April 2020 Waterwise Newsletter

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In their first piece for the Waterwise newsletter at the end of February Artesia looked at historical trends in personal water use. This latest piece looks at possible future forecast scenarios for water consumption

The world has changed considerably since the February article was published due to Covid-19. Lockdown has changed how we use water almost overnight and may result in more permanent changes if the working habits and economic measures that have been implemented continue beyond the current emergency.

Forecasting water use is challenging even in normal times because the total volume of water used depends on the behaviour attitudes and practices of many individuals. Water companies have until recently used methods such as historic micro-component data to model and forecast household water consumption over the next 25 years.

The most recent UKWIR guidance on household consumption forecast (developed by Artesia)[1] set out a range of different methods, including multiple linear regression modelling (MLR), which were adopted by some water companies in WRMP19.

Reports we produced for Ofwat and Water UK have produced a range of scenario forecasts for future water use based on a combination of micro-component and MLR methods, as well as probabilistic modelling to produce distributions of consumption.

The Ofwat report[2] developed four future water use scenarios in which per capital consumption (PCC) ranged from 86 to 49 litres per head per day (l/h/d) by 2065, compared to the current reported rate of 143 l/h/d and a 'current ambition' scenario of 105 l/h/d/ by 2065.

[1] UKWIR (2015) WRMP19 METHODS – HOUSEHOLD CONSUMPTION FORECASTING. 15/WR/02/9

[2] https://www.ofwat.gov.uk/publication/long-term-potential-deep-reductions-household-water-demand-report-artesia-consulting/

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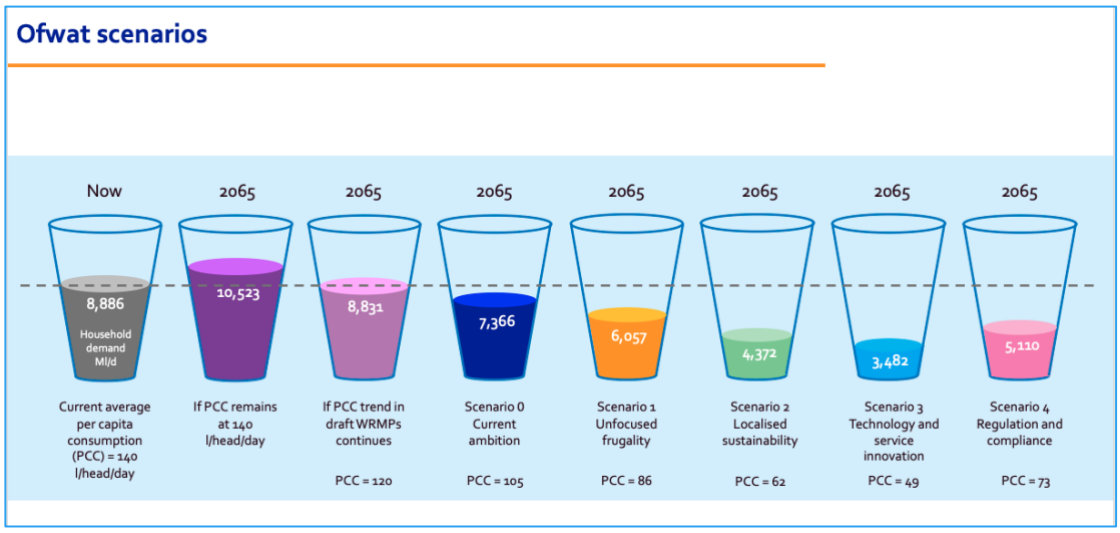

The scenario with the lowest consumption rate – 'localised sustainability' – attracted some attention as it was similar to the water use rate expected of Cape Town residents as they approached 'Day Zero' in April 2018[3]. In fact, in our modelling we assumed that behaviour change and the requirement for lower water use drives technology in this scenario. When new technology comes in people have already changed their habits, so that the technology doesn't really change the frequency of use. There is a widespread take-up of rain and grey water use, meaning many homes are retrofitted with a dual water system for flushing WCs and external use.

Whilst the Ofwat report was intended to set a 'blue sky' context for what is possible, the work we did for Water UK in 2019 was intended specifically to identify cost effective long-term pathways for reducing PCC[4]. This work produced forecasts of water use based on a range of interventions and scenarios. The intention was to ensure ambitious levels of demand reduction can be achieved over the next thirty to fifty years, thus delivering the resilience required to withstand the challenges ahead. The report was also widely quoted in the responses to Defra's consultation on reducing personal water use.

[3] https://en.wikipedia.org/wiki/Cape_Town_water_crisis

[4] https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf

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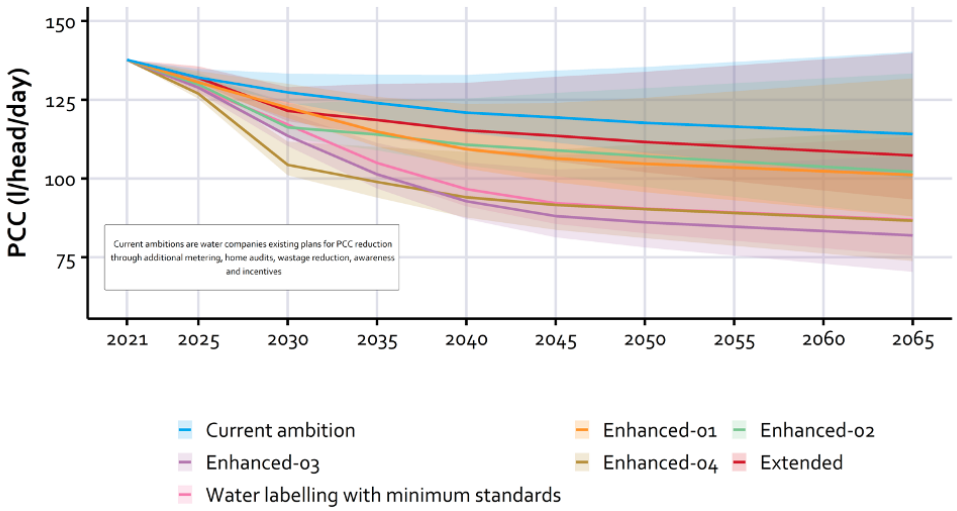
Waterwise scenarios



The results from this project suggest that the most cost-effective scenario resulted in a PCC rate of 82 l/h/d by 2065 through a combination of smart metering and mandatory water labelling (combined with tightening minimum standards linked to Building Regulations). This demonstrated that the most extensive, cost-effective reductions in household water use, beyond the ambition in current water company plans, are only possible with concerted action by all stakeholders.

Of course, models and forecasts become outdated very quickly and the current crisis is likely to affect future water use in a range of ways we are only just finding out about. A much-used recent quote says that "all models are wrong, but some are useful"[5] and this is as relevant to water demand forecasting as it is for epidemiology. However good data will and recent developments in water demand forecasting methods should provide us with a range of tools and approaches that will help the industry understand this changing world.

[5] Attributed to George Box, statistician

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