

**SOME THOUGHTS OF
THE WORSHIPFUL COMPANY OF WATER CONSERVATORS
ON THE FUTURE OF WATER RESOURCES IN ENGLAND**

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Introduction

1. This paper is produced by the Worshipful Company of Water Conservators, the City of London Livery Company focussed on the long-term health of our water resources and the broader environment. Our members include senior professionals from water, environmental and related sectors and regulators, along with others who share our passion for water and the environment. Our experience and knowledge range from the complexities of environmental sciences, through the application of engineering to deliver the goals identified by those sciences, and the subsequent management of the assets created. The Company's purpose is *Promoting a diverse and sustainable environment*.
2. To avoid confusion between the use of the term Company and water companies, the abbreviation WCWC is used.

Why has the Worshipful Company produced this paper?

3. During 2022 there has been a very substantial increase in focus on matters relating to water conservation, heightened by the drought in the Summer. The Department for environment, Food and Rural Affairs (Defra) has issued several consultation documents to which the WCWC has responded. These include consultations on targets for reduction in water demand, water fittings and water efficiency labelling. All the responses are on the WCWC website.
4. There is debate around the wider issues of water management and the WCWC is preparing a suite of think pieces which draw on the experiences and knowledge of its members to provide insights which might help decision making. The first addressed governance and economic regulation of water services in England; this think piece is the second. It is intended that these will be added to the WCWC website in due course.
5. The WCWC is mindful that draft Regional Water Resources Plans are out for consultation and the insights of this paper should help the development of those Plans (Ref 7). The WCWC has suggested a number of times, that there is a pressing need for an overall national strategy on the use and protection of the Nation's water assets, which would embrace all aspects from governance to aquatic biodiversity. Water resources should sit in that strategy.

Summary

6. The WCWC has supported the principle underpinning Defra targets of a 50% reduction in leakage and a reduction in customer use from 140 to 110 l/h/d by 2050, but the cost and

means of achieving these targets (including risks) need further research, and better communication to the customer. In providing such support it has, however, noted that a national target is a blunt management instrument and that a set of more appropriate regional targets might be better. It has suggested that any reduction will be achieved in many ways, including even greater contributions from consumers, and every assistance needs to be given to help them. It is pleased to note the publication, in late September, of the Waterwise UK Strategy for Water Efficiency to 2030 (Ref 6). Maximum focus on the installation of metering (preferably smart meters) is required to reduce leakage and customer usage to ensure drought resilience is not compromised in the short term. The WCWC has supported the Defra proposals on mandatory water efficiency labelling and suggested ways in which these could be made even more helpful, but there is a need for urgent Government action; it has also suggested that Planning, Building and Fitting Regulations change to reduce per capita consumption.

7. The WCWC suggests a review of supply outage and demand headroom factors to ensure factors of safety against drought conditions are not being compromised by the increased delivery uncertainty of leakage reduction and demand management measures (compared with new infrastructure) along with climate change and population fluctuations and that companies have a backup plan that can be implemented in the necessary timescales, without compromising drought and peak demand resilience.
8. The WCWC supports the National Infrastructure Commission's 2018 report "Preparing for a drier future" and the need to build upon the report to establish future costs and environmental impact at the catchment level. Closer cooperation and compromise are required between Defra, EA, DWI, Ofwat and the companies to ensure the most effective plans are delivered in terms of cost and environmental impact and that customers are more aware of both factors so they are fully engaged in the final decision-making process. The recent summer drought has highlighted the need for urgent action on these recommendations.
9. The WCWC regard desalination and reuse schemes as schemes of last resort as these are energy and chemical intensive with high maintenance and running costs, and lower reliability than traditional treatment processes. However, research must continue to reduce the environmental impact of these technologies.
10. A further option is to look at the potential for increased abstraction at the fresh water/tidal boundary thus ensuring the maximum amount can be abstracted, as a potentially faster, lower carbon, reduced cost and energy alternative to desalination/storage schemes. Any such scheme should include a study to assess the potential impact on the ecological status of the tideway downstream.

Water Resource Planning

11. Much recent public debate has looked only at one element of the overall water resource plan in isolation. In fact, water resource requirements are determined by a variety of factors including climate change and consumer behaviour as well as the actions of the

water companies and regulators. The debate needs to look at these issues in the round and recognise that action in more than one area is needed. Failure to face up squarely to these issues will lead to increasing water supply disruptions and public dissatisfaction. From a public policy/national interest viewpoint all relevant groups need to take ownership of the problem and be clear who is expected to deliver what.

