doesn't take decades to plan and build like supply-side measures. There's an urgent need to raise awareness of the value of water as a precious and finite resource, to become conscious of our water usage habits, provide advice on water saving, and make it as easy as possible for cities and countries to reach truly ambitious per capita consumption targets. As a strategy, Water Event Metering is the most straightforward way of solving the demand-side problem that water companies continue to grapple with.

SOURCES

- https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf
- https://www.theguardian.com/environment/2019/mar/18/england-to-run-short-of-water-within-25-years-environment-agency
- https://www.theccc.org.uk/2017/09/12/pressure-preparing-uk-water-shortages/
- https://www.theguardian.com/environment/2017/jun/24/quarter-england-rivers-risk-running-dry-finds-wwf
- https://www.ofcom.org.uk/__data/assets/pdf_file/0020/82262/openreach_-_walker_institute_report.pdf
- https://www.vice.com/en_uk/article/9kz7ba/this-is-what-will-happen-when-london-runs-out-of-water
- https://www.theriverstrust.org/media/2019/06/Chalk-streams-dossier_June-2019_FINAL_FINAL-1.pdf
- https://www.bbc.co.uk/news/uk-england-52890535

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