12. Most water company Water Resource Management Plans, as determined by the Water Industry Act 1991, are based around the following five key elements:

- a) Population Growth
- b) Reduced Existing Resource Capability – Climate Change, Sustainability Reductions, Water Quality Constraints
- c) Leakage Reduction
- d) Demand Management
- e) New Resource Schemes

These Plans have a 25 year horizon; they must be prepared every five years and reviewed annually. The Draft Plans for 2025, for the five water resources regions, are out for consultation now.

13. In the past, water companies would examine each of these factors to determine the least cost water resource plan, to meet future demands. However, it is essential that the environmental cost of any water resource plan is fully assessed. Whilst it is important to drive down leakage, reduce demand and reduce abstractions that have an adverse impact on river ecology as much as possible, these actions need to be balanced with the cost to achieve the best overall outcome based on a reasonable charge to the customer. That requires Ofwat, Defra, DWI and the EA to work together to agree future targets that achieve this objective as much as possible.

14. Based on the NIC recommendations Defra has set future targets on leakage (50% reduction by 2050) and a reduction in customer use from 140 to 110 l/h/d by 2050. But the WCWC has suggested that more appropriate regional targets, rather than a single national target, might be more efficient. The water industry has set itself tough targets to achieve by 2030 as part of its Public Interest Commitments. However, the cost and means of achieving the above targets is not always made clear to the customer (e.g. how will increased water efficiency/reduced demand per capita be achieved and who is the lead on the various aspects of this).

15. Whilst leakage reduction and demand management are often the most immediate actions in current water resource plans, these reductions involve a greater degree of uncertainty than planning for new resource schemes. In addition, climate change is likely to have a significant impact (though the full ramifications are still unclear which only adds to the uncertainty), and sustainability reductions (reduced abstraction to protect the environment) are requiring companies to operate with reduced headroom against demand. In addition, UK population is now higher than was predicted at privatisation in 1989, having increased 12.5% since 1989, yet it has been three decades since the last major reservoir was built. Increased water quality constraints and more complex treatment are also challenging the reliability of treatment works outputs during critical supply/demand

periods. The WCWC has suggested that an urgent revisit of the conclusions of the 2011 Royal Commission on Environmental Pollution Report on Demographic Change and the Environment would be valuable.

16. It is important that the factors of safety against a supply failure are not compromised by the above issues and the WCWC suggests that an urgent review is needed of demand headroom and supply outage factors particularly for resource areas where the peak week demand is the critical factor in determining supply capability and uncertainty is greatest . (In this context it is suggested that treatment works outputs are practically tested regularly wherever feasible to ensure they are able to meet the high outputs required during peak demand and dry periods.)
17. The WCWC supports the recommendation of the National Infrastructure Commission's 2018 report "Preparing for a drier future" (Ref 1) that government should ensure increased drought resilience in England by enhancing the capacity of the water supply system. This will require a twin-track approach combining demand management and leakage reduction alongside long-term investment in supply infrastructure.
18. To achieve this, the Commission recommends that government should ensure plans are in place to deliver additional supply combined with leakage plus demand reduction of at least 4,000 million litres per day (Ml/d). They suggest that roughly each of the three key elements (leakage, demand management and new infrastructure) will each have to achieve a third of the 4,000 Ml/d total. In 2018 the Commission's report recommended the following actions to deliver this three-track approach:
 - a) Ofwat should launch a competitive process by the end of 2019, complementing the Price Review, so that at least 1,300 Ml/day is provided through (i) a national water network and (ii) additional supply infrastructure by the 2030s.
 - b) Defra should set an objective for the water industry to halve leakage by 2050 (from 20 to 10%) with Ofwat agreeing five-year commitments for each company (as part of the regulatory cycle) and reporting on progress.
 - c) Defra should enable companies to implement compulsory metering beyond water stressed areas by the 2030s, by amending regulations before the end of 2019 and requiring all companies to consider systematic roll out of smart meters as a first step in a concerted campaign to improve water efficiency. The stated aim is to reduce average UK per capita consumption from around 140 to 110 litres per day. This requires a very major change in customer behaviour facilitated by redesign of consumer appliances. A strong central lead is required on this.

Water Resources - Leakage and Water Efficiency/Demand Management

19. Leakage and water efficiency/demand management are two separate issues which overlap as indicated below. Leakage conventionally refers to losses from the water companies' supply pipes whilst demand management refers to water delivered to and used by customers; the latter can include leakage from customer appliances. The former is a water company responsibility, and the latter is broadly down to the consumers and their

equipment suppliers. Ofwat's practice of reporting the water losses from the water company networks and the customer losses as a single figure is confusing and misleads customers. The WCWC suggests that these two amounts should be reported separately.

20. To achieve the Defra future targets on water efficiency/demand management will involve major changes in household usage of water and will require, at least, an increased focus on the following key areas:
 - a) Mandatory water efficiency labelling
 - b) Changes to Building Regulations and Planning Requirements
 - c) Accelerated metering uptake – smart metering, compulsory metering in resource scarce areas
 - d) Leakage reduction (supply pipework and fixtures and fittings)
 - e) Water re-use (rainwater harvesting and greywater recycling)
 - f) Embracing new technology
 - g) Incentivising behavioural change
21. The water industry has just started to quantify effectively household water loss. The 2021 WCWC webinar by Thames Water on this demonstrated the huge potential for linking universal smart water metering to identify where the real areas of concern are. It had been assumed that average household water consumption was 140 l/c/day. In fact, the smart water metering programme has identified 28,000 households so far in Thames area with exceptionally high internal leakage or malfunctioning equipment, especially dual-flush loos. Net of these, average consumption was closer to 116 l/h/day. This suggests a future target of 110 l/h/d should be achievable, particularly if these customer losses can be addressed.
22. Water companies have a statutory duty under the Water Industry Act 1991 to enforce the Water Supply [Water Fittings] Regulations, which make provision for preventing contamination, waste, undue consumption [etc] of water supplied, and include requirements on consumers not to use fittings, including WCs, which are “damaged, worn, or otherwise faulty, causes or likely to cause, waste, misuse or undue consumption of water supplied”. The universal implementation of smart metering will help water companies identify waste by individual properties and companies should be strongly encouraged to use their powers to enter properties to carry out inspections and works to make sure the Regulations are being complied with, utilising programmes such as smart home visits. With the complexity of responsibilities, including the reduction of leakage from customers' service pipes, and the soon to be added water efficiency labelling, the WCWC has suggested that these regulations all need to be reviewed to ensure that they are fit for purpose as part of regulation streamlining.
23. The WCWC also suggest that Defra revisits the option for a mandatory “approved plumbers” scheme under the Water Regulations Advisory Scheme, recognising the importance of reducing waste.
24. Water UK's “Pathways to long-term PCC reduction” report of 2019 (Ref 2) indicates that the greatest saving will come from government-led water labelling and minimum

standards, not under water company control. The report also estimates that overall future savings will come almost entirely from a combination of mandatory water labelling, full smart metering, building and fittings regulations, and education. Hence government will also need to take a strong lead if future demand management aspirations are to be met.

25. A 50% reduction in leakage by 2050 will not be possible without the introduction of new technology. A WCWC webinar led by Hydraulic Analysis demonstrated how the continuous analysis of a combination of district meter and smart meter data can be used to identify and resolve underlying causes of high leakage recurrence rates which are not resolved using current find and fix methods. This is particularly needed in the area of leak repairs, which comprise around 75% of the cost of existing leakage reduction methods, which cause disruption and have a high carbon footprint. Further pressure optimisation and calm network operation will also help to reduce leakage and prolong network pipe life.
26. The water companies and their supply chain have carried out very detailed analyses to assess both the costs and the risks related to reducing leakage (Ref 3 - Water UK Leakage Routemap). However, the problem, particularly for frontier companies, is that they are venturing into unknown areas with no information on leakage reduction costs at these lower levels, and hence without fully understanding the cost implications on customer bills and risks of under-achievement. These factors, along with the environmental implications of leak repairs, new infrastructure (and infrastructure renewal - Ref 4), supply sustainability reductions and climate change influences could influence the final balance of each component as estimated in the NIC report to meet future demands. The WCWC urges further research and greater cooperation between Defra, EA, DWI, Ofwat and the companies to minimise these risks.

Water Resource Schemes

27. The WCWC support the National Infrastructure Commission's recommendations for:
 - a) At least 1,300 Ml/d of additional water supply infrastructure by 2050
 - b) The need for a greater urgency in providing additional long-term storage and the need to speed up the planning process.
28. Five future storage schemes are under development through the Regulators' Alliance for Progressing Infrastructure Development (Rapid). This is an initiative spearheaded by regulator Ofwat in conjunction with Defra, the Environment Agency and the Drinking Water Inspectorate to facilitate the development of new water infrastructure.
29. However, most storage schemes will still take over ten years to plan and construct, even with an improved planning process, and, whilst leakage and demand management measures are vital to ensure security of supply in the short term, it is important that companies have a plan B if these reductions are not fully realised. The WCWC regard desalination and reuse schemes as schemes of last resort as these are energy and chemical intensive with high maintenance and running costs, a high impact on sustainability and the carbon footprint, and lower reliability than traditional biological, chemical and

physical processes. Nevertheless, in the Company response to the consultation on demand reduction it did observe that research must continue to reduce the cost and impact of desalination to render it a more viable option in the long term.

30. For many catchments there is still a large volume of water that is discharged to sea, particularly during the winter period. A further option is to look at the potential for increased abstraction at the fresh water/tidal boundary, thus ensuring the maximum amount is abstracted rather than abstraction upstream. Any such scheme should include a study to assess the potential impact on the ecological status of the tideway downstream.
31. In the 1960s, the Water Resources Board recommended that all new abstractions should take place as close as possible to the tidal interface. One option might be for water companies to expand this recommendation into a programme of new abstraction points/water treatment plants, with the abstraction points at the final weir: initially, to solve the water shortage; ultimately, to reduce upper catchment abstractions.
32. Reduction of the flow of water into the estuary is controlled by the European Union Water Framework Directive as introduced into UK regulation by the United Kingdom Technical Advisory Group (UKTAG) Report, UK Environmental Standards and Conditions (Ref 5). Using the formula in the UKTAG report, it would appear that most estuaries in England and Wales are of moderate status and low sensitivity. Table 28 on page 54 shows that any flow below the 95%ile can be reduced by 50% of the 95%ile flow.
33. Reference to the National River Flow Archive (NRFA) shows the total potential reduction from the 200+ rivers in England and Wales could be as much as 11,500 MI/d (50% of the 95%ile), more than sufficient to meet the 1,300 MI/d recommended in the NIC report. This suggests that in many cases the increased abstraction could be achieved without the need for additional storage, provided the ecological status of the tideway can be maintained. Such options could be less expensive than additional storage, less carbon intensive and more reliable than reuse or desalination schemes and are therefore worth investigating. Depending on the location, new direct abstraction schemes may also need to be combined with new or existing bankside storage to allow settlement and give some protection to treatment processes against variable river quality and potential pollution incidents without compromising supply resilience.
34. Close cooperation between water companies will be required to meet the new infrastructure and water transfer capabilities identified in the draft Regional Water Resource Plans out for consultation until early next year. Joint or regional water resource schemes providing benefits to a number of companies also offer the opportunities for alternative funding mechanisms such as used for the Thames Tideway scheme.. Ofwat has already introduced Design Procurement for Customers for large projects, following on from experiences with the Thames Tunnel, which may ease the approach as long as adjacent water companies are prepared to co-operate.

35. The WCWC has suggested that there is a pressing need for an overall national strategy on the use and protection of the Nation's water assets, which would embrace all aspects from governance to aquatic biodiversity .Water resources should sit in that strategy.

References

Ref 1 - National Infrastructure Commission's 2018 report "Preparing for a drier future"
<https://nic.org.uk/studies-reports/national-infrastructure-assessment/national-infrastructure-assessment-1/preparing-for-a-drier-future/>

Ref 2 – Water UK - Pathways to long-term PCC reduction, 2019
<https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf>

Ref 3 – Water UK – A Leakage Routemap to 2050
<https://www.water.org.uk/publication/a-leakage-routemap-to-2050/>

Ref 4 - Water UK Report proposing alternative ways of funding asset renewal
<https://www.water.org.uk/publication/options-for-a-sustainable-approach-to-asset-maintenance-and-replacement/>

Ref 5 - United Kingdom Technical Advisory Group (UKTAG) Report, UK Environmental Standards and Conditions
https://www.wfduk.org/sites/default/files/Media/Environmental%20standards/Environmental%20standards%20phase%202_Final_110309.pdf

Ref 6 - Waterwise_water efficiency strategy to 2030
<https://www.waterwise.org.uk/strategy2030/>

Ref 7 - EA/Ofwat/NRW_Water resources planning guideline
<https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline>