

DEMOS

**FLOWING
FORWARD**
SAFEGUARDING THE
UK'S WATER SYSTEM

DAN GOSS
ANDREW O'BRIEN

DECEMBER 2023

Open Access. Some rights reserved.

Open Access. Some rights reserved. As the publisher of this work, Demos wants to encourage the circulation of our work as widely as possible while retaining the copyright. We therefore have an open access policy which enables anyone to access our content online without charge. Anyone can download, save, perform or distribute this work in any format, including translation, without written permission. This is subject to the terms of the Creative Commons By Share Alike licence. The main conditions are:

- Demos and the author(s) are credited including our web address **www.demos.co.uk**
- If you use our work, you share the results under a similar licence

A full copy of the licence can be found at **<https://creativecommons.org/licenses/by-sa/3.0/legalcode>**

You are welcome to ask for permission to use this work for purposes other than those covered by the licence. Demos gratefully acknowledges the work of Creative Commons in inspiring our approach to copyright. To find out more go to **www.creativecommons.org**



Published by Demos December 2023
© Demos. Some rights reserved.
15 Whitehall, London, SW1A 2DD
T: 020 3878 3955
hello@demos.co.uk
www.demos.co.uk

CONTENTS

ACKNOWLEDGEMENTS	PAGE 4
FOREWORD	PAGE 5
EXECUTIVE SUMMARY	PAGE 6
INTRODUCTION	PAGE 8
SECTION 1: THE PROBLEM	PAGE 10
SECTION 2: THE OPPORTUNITY	PAGE 19
SECTION 3: THE BARRIERS	PAGE 24
SECTION 4: THE SOLUTIONS	PAGE 37
CONCLUSION	PAGE 42

ACKNOWLEDGEMENTS

We would like to thank Affinity Water for their generous support for this project and valuable insights and enthusiasm throughout.

We would also like to thank many of our colleagues at Demos for their support. In particular, thanks to Polly Curtis and Chloe Burke for their support throughout.

Any errors remain the authors' responsibility.

Dan Goss and Andrew O'Brien.

December 2023.



AN INCLUSIVE ECONOMY

This project is part of Demos's work to help create an *Inclusive Economy*. A more sustainable, resilient water system is central to this. All households or businesses use water every day, and often believe our future supply is completely secure. The evidence suggests this is not the case, and a looming water crisis could create supply shortages, rising bills, significant government costs, barriers for business development and environmental harms. This would damage our economy and society - and those in drier regions or on lower incomes would suffer the most.

Addressing these problems is therefore of critical importance to an inclusive and sustainable UK economy. But to overcome the challenges in a way that suits the needs of those affected, we have to listen to businesses and households. We have done this through nationally representative polling and policy workshops with business experts, putting those affected at the heart of this research.

FOREWORD

BY KEITH HASLETT



At Affinity Water, our unwavering commitment to provide high-quality water services to our customers is coupled with our dedication to ensuring its long-term sustainability. But clean and available drinking water shouldn't be taken for granted. With the UK's water resilience under threat in the near term, we believe action is needed across society, and it needs to come sooner rather than later. That's why we have partnered with the leading cross-party think-tank, Demos, to produce a comprehensive report on the UK's water resilience and the collective action needed to address and prevent water shortages.

Water is a precious and indispensable resource; however, parts of the UK face a water deficit due to a changing climate, and the challenges posed by a growing population. While Britain has traditionally been blessed with ample rainfall, rising temperatures and the increased frequency of extreme weather events pose significant threats to the security of our water supply. Particularly in the Southeast of England, with much of the region already deemed as water stressed.

We are acutely aware of the challenge here. We are continuing with our efforts to reduce demand through investments in technology, and the exploration and delivery of successful demand management and customer behaviour change programmes. We're also working to improve the resilience of our network so we can do our part to save water as well. In 2022/23, we beat our 14% leak reduction target, achieving 15.8% and are progressing well towards our 2025 goal to reduce leaks by 20%. However, we are not stopping there and aim to reduce leakage by 50% by 2050.

While pleased with our progress, we recognise the industry must do more to ensure long-term sustainable supplies of water. This is why we have been collaborating across the industry on water resource plans at a regional level to put forward proposals on new sources of water such as water transfers and new reservoirs.

However, this is just one aspect of our long-term plans and must work in tandem with reducing leakage and a societal wide push to reduce demand for water to ensure a more sustainable supply of water for the future. We advocate for a united approach to reduce water demand, involving stakeholders from across government, regulators, wider water industry and beyond. Demos has developed compelling policy solutions presented in this report, offering a foundation for transformational change. We urge readers to support these wide-ranging reforms in a collective effort to safeguard this invaluable resource.

Keith Haslett, CEO of Affinity Water

EXECUTIVE SUMMARY

The UK's long-term supply of water is being eroded. If no adaptation measures were taken, our demand for water would be level with supply by 2032 and exceed it by 2036.¹ We need to act fast, or the costs will build up. In recent years, the UK has felt the consequences of failing to mitigate long-term risks - from unsafe concrete in school buildings to insufficient pandemic preparedness. The government cannot let water scarcity be another such failure.

Although water usage per person has fallen slightly in recent years, it has not fallen at the rates required to secure our future water supply. There is no publicly available data on whether the UK is on track to achieve our targets to maintain water supply.

The potential cost of failing to maintain our water supply is significant. If England experienced a severe drought (which has a one in seven chance of happening before 2050), and used emergency supply measures to cover the entire shortfall of water while retaining household water pressure, this would cost around £1.8 billion each day.² That is almost 30% of the UK's average daily GDP (£6.5bn a day). If such a drought happened under a scenario of high global warming in 2065, that cost would be £5.7 billion each day. We therefore cannot afford to drop the ball on the UK's water resilience.

The public is increasingly concerned about maintaining our access to water. In our recent briefing paper, *Addressing the UK's Water Dilemma*,

our nationally representative polling showed that seven in 10 people think the UK - or part of it - is either currently or at risk of experiencing a drought within the next 10 years.³ Yet, when asked, much of the public is not prepared to undertake the measures needed to improve the UK's water efficiency.⁴ This is despite investments to avoid future bill increases in the future and save customers money.

We need to bring new ambition to improve the UK's water resilience and turn reduced water consumption into a truly national challenge, drawing on resources and expertise from all parts of our economy, society and government.

To achieve this, we recommend the government to:

1. Create a new dedicated Minister for Water to act as a national champion for water efficiency, with Defra reporting annually to the minister and parliament on progress on water efficiency.
2. Reinstate the National Water Council to bring the key stakeholders, not just the water industry, together in one place to drive a national effort around water efficiency.
3. Make water meters compulsory for all households.⁵
4. Explore the use of rising block tariffs, providing

1 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

2 41 Analysis of National Infrastructure Commission, Analysis of the cost of emergency response options during a drought, 13 March 2018, <https://nic.org.uk/app/uploads/Atkins-2018-Analysis-of-the-cost-of-drought.pdf>. Measures are drought Permit, desalination, effluent reuse, emergency leakage control, surface water options, water transfer options, and groundwater options. Analysis takes the median cost of each measure (both capex and opex costs) 42 Cost calculations are based on the costs identified for each emergency supply option by the National Infrastructure Commission (NIC). These costs were weighted according to the proportion of total additional capacity that each option could contribute nationally. Severe pressure management options are excluded from this analysis as this would disrupt the customer experience. This model is intended to reflect the cost of retaining the same access to water for the customer.

3 Demos, Addressing the UK's Water Dilemma, September 2023, https://demos.co.uk/wp-content/uploads/2023/10/Below-the-surface_Final-1.pdf

4 Demos, Addressing the UK's Water Dilemma, September 2023, https://demos.co.uk/wp-content/uploads/2023/10/Below-the-surface_Final-1.pdf

5 Currently, areas deemed to be in serious water stress by the Secretary of State, currently get permission to compulsory meter their customers.

a range of tariffs which determine the price that consumers pay based on usage.

5. Put in place more ambitious targets for new homes for water efficiency, aiming for 100 litres per person per day in water-stressed areas (where demand is high relative to the available supply), and 110 litres in all other areas.
6. Ensure better training of plumbers and installers to reduce leaks and ensure that products are of quality to achieve maximum efficiency.
7. Develop an 'All-In-One' approach to retrofitting homes so that we include water efficiency alongside energy efficiency.
8. Create a rapid "Greywater Review" to identify whether the UK needs to explore the use of greywater for businesses and recreational usages, and report back to Defra within 12 months.

These proposals are not an attempt to reinvent the wheel. They build on the existing plans, such as the Plan for Water and existing commitments from the water industry. Yet, they would mark a step change in our approach to water efficiency.

We hope that this report will help stimulate a national conversation about how we ensure the tap keeps flowing across the UK.

INTRODUCTION

A NATIONAL CHALLENGE

The UK's long-term supply of water is being eroded. We are taking more water out of the ground than our environment can cope with - and this will worsen over time as climate change cuts freshwater supply while expanding demand. If no adaptation measures were taken, our supply of water would level with demand in 2032 and be exceeded in 2036.⁶ That is an incredibly worrying prospect.

Even before water demand nears our level of supply, we could see an array of problems for regions facing more water stress: higher bills; more hosepipe bans; barriers to business productivity; blockers to building new homes; rivers drying up, harming water quality and destroying natural habitats; and reduced resilience in the face of droughts, which could mean extreme water rationing measures. We need to get on top of the problem before it worsens

This is a national challenge which requires national leadership. This is not simply the responsibility of one sector or one part of the UK - we will need to bring the full resources and attention of the country together to achieve results. As a devolved policy issue, the UK government is responsible for the water sector only within England and Wales, but lessons can be learned within Scotland and Northern Ireland also. In this paper, we discuss the issues in the UK context, but often focus on data and policy applying specifically to England and Wales.

Given the scale of the challenge, the government will need to take a more active role. Until recently, water resilience was not a significant feature of government planning. The Plan for Water is a welcome response to the importance of England's water supply, but too much of the debate - and investment - is concentrated on sewage, and not enough on keeping the taps flowing. Although sewage looms large in the public debate, maintaining access to water is essential for communities and our economy.

Water companies have been deemed to have insufficient plans for delivering long-term water resilience and urgent action needs to be taken. The record levels of investment in our water system proposed so far are welcome, but this will need to be the start of decades of large-scale patient investment.

Citizens also have a critical role to play. As our research shows, the public has a worrying lack of understanding about its current water consumption and there is a lack of support for further actions to improve water efficiency. Government, the water industry and businesses need to come together to bring the public on side and raise awareness of the UK's water challenge, before it becomes a crisis.

THE SOLUTION

Part of the problem can be solved by better management of, or more investment in, water supply; reducing leakage, more sustainable water withdrawals (taking water from the ground), better infrastructure, or more trade between water companies. But there are natural limits on that supply, shaped by our geography and climate. We therefore have to also manage water demand, ensuring consumers and businesses use water efficiently.

The government is already working towards this, with a clear target to reduce water household consumption from 145 litres per person per day to 110 by 2050.⁷ This can be done - representing a return to our level of consumption in 1970. But lifestyles were very different in 1970, and we cannot just turn back the clock. Reducing household water consumption in the 2020s will require new adaptation measures and technologies, as well as changed behaviours. The government also wants to reduce non-household water use from industry and agriculture, by 9% by 2038 and 15% by 2050.

⁶ National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

⁷ Environment Agency, Meeting our Future Water Needs: a National Framework for Water Resources, 16 March 2020, https://assets.publishing.service.gov.uk/media/5e70c2c4e90e070acfef5077/National_Framework_for_water_resources_summary.pdf

However, a range of barriers hinder progress - around regulation, funding, behaviours, planning and governance. This report lays out how the government can overcome those barriers.

OUR METHODOLOGY

To develop this report, we conducted a comprehensive review of relevant literature. We then ran a nationally representative poll with 1,267 UK adults looking into public views on water scarcity, its impacts and how to address the problems. We ran two workshops - one with house building organisations and one with policy experts in the sector - and a series of expert interviews. In these, we investigated the various barriers to change and tested possible solutions, informed by the public's priorities.

THIS REPORT

Section one of this report illustrates the problem. It explains how the demand for water is set to increase relative to supply, causing increasing problems for consumers and businesses, as well as the environment, housebuilding, productivity and the wider economy. It also reviews our survey findings that the public share these concerns and want more to be done.

Section two highlights the opportunities presented by a reduction in water demand. It shows that this is an achievable goal, and then outlines the potential benefits in reducing water scarcity, avoiding large increases in consumer bills and emissions, while creating new export opportunities.

Section three outlines the barriers to change. Reform requires making homes and their appliances more water efficient, encouraging people to minimise excessive use, and using water from other sources such as rainwater or greywater (recycled from showers etc). This section shows how these options are held back by lack of investment and coordination from the government, lack of information for consumers and regulatory inefficiencies. Addressing these problems also requires good governance of the water system.

Section four outlines our recommendations. These range from increasing strategic leadership on water through a new dedicated Minister for Water to tightening regulations and making water meters compulsory for all households.

SECTION 1

THE PROBLEM

There is a growing gap between the supply and demand of water in the UK - caused by climate change, a growing population and various other factors. This will increasingly put pressures on consumers' and businesses' water usage - meaning higher bills and potential restrictions on use. In turn, this will also have knock on effects for the environment, housebuilding, productivity and the wider economy.

This section outlines this cascade of problems.

1.1 A GROWING GAP BETWEEN SUPPLY AND DEMAND

Our available water is falling. If we follow a path of two degrees of global warming, modelling suggests UK river flows could reduce by up to a fifth by around 2055.⁸ With a path of four degrees of warming, they could reduce by up to 30% by 2055 and 50% by 2085. There will also be less rain in summer - with 70% less rainfall expected during UK summers by 2070 if high global emissions continue.⁹ To put this into context, the Met Office projects that by 2060, summers like that in 2022 (which saw the

driest July in England since 1935) will be the norm for the UK.^{10,11} Other research suggests London could have a similar climate to Barcelona by 2050.¹²

At the same time, water demand is growing. Our population is expanding, hotter temperatures will mean water demand per person is higher (particularly through agriculture), and the increasing demand for electricity through the net zero transition boosts demand for water also.¹³

Overall, this means that without measures to increase supply or reduce demand, demand would overtake supply in the near-future. Modelling by the Environment Agency projects that this would happen in England between 2032 and 2036 - and by 2045, we would be short by around 500 million litres each day (l/d). Currently we use around 14 billion l/d.

8 HR Wallingford, Updated projections of future water availability for the third UK Climate Change Risk Assessment, July 2020, https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf

9 Met Office, Most detailed picture yet of UK's future climate, 26 November 2018, <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2018/ukcp18-launch-pr>

10 Met Office, Driest July in England since 1935, 1 August 2022, <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2022/driest-july-in-england-since-1935>

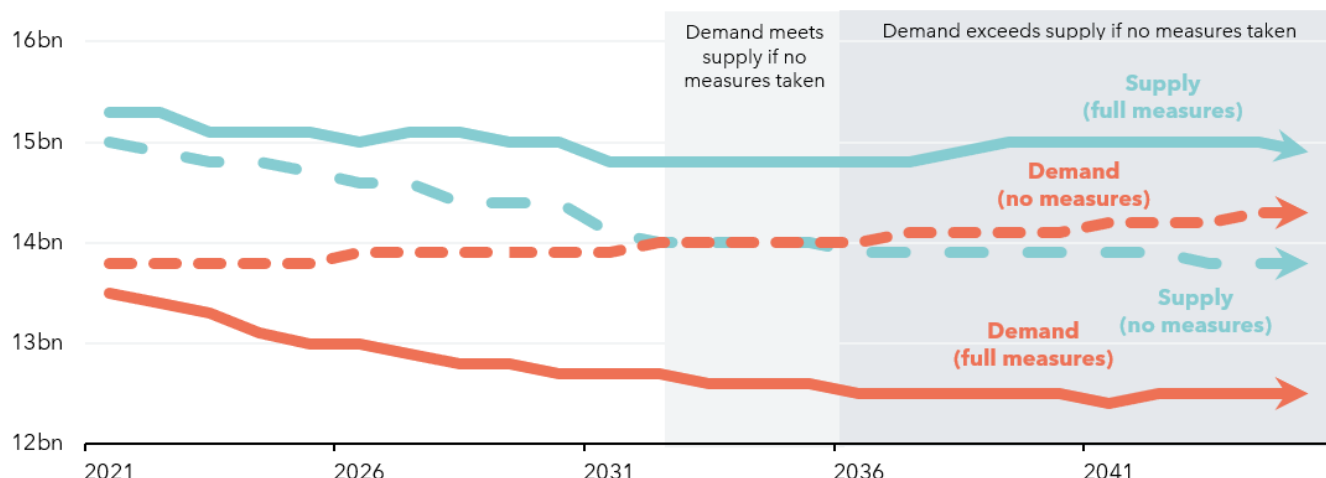
11 Met Office, Record breaking 2022 indicative of future UK climate, 27 July 2023, <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2023/record-breaking-2022-indicative-of-future-uk-climate>

12 Harvey F, 'Global heating: London to have climate similar to Barcelona by 2050', The Guardian, 10 July 2019, <https://www.theguardian.com/environment/2019/jul/10/global-heating-london-similar-climate-barcelona-2050>

13 Plimmer G, Hollywood E and Rodgers L, 'The UK is at risk of running low on water. Why?', Financial Times, 3 September, 2023, <https://www.ft.com/content/19caeb90-b5c9-46b2-9118-8d69d4c48d53>

If no adjustment measures are taken, demand for water will be level with supply in 2032 and exceed it by 2036

Daily supply and demand for water in England (litres), for scenarios of planned adjustment measures being fully introduced and not introduced



Source: National Audit Office, *Water supply and demand management*, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

Modelling by the Climate Change Risk Assessment of the UK looks further beyond 2045 and finds larger shortfalls. It suggests that, if there is no reduction in water demand, by 2055 the UK's supply is projected to be short by around 650 to 920 million l/d (depending on global warming trajectory between 2°C to 4°C range).¹⁴ That's the daily usage of around 4.7 to 6.6 million people. By 2085, it's projected to be short by around 1,220 to 2,900 million l/d (the usage of 8.7 to 20.7 million people, varying between 2°C to 4°C of warming).

Because of this, the Environment Agency already deems seven water companies in England and Wales to be covering areas of 'serious water stress', meaning household demand is currently - or likely to be in the future - making up a high proportion of the available rainfall.¹⁵

Adding further pressure, the government has also committed to increasing our resilience to droughts (from 1 drought in every 100 years to 1 in every 500 years), and ending environmentally harmful water abstractions (which currently amount to 700

million l/d).¹⁶ To meet the growing demand and the government targets, in England alone we need around an additional 3.5 billion l/d by 2050 - a 25% increase on our current production levels.¹⁷

¹⁴ HR Wallingford, Updated projections of future water availability for the third UK Climate Change Risk Assessment, July 2020, https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf

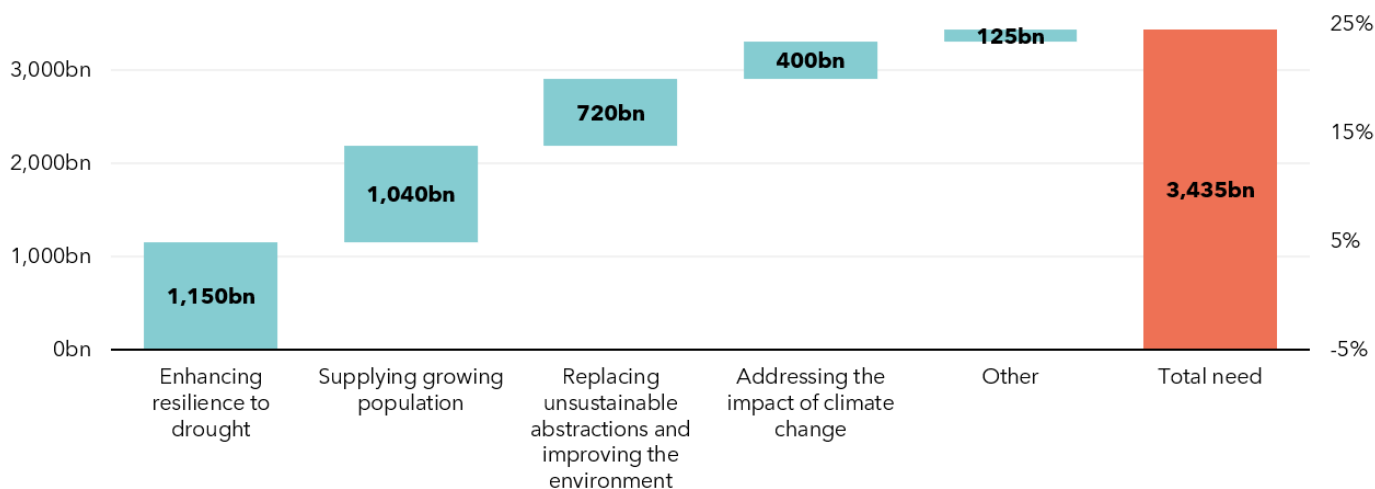
¹⁵ Environment Agency, Updating the determination of water stressed areas in England, 1 July 2021, <https://consult.environment-agency.gov.uk/environment-and-business/updating-the-determination-of-water-stressed-areas/>

¹⁶ Climate Change Committee, Water Stress and Resilience, July 2019, <https://www.theccc.org.uk/wp-content/uploads/2019/07/Outcomes-Water-stress-case-study.pdf>

¹⁷ Environment Agency, Meeting our future water needs: a national framework for water resources – accessible summary, 16 March 2020, <https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources/meeting-our-future-water-needs-a-national-framework-for-water-resources-accessible-summary>

If no action is taken, the UK will need an extra 3.5 billion litres of water per day by 2050

Extra water needed per day between 2025 and 2050 if no other action is taken, in volume (left axis) as percentage of current water supply (right axis)



Source: Environment Agency, *Meeting our future water needs: a national framework for water resources – accessible summary*, 16 March 2020, <https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources/meeting-our-future-water-needs-a-national-framework-for-water-resources-accessible-summary>

While plans are in place to help address this situation by reducing demand, there have been concerns in recent years that these will not be sufficient. In Ofwat's January 2019 analysis of the plans of 17 water companies, only two were deemed to have high-quality plans for securing long-term resilience.¹⁸ The plans of ten companies were considered to fall short, and those of five were considered to fall significantly short. 'Securing long-term resilience' was therefore the category with the lowest overall rating.

The picture has since improved. The Environment Agency notes that water companies' plans imply a reduction in per capita consumption to 113 l/d per person by 2050 (just over the 100 litres target).¹⁹ This target is encouraging, but may still require more comprehensive strategies to achieve it, both from water companies and the government. Ofwat stated in 2023 that "we are still seeing a lack of robust and

tailored glidepaths to meet [water demand] targets and our concerns remain around the deliverability of demand management strategies".²⁰

Alongside this, the Environment Agency and National Infrastructure Commission have expressed that more government intervention is needed to support the shift.^{21,22} The latter states that "Company plans may struggle to achieve the 110 litres per person per day target without further government intervention at the national level."²³ As noted across the plans of various water companies, some changes needed around appliance and building regulations or public awareness campaigns require government policy and leadership.²⁴ Water companies have also suggested that the government needs to increase its ambition. Water Resources South East, an alliance of six water companies, noted in 2023 that "achieving the Government's national target will require decisive action by the Government, going beyond current

18 National Audit Office, *Water supply and demand management*, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

19 Environment Agency, *A summary of England's draft regional and water resources management plans*, 25 October 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/a-summary-of-englands-draft-regional-and-water-resources-management-plans>

20 Armstrong A, 'Water Resources South East (WRSE) draft regional plan', Ofwat, 20 February 2023, https://www.ofwat.gov.uk/wp-content/uploads/2023/03/WRSE-draft-regional-plan-feedback-Ofwat-20-Feb-2023_Redacted.pdf

21 Environment Agency, *A summary of England's draft regional and water resources management plans*, 25 October 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/a-summary-of-englands-draft-regional-and-water-resources-management-plans>

22 National Infrastructure Commission, *Infrastructure Progress Review 2023*, March 2023, <https://nic.org.uk/app/uploads/IPR-2023-Final.pdf>

23 National Infrastructure Commission, *Infrastructure Progress Review 2023*, March 2023, <https://nic.org.uk/app/uploads/IPR-2023-Final.pdf>

24 Thames Water, *Draft Water Resources Management Plan 2024*, November 2022, <https://thames-wrmp.co.uk/assets/images/documents/technical-report/8-Demand-Options.pdf>

policy decisions and announcements and including labelling of white goods and building regulations".²⁵

1.2 THE COSTS OF WATER STRESS

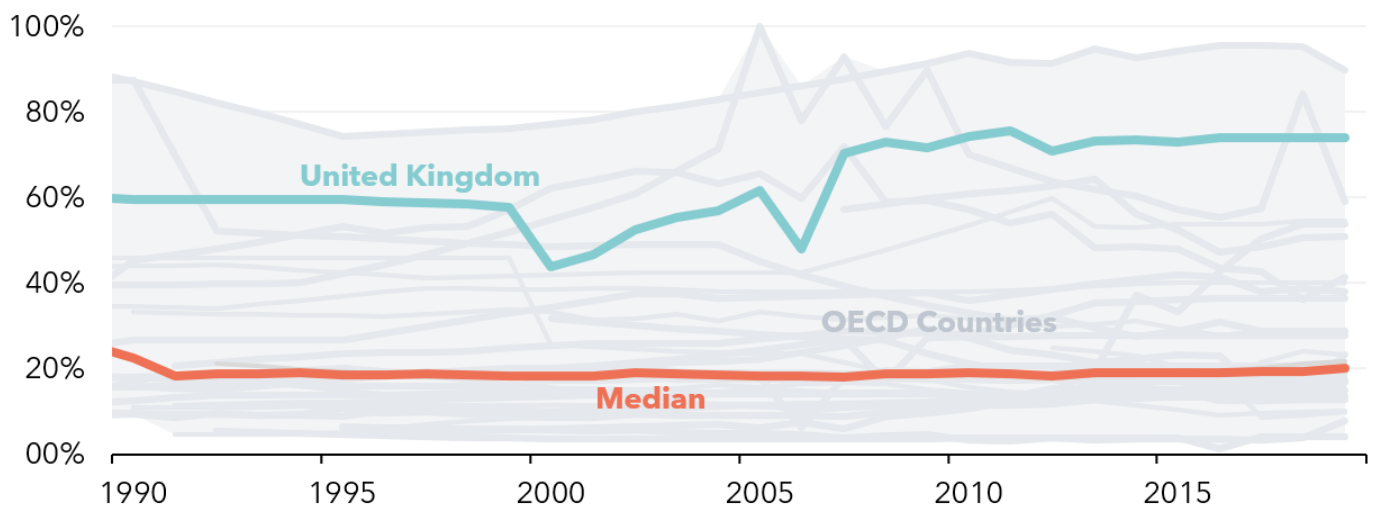
Shortages of water would create problems for citizens, businesses, and the environment, and diminish our resilience in the face of droughts.

Citizens

Citizens would bear the brunt of water stress in the UK. This is because our demand is primarily driven by households - much more than most other countries. In 2019, three quarters of total water withdrawals in the UK are used for domestic purposes, rather than industry or agriculture.²⁶ In contrast, the median OECD country used just a fifth of water withdrawals for domestic purposes. Other water usage comes from industry (11% of the UK total), agriculture (1.5%) and other businesses (13%).^{27,28}

Water usage in the UK is driven much more by household demand than in peer countries

Municipal water as a share of total water withdrawal



Source: Food and Agriculture Organization of the United Nations, AQUASTAT Dissemination System, <https://data.apps.fao.org/aquastat/?lang=en>

25 Water Resources South East, Revised Draft Regional Plan Water Resources South East, August 2023, <https://www.wrse.org.uk/media/osjqgafk/wrse-revised-draft-regional-plan-august-2023-v1-1.pdf>

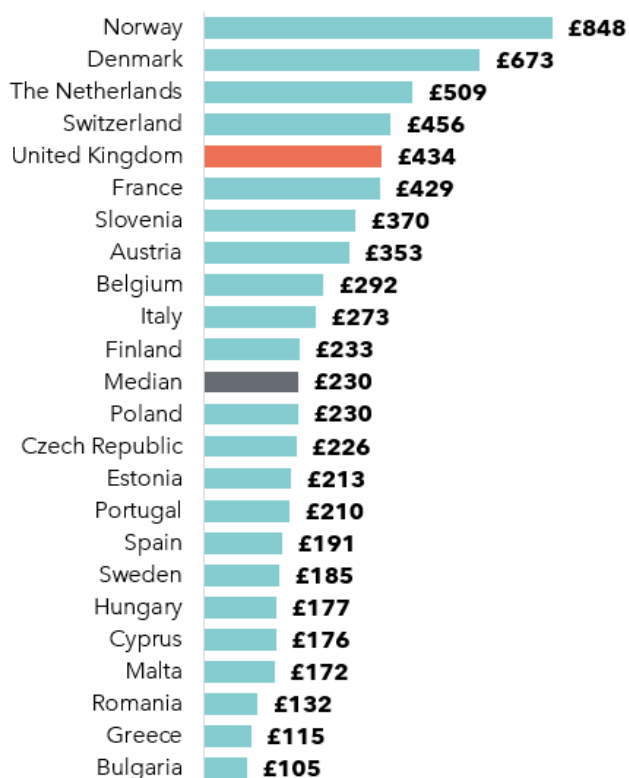
26 Food and Agriculture Organization of the United Nations, AQUASTAT Dissemination System, <https://data.apps.fao.org/aquastat/?lang=en>
27 This does not include water for the power sector, for which water is used and then returned further down the water course without needing to be treated.

28 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

For citizens, water stress directly causes rising bills and constraints on water use. Average annual bills in the UK are already much higher than the average European country (£434 vs £220 in 2017-19).²⁹ This is primarily because Brits consume a lot more water than most other European countries - as the price per cubic metre of water is more similar to the average European country. Yet, given rising water scarcity, water companies are planning to invest in new reservoirs, desalination plants and water recycling in order to expand supply.^{30,31} Along with added investment in sewage, this is driving the largest increase in bills ever in coming years - a 35% increase by 2030.³²

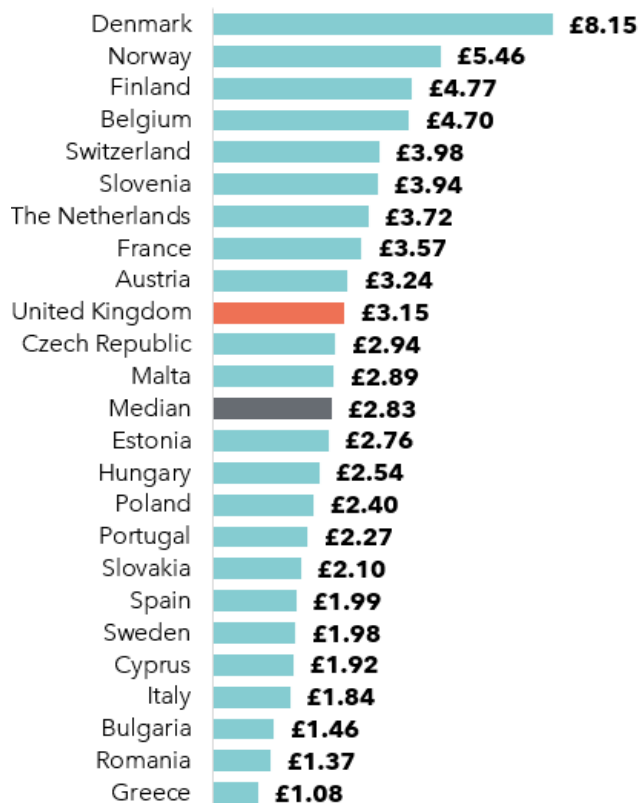
The UK tends to have much higher annual water bills than the median European country...

Average annual water bill per household, figures from between 2017 and 2019 (GBP, adjusted from Euros using 2018 exchange rate)



...but only slightly higher prices per metre cubed of water than the median European country

Average price per m3 of water, figures from between 2017 and 2019 (GBP, adjusted from Euros using 2018 exchange rate)



Source: EurEau, Europe's Water in Figures An overview of the European drinking water and waste water sectors, 14 July 2021, <https://www.eureau.org/resources/publications/eureau-publications/5824-europe-s-water-in-figures-2021/file>

29 Source: EurEau, Europe's Water in Figures An overview of the European drinking water and waste water sectors, 14 July 2021, <https://www.eureau.org/resources/publications/eureau-publications/5824-europe-s-water-in-figures-2021/file>

30 Water UK, We haven't always got it right but the cost of inaction is huge, 11 October 2023, <https://www.water.org.uk/news-views-publications/views/we-havent-always-got-it-right-cost-inaction-huge>

31 Gatten E, 'Southern Water bills to rise by nearly 50pc', The Telegraph, 2 October 2023, <https://www.telegraph.co.uk/news/2023/10/02/southern-water-bills-rise-nearly-50pc/>

32 Gatten E, 'Water bills will rise by 35pc in biggest hike ever to fix sewage crisis', The Telegraph, 2 October 2023, <https://www.telegraph.co.uk/news/2023/10/02/water-bill-rises-sewerage-rivers-pollution-investment/>

We've also seen customers affected by temporary usage bans (which cover non essential use including hosepipe use) - which come with a £1,000 fine for breaking the rules. For example, this year South West Water announced a hosepipe ban for almost 2 million customers.³³ Such events will become more common if water scarcity increases.

Indirectly, water stress means barriers to housebuilding. For the first time, in June 2023 the Environment Agency raised concerns about five planning applications in Cambridgeshire, including at least 4,425 homes.³⁴ This could prevent the development. Some areas in West Sussex have also been subject to water neutrality regulations - which ensure that any increase in water consumption due to new developments is offset by reductions in the existing community.³⁵ Evidence submitted to parliament by Horsham District Council in 2023 suggests that these regulations are delaying the delivery of 3,360 homes in their area.³⁶

Businesses

Businesses mainly face issues with water scarcity when trying to develop new buildings. Those in areas with water neutrality requirements, for example, have faced higher costs in having to fund water efficiency improvements in the community.

As part of the planning process, we've had to fund water efficiency improvements in big commercial businesses to show we can free up enough space to allow our houses. There is too much water being taken by too many people in a given area, but the onus falls either on people wanting to build more homes in this area, or the water company.

- Housebuilder in our workshop.

All businesses who seek new buildings also have to manage regulations around water efficiency, including around the design and operations of plumbing systems, water fittings and water-using appliances.³⁷ These can cause bureaucratic burdens and higher costs - and would likely become more restrictive as water scarcity increased.

Environment

For the environment, if the UK continues to withdraw water in unsustainable ways, this could reduce river flow rates. These effects can disrupt ecological systems by, for example, hindering the passage of migratory fish, increasing sedimentation rates, and changing the rates of erosion and decomposition.³⁸

Water stress (the level of pressure on a country's natural water supply) is slightly higher in the UK than the typical OECD country - and has stayed levels for many decades.³⁹ The UK's water stress is, however, relatively concentrated in specific areas, particularly in the South, East, and Midlands of England.⁴⁰ This means these particular areas are vulnerable to dry periods - enhancing the environmental harms.

33 Mathers M, 'Heatwave sparks hosepipe ban affecting 2 million customers', The Independent, 16 June 2023, <https://www.independent.co.uk/news/uk/home-news/hosepipe-ban-kent-sussex-south-east-water-b2358816.html>

34 Schofield B, 'Water supply fears prompt first housing objections', BBC, 26 June 2023, <https://www.bbc.co.uk/news/uk-england-cambridgeshire-65965718>

35 Environment Agency, Delivering water neutrality: measures and funding strategies, October 2009, <https://assets.publishing.service.gov.uk/media/5a7c6289e5274a7ee501a9b5/scho1009bqzt-e-e.pdf>

36 Horsham District Council, Written evidence (IER0001), House of Lords Built Environment Committee, March 2023, <https://committees.parliament.uk/writtenevidence/119628/html/>

37 Water for Life, 'Water regulations', no date, <https://www.southernwater.co.uk/help-advice/water-regulations>

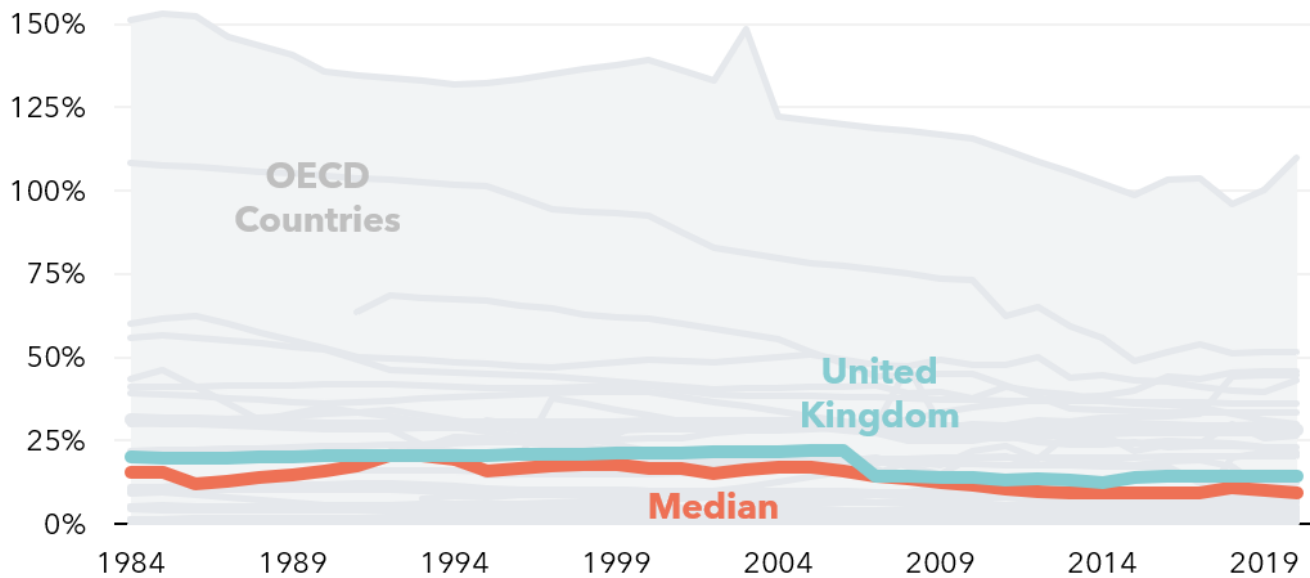
38 Department for Environment, Food and Rural Affairs, Managing Abstraction and the Water Environment, December 2013, https://consult.defra.gov.uk/water/abstraction-reform/supporting_documents/abstractreformconsultmanage20131217.pdf

39 Food and Agriculture Organization of the United Nations, AQUASTAT Dissemination System, <https://data.apps.fao.org/aquastat/?lang=en>

40 OECD, Water Stress Projections WRI, 27 May 2023, <https://public.tableau.com/shared/DPWGZ97DB>

The UK faces a slightly higher level of water stress than the average OECD country

Freshwater withdrawal as a proportion of available freshwater resources, OECD countries



Source: Food and Agriculture Organization of the United Nations, AQUASTAT Dissemination System, <https://data.apps.fao.org/aquastat/?lang=en>

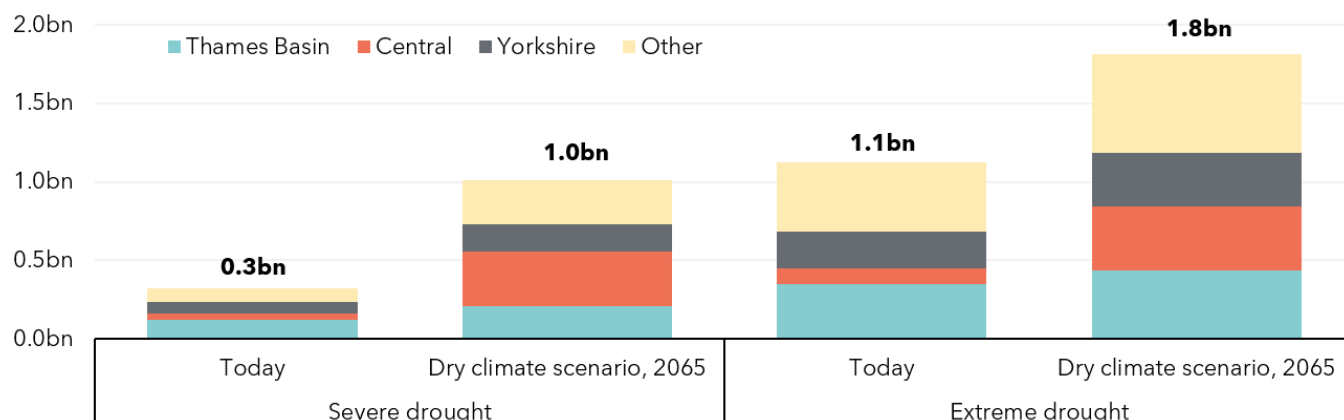
Severe droughts

Water stress also makes regions less resilient to droughts. The National Infrastructure Commission estimates that with a serious drought (which has a one in four chance of happening by 2050), six water companies - serving almost 40% of the English population - would experience water deficits.⁴¹ More severe droughts could be much more harmful. The Commission estimates that a severe drought (which has a one in seven chance of happening by 2050) would lead to a daily shortfall in England of 320 million litres if it happened today, even after temporary and non-essential use bans. All regions other than the North West would see a shortfall. If such a drought happened in 2065, given a pessimistic scenario for climate change, this shortfall would total one billion litres daily, affecting all regions. Extreme droughts (about half as likely as a severe drought) would lead to much greater shortfalls.

⁴¹ National Infrastructure Commission, Preparing for a drier future: England's water infrastructure needs, April 2018, <https://nic.org.uk/app/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf>

With climate change, an extreme drought could cause a shortfall for water of almost 2 billion litres per day in England

Daily water shortfall in England under different drought scenarios by region, in litres



Source: National Infrastructure Commission, *Preparing for a drier future: England's water infrastructure needs*, April 2018, <https://nic.org.uk/app/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf>

Without reductions in demand, such droughts would be extremely costly. Looking at measures to bring additional water into the system during droughts, expanding abstraction licences (allowing water withdrawal from new areas, deemed less sustainable) would cost £28.50 per litre of water, desalinating water would cost £7.50 per litre and reusing sewage would cost £5.80 per litre.⁴²

To put these costs into context, if a severe drought happened (again, a one in seven chance of happening before 2050) and we used emergency supply measures to cover the entire shortfall in England (321 million litres daily), this would cost around £1.83 billion each day.⁴³ That is almost 30% of the UK's average daily GDP (£6.2 billion). If we did the same during a severe drought in 2065, under a dry climate scenario (a billion litres daily), this would cost around £5.70 billion daily - over 90% of the UK's annual GDP. In reality, emergency demand measures would likely be put in place and we would not attempt to cover the entire shortfall - but the numbers reflect the scale of the threat.

We can also look at models of the holistic costs of droughts. A report by AECOM for the Environment

Agency looks at the holistic costs of a severe drought in the 2050s lasting three years. It finds that the economic costs could reach almost £55 billion (in 2022 prices) and the welfare costs (based on restrictions on water usage) would be worth another £45 billion.⁴⁴ The costs would be concentrated around the River Thames (including London), where the demand for water is likely to be highest.⁴⁵

42 Analysis of National Infrastructure Commission, *Analysis of the cost of emergency response options during a drought*, 13 March 2018, <https://nic.org.uk/app/uploads/Atkins-2018-Analysis-of-the-cost-of-drought.pdf>. Measures are drought Permit, desalination, effluent reuse, emergency leakage control, surface water options, water transfer options, and groundwater options. Analysis takes the median cost of each measure (both capex and opex costs)

43 Cost calculations are based on the costs identified for each emergency supply option by the National Infrastructure Commission (NIC). These costs were weighted according to the proportion of total additional capacity that each option could contribute nationally. Severe pressure management options are excluded from this analysis as this would disrupt the customer experience. this model is meant to reflect the cost of retaining the customer

44 Department for Environment, Food and Rural Affairs, *Strategic water resources planning: "Strategic Water Infrastructure and Resilience"* - WT1535, 2013, <https://randd.Defra.gov.uk/ProjectDetails?ProjectID=18964>

45 Department for Environment, Food and Rural Affairs, *Strategic water resources planning: "Strategic Water Infrastructure and Resilience"* - WT1535, 2013, <https://randd.Defra.gov.uk/ProjectDetails?ProjectID=18964>

1.3 WHAT THE PUBLIC THINK

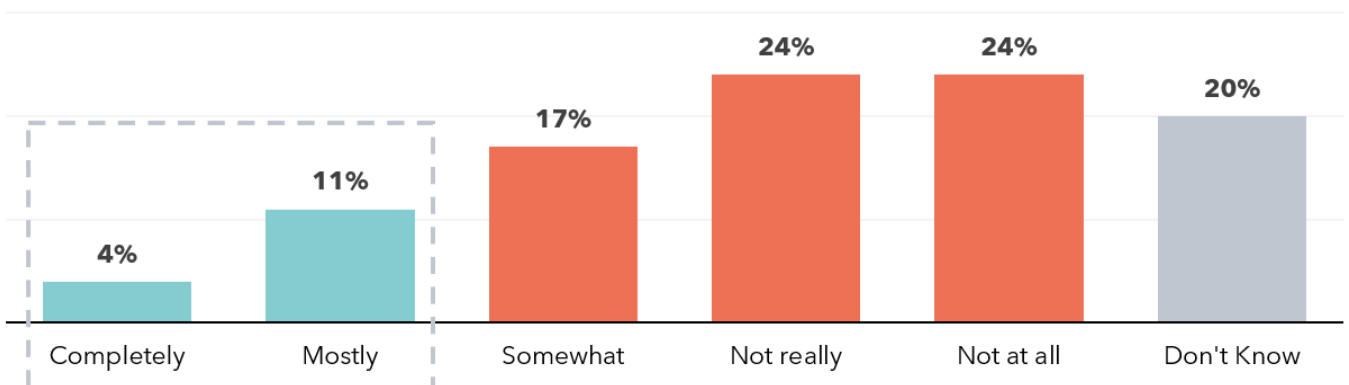
Our first paper of this project, *Addressing the UK Water Dilemma*, details how the public think that maintaining access to water should be a priority for the government, but that the government is not currently meeting its responsibility on this. It also found that many have already been affected by issues of water scarcity in negative ways.⁴⁶ Specifically, our survey found that:⁴⁷

- Seven out of ten people think the UK (or part of it) is at risk of experiencing a period of drought in the next ten years
- People think maintaining access to water should be a bigger priority for government than transport, education and job creation

- Nearly half of the public do not think that the government is meeting its responsibility to maintain water supply
- Water companies and government are considered most responsible for keeping taps flowing
- Around one in five people have already been somewhat or significantly affected by water shortages
- Over half of people that have been affected by water shortages say that their physical and mental health has been affected

Only around one in seven Brits thinks the government is **completely or mostly** meeting its responsibility to maintain water access

To what extent do you think the UK government is or is not meeting its responsibility to maintain access to safe, usable water?



Source: Demos, *Addressing the UK's Water Dilemma*, September 2023, https://demos.co.uk/wp-content/uploads/2023/10/Below-the-surface_Final-1.pdf

This suggests the government could win significant political capital if it demonstrates a strong commitment to maintaining water supply. This presents the political opportunity, but there are a wide range of other opportunities that come with tackling water scarcity, as detailed in the next section.

⁴⁶ Demos, *Addressing the UK's Water Dilemma*, September 2023, https://demos.co.uk/wp-content/uploads/2023/10/Below-the-surface_Final-1.pdf

⁴⁷ Ibid.

SECTION 2

THE OPPORTUNITY

It is clear that growing water stress could create serious problems for our economy and society. We need to ramp up our efforts to tackle this. As noted, these efforts require reforms to our water supply, but it must also come with shifts in demand. First and foremost, this is because demand-reduction could play a big role in tackling water scarcity. Modelling shows it could be key to flipping future shortfalls to surpluses. It is also achievable; our current water consumption is a relatively recent phenomenon, and Ofwat suggests that water companies need to do more to help drive change. Alongside this, there are positive knock-on effects of demand reduction, primarily in terms of keeping bills down.

This section details these opportunities.

2.1 REDUCED WATER SCARCITY

Modelling of future water affirms the importance of demand-reduction efforts - it finds that the government's demand-reduction plans would enable us to avoid a national water shortfall. As noted earlier, modelling suggests that with no demand-reduction policies by 2055, the UK will experience a significant shortfall in supply (by an amount equivalent to the consumption of between

4.7 and 6.6 million people).⁴⁸ Yet, with the current and announced demand-side reduction policies, we would instead have a significant surplus (equivalent to the daily consumption of between 13.2 and 15.1 million people).⁴⁹ All regions in the UK, except for the South East in a 4°C world, would be in surplus.

With such a surplus, the UK could also benefit from increased water exports. Currently the UK is a net importer - with \$182 million of imports and \$67 million of exports in 2021. Shifting the balance on this could provide needed improvements to the UK's trade balance, and make the UK an important trade partner as global scarcity of water increases.⁵⁰

48 HR Wallingford, Updated projections of future water availability for the third UK Climate Change Risk Assessment, July 2020, https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf

49 Demos calculations based on a surplus of between 1,860MI/d and 2,120 MI/d, as noted within HR Wallingford, Updated projections of future water availability for the third UK Climate Change Risk Assessment, July 2020, https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf

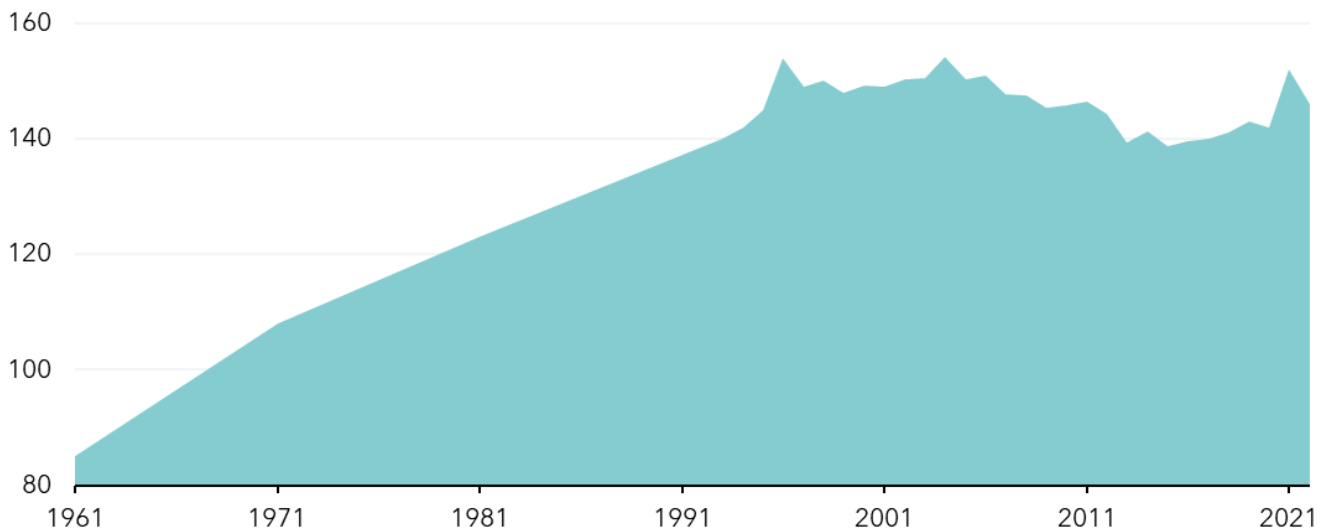
50 OEC, 'Water in the United Kingdom', no date, <https://oec.world/en/profile/bilateral-product/water/reporter/gbr>

2.2 AN ACHIEVABLE GOAL

Water demand has not always been as high as it is now. While water demand fell slightly from a peak in the 2000s down to 139, it has since been increasing again.^{51,52,53} After a spike during the pandemic, it returned to 146 in the financial year ending 2022.⁵⁴ To meet the government target of 110 litres per person per day by 2050, we need to return to the level of water consumption in around 1971. But we live in a very different world now, with different expectations for the home and heating, different cleaning behaviours and many more cars to clean. Returning to our consumption decades ago therefore requires new strategies and ambition.

Water usage per person increased rapidly up to the 1995. After falling slightly since, that trend has now reversed

Average litres per person per day, England and Wales



Source: Artesia Consulting, *The long term potential for deep reductions in household water demand*, 26 April 2018, <https://www.ofwat.gov.uk/wp-content/uploads/2018/05/The-long-term-potential-for-deep-reductions-in-household-water-demand-report-by-Artesia-Consulting.pdf>

51 National Audit Office, *Water supply and demand management*, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

52 National Infrastructure Commission, *Infrastructure Progress Review 2023*, March 2023, <https://nic.org.uk/app/uploads/IPR-2023-Final.pdf>

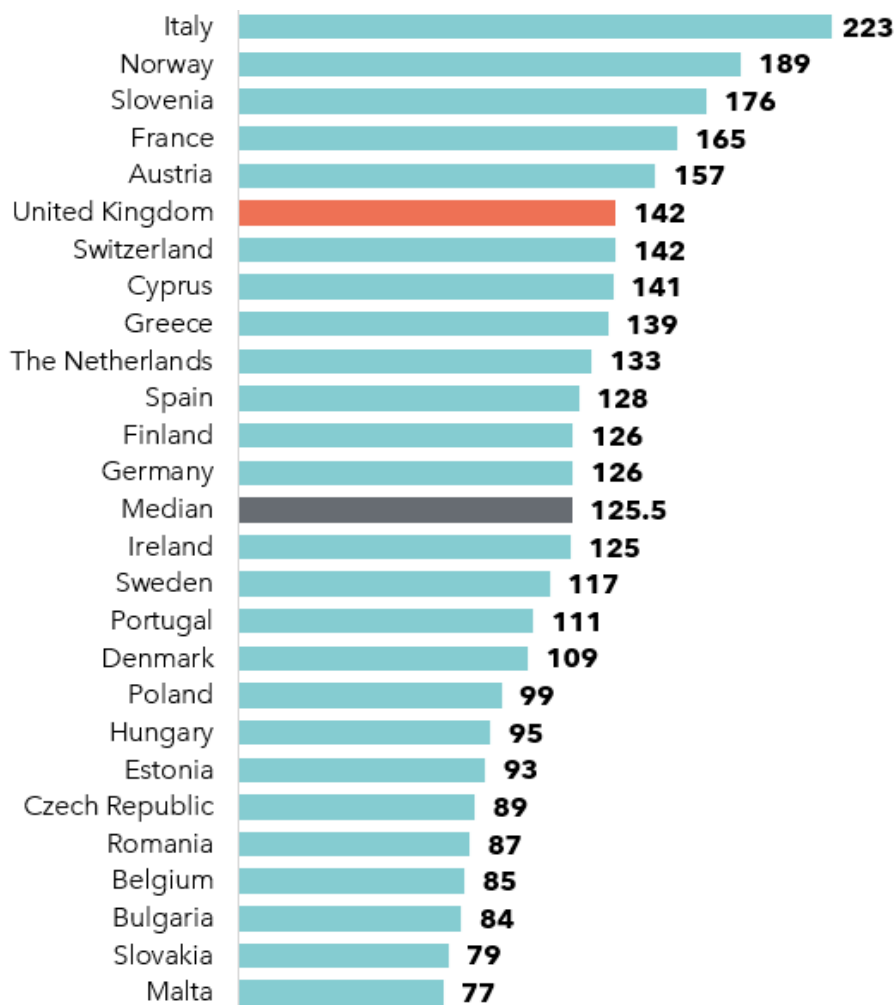
53 Discover Water, 'The amount we use', no date, <https://www.discoverwater.co.uk/amount-we-use>

54 Statista, *Average household water usage per person per day in England and Wales from 2016 to 2022*, June 2023, <https://www.statista.com/statistics/1211708/liters-per-day-per-person-water-usage-united-kingdom-uk>

There is also international precedence for a lower consumption of water. In 2021, people in the UK consumed 16 litres of water a day more than the average European country.⁵⁵ Reaching our target level of consumption would put us at a similar consumption level as Portugal or Denmark are at today.

The UK has much higher water consumption than the average European country

Household water consumption (litres per person per day), 2021



Source: EurEau, *Europe's Water in Figures An overview of the European drinking water and waste water sectors*, 14 July 2021, <https://www.eureau.org/resources/publications/eureau-publications/5824-europe-s-water-in-figures-2021/file>

⁵⁵ EurEau, *Europe's Water in Figures An overview of the European drinking water and waste water sectors*, 14 July 2021, <https://www.eureau.org/resources/publications/eureau-publications/5824-europe-s-water-in-figures-2021/file>

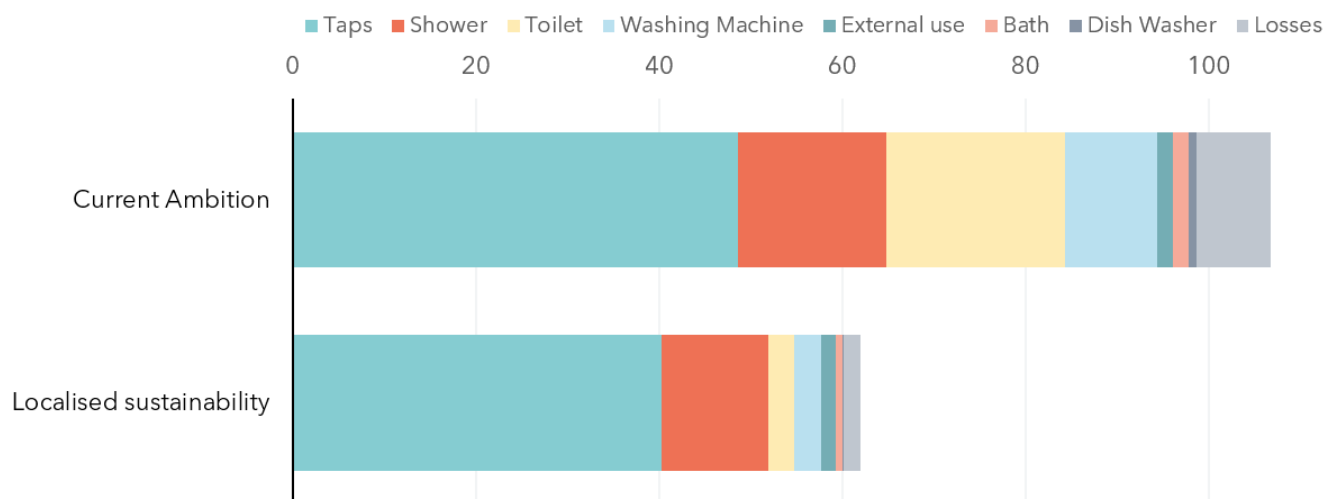
Modelling by Artesia, a consultancy, also suggests, with local efforts or technological innovation, we could theoretically in fact go far beyond the 110 litres target.⁵⁶ They model a 'local sustainability' scenario, in which "Markets in water resources and water services results in widespread competition and local providers delivering integrated water services. This positively influences consumer behaviour in purchasing and use of water using devices." This would see:

- Half of toilets using rainwater or greywater and half using 1.5 litres per flush
- Digital and recycling showers, and shorter showers
- Widespread use of rainwater for external uses

Although this was only a hypothetical exercise and required significant new technologies, retrofitting and support for the transition, it shows that we are only currently scratching the surface of what could be possible with a comprehensive plan and approach.

Significant shifts in appliances and behaviours could push water consumption far below the government target

Water usage per person per day in 2065 under different scenarios mapped by Artesia, by appliance (litres)



Source: Artesia Consulting, *The long term potential for deep reductions in household water demand*, 26 April 2018, <https://www.ofwat.gov.uk/wp-content/uploads/2018/05/The-long-term-potential-for-deep-reductions-in-household-water-demand-report-by-Artesia-Consulting.pdf>

⁵⁶ Artesia Consulting, *The long term potential for deep reductions in household water demand*, 26 April 2018, <https://www.ofwat.gov.uk/wp-content/uploads/2018/05/The-long-term-potential-for-deep-reductions-in-household-water-demand-report-by-Artesia-Consulting.pdf>

2.3 AVOIDING FUTURE PRICE RISES

Households are charged for the volume of water they use. Although the cost of delivering the water infrastructure is fixed, if we are unable to manage demand for water effectively, costs may increase and we need to build additional water infrastructure. Reduced consumption therefore means reducing future price rises for households. If a typical household currently used the government's target level of water for new builds (110 litres per person per day), they could save over £50 per year if they use South West water (using 2023 tariff rates), or £36 a year if on the median tariff.^{57,58} If all households in the UK were on metered tariffs charged at the median rate, households could save £3.64 billion worth of water annually. To put this into context, the total cost of household bills is £11.1bn a year.⁵⁹ Reducing demand of water could avoid the need for costs to go up significantly for households in future years.

There are also longer-term benefits for bills that result from increased water resilience. The cost of investing in resilience to severe droughts is very low. The industry body Water UK - which represents all UK water companies - finds that the cost of maintaining resilience against severe droughts is around £4-5 per customer each year, depending on the level of climate change.⁶⁰ In contrast, they estimate the savings of such a move to be around 10 times higher than this, given the costs that a drought would create.

There could also be more significant savings on other bills. Water UK, for example, estimates that for every pound saved on water in the shower, a household saves £1.65 on energy bills.⁶¹ Alongside this, leakage from a toilet or shower can cause damage to a house, increasing maintenance bills while potentially also damaging health.

However, we need to think long term about our water infrastructure if we want to ensure that bills remain affordable for households in the years ahead.

57 South West Water, South West Water continues support for customers through cost-of-living crisis, 2 February 2023, <https://www.southwestwater.co.uk/about-us/latest-news/2023-news/south-west-water-continues-support-for-customers-through-cost-of-living-crisis/>

58 Independent Water Networks, Your residential charges explained, <https://www.iwnl.co.uk/your-residential-charges/>

59 Based on average water bill cost of £448 from Water UK and total number of households in England and Wales (24.8m)

60 Water UK, Water resources long term planning framework (2015-2065), July 2016, https://www.water.org.uk/sites/default/files/wp/2018/11/WaterUK-WRLTPF_Final-Report_FINAL-PUBLISHED-min.pdf

61 Water UK, Brits urged to be 'water savvy' as small changes could help save almost £500 a year on bills, 16 November 2022, <https://www.water.org.uk/news-views-publications/news/brits-urged-be-water-savvy-small-changes-could-help-save-almost-ps500>

SECTION 3

THE BARRIERS

To deliver on the UK's ambitions for demand reduction, we need to understand the determinants of water demand and how to affect them. Beyond factors like population and the climate, demand for freshwater in the UK is determined by three key variables: (1) the water efficiency of homes and other buildings; (2) people's efforts to cut water usage; and (3) the ability to use other sources of water. Each of these variables presents barriers in terms of demand reduction. In addition, the governance of the water sector presents its own cross-issue barriers.

This section outlines these various barriers.

3.1 WATER INEFFICIENT BUILDING

Water-inefficient appliances are abundant in UK homes and other buildings, while leaking appliances are too common and can cause enormous wastage. To tackle this, consumers could pay for new and more efficient appliances, water companies and the government could sponsor retrofitting, better training could enable better installation, and new builds could be built with more water efficient appliances. All of these, however, face barriers.

Inefficient appliances

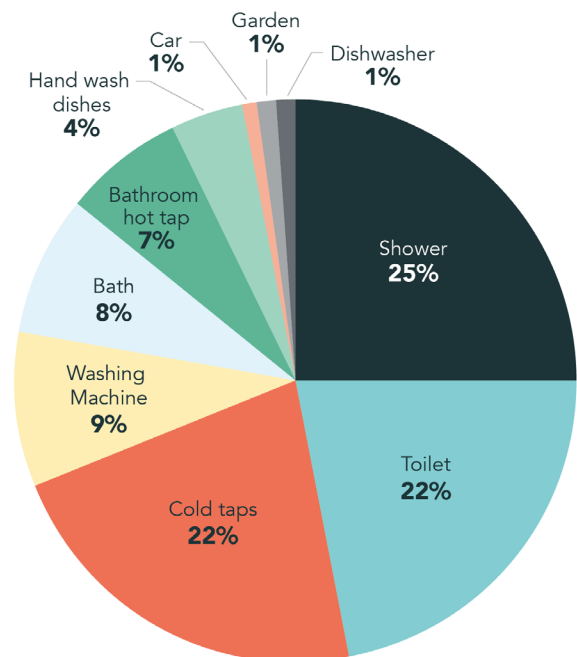
The main uses of water in households are personal washing (primarily showering), toilets, clothes washing machine, washing dishes (either by hand or machine) and external uses such as for a garden or cars. Other internal uses include drinking water, water for radiators and watering house plants.

All of these uses involve appliances which control

water flow, from taps and shower heads, to toilets, washing machines and dishwashers. Taps and showers are designed to have a specific flow rate, while toilets, washing machines and dishwashers are designed to use specific amounts of water. Both the flow rates and the desired amounts of water can be reduced.

Most household water is used in the bathroom

Proportion of household water use, by appliance

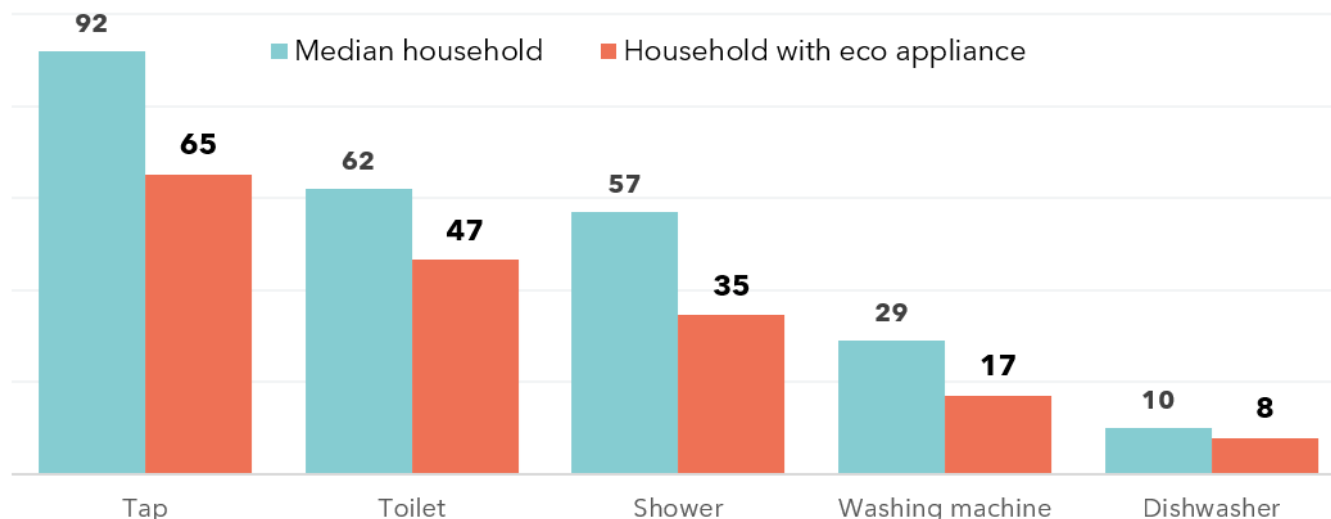


Source: Artesia Consulting, *The long term potential for deep reductions in household water demand*, 26 April 2018, <https://www.ofwat.gov.uk/wp-content/uploads/2018/05/The-long-term-potential-for-deep-reductions-in-household-water-demand-report-by-Artesia-Consulting.pdf>

There are a range of technologies that offer reduced water usage for these appliances. If a typical household used a water-efficient model for the five appliances which use most water, they could cut their daily usage by a third.

Eco appliances could enable the average household to use to cut their daily water usage by a third

Household daily water usage (litres), by appliance, with estimates for eco appliances



Source: Demos analysis based on price rates for each water company from Independent Water Networks, *Your residential charges explained*, <https://www.iwnl.co.uk/your-residential-charges/>

This potential has been borne out at scale. A programme by a water company in South East England, for example, provided up to £110 worth of water-saving products alongside advice on how to save water, and this reduced long-term per capita consumption by 15%.⁶² Another example comes from the US, where interventions to partially fund or exchange showerheads, toilets and clothes washers were found to deliver savings between 11% and 15%.⁶³

There is also a distinct problem with dual flush toilets. SES Water found that just over a quarter of their customers (28%) reported knowing which button on their toilet was for reduced flush.⁶⁴

They estimate the failure to use the reduced flush could be wasting over 200 million litres per day in the UK. While part of this is a problem of public awareness (which we discuss later), part is the design of the toilets. Even when people are trying to identify the half flush, many get it wrong. A survey by Affinity Water found that nearly a quarter (23%) of its customers failed to correctly identify the half flush button on five different toilet systems.⁶⁵ Many dual flush toilet designs are therefore not clear enough for consumers.

⁶² Manouseli D, Kayaga S and Kalawsky R, Evaluating the Effectiveness of Residential Water Efficiency Initiatives in England: Influencing Factors and Policy Implications, *Water Resources Management*, April 2019, <https://link.springer.com/article/10.1007/s11269-018-2176-1>

⁶³ Lee M, Tansil B and Balbin M, Influence of residential water use efficiency measures on household water demand: A four year longitudinal study, *Resources, Conservation and Recycling*, November 2011, <https://www.sciencedirect.com/science/article/abs/pii/S0921344911001674>

⁶⁴ Waterwise, 'Why plumbers should be key partners in raising awareness of dual flush buttons', no date, <https://www.waterwise.org.uk/2022/11/16/why-plumbers-should-be-key-partners-in-raising-awareness-of-dualflush-buttons/>

⁶⁵ Affinity Water, Brits admit they don't know how to flush a toilet, August 2021, <https://www.affinitywater.co.uk/news/flush-a-toilet>

Faulty appliances

Appliances that use water in households can be faulty and leak. Most important is leaking toilets.⁶⁶ A leaking toilet wastes, on average, 215 litres of clean drinking water every day.⁶⁷ That's like having an extra person and a half living in the home. It is estimated that between 5% and 8% of toilets are leaking, but most households with a leaky toilet are unaware of the problem.⁶⁸ Across the UK, this means around 400 million litres of water leaks from UK toilets every day - enough for all the needs of 2.8 million people, or about 12% of the added capacity needed by 2050.⁶⁹

Toilet leakages generally result from a fault in the mechanical flush valve. 81% of leaking toilets have a flush valve mechanism (compared to just 58% of non-leaking toilets). Such valves have been allowed in the UK since regulatory change in 1999 - and toilet leakages in new builds have increased since then. Those regulations also allowed for the reintroduction of dual flush mechanisms, which themselves are more likely to lead to leakages. In fact, Thames Water suggests dual flush toilets waste more water than they save.⁷⁰

These faults are also easy to fix - as around 70% of them can be fixed by the plumber on the first visit.⁷¹ They can, however, take a long time to identify. An analysis by Waterwise of 15 leaky toilets found (using data from smart metres to estimate leakage start-date) that they took on average 106 days to repair.⁷² Identification mainly relies on customers or water companies spotting them either based on unusually high water usage, or if a smart metre is installed, based on water usage at unusual times (e.g. excessive water usage throughout the night). However, surveys suggest 55% of Brits don't know how to check their toilets or tanks for leaks.⁷³

A smaller problem is around dripping taps. While the amount of wastage will vary significantly between taps, Watersafe UK estimates that a dripping taps

can waste up to 5,500 litres of water per year.⁷⁴ Repairing these often relies on customers taking action, but surveys suggest that people in the UK leave a leaky tap for 25 days before attending to it on average.⁷⁵

After leaks are identified, fixing them can still take some time. This is partly a result of high cost (a third of people with a leak reported that they delayed fixing it due to repair costs), partly of low concern (a third say they had more critical repair jobs to address) and partly knowledge (just over a quarter said they didn't know a reliable plumber to ask for help).⁷⁶

Expense of retrofitting

About 80% of 2050's homes have already been built.⁷⁷ Ensuring these homes and buildings are water efficient is key to reducing demand - and this requires widespread retrofitting (replacing and fixing appliances in already existing homes). The key barrier to this is cost. Despite potential bill savings (for example, in lower energy costs), consumers are not often willing to pay for water efficient appliances. The current cost of living pressures only make this worse.

We've seen a significant increase among our customers in knowledge about water efficient appliances, but a reduction in people who would be willing to pay for these from 36% to 28%. Energy efficiency and carbon takes more of a priority.
- Expert in our policymaker workshop.

Part of this is a problem with upfront cost. The costs of some individual fittings are not huge (for example, water efficient showerheads often cost in the range of £10 to £85), but these can add up across a household.⁷⁸ Yet, larger adjustments, like installing a new water-efficient toilet, can cost hundreds of

66 Ricardo Energy and Environment, Leaky Loos Phase II, November 2015, https://www.waterwise.org.uk/wp-content/uploads/2018/08/Leaky-Loos-Phase-II_Final-report.pdf

67 Ibid.

68 Ibid.

69 Ibid.

70 Rawlinson K, 'Dual-flush toilets 'wasting more water than they save'', The Guardian, 29 September 2010, <https://www.theguardian.com/environment/2020/sep/29/dual-flush-toilets-wasting-more-water-than-they-save>

71 Waterwise, Leaky Loos - Summary Position Statement, March 2019, <https://www.waterwise.org.uk/wp-content/uploads/2019/03/Leaky-Loo-Position-Statement.pdf>

72 Ricardo Energy and Environment, Leaky Loos Phase II, November 2015, https://www.waterwise.org.uk/wp-content/uploads/2018/08/Leaky-Loos-Phase-II_Final-report.pdf

73 Affinity Water, Money down the drain: Every Litre Lost Matters, October 2023, <https://www.affinitywater.co.uk/news/sos-home-leaks>

74 WaterSafe, Plumbers Shine the Spotlight on Dripping Taps During Water Saving Week, no date, https://www.watersafe.org.uk/news/latest_news/dripping-taps-water-saving-week/

75 Direct Line, Leaky Britain: 460 million litres of water wasted each year, no date, <https://www.directline.com/media/archive-2018/leaky-britain>

76 Affinity Water, Money down the drain: Every Litre Lost Matters, October 2023, <https://www.affinitywater.co.uk/news/sos-home-leaks>

77 Sarshar M, 'UK needs to retrofit 26 million homes by 2050 to reduce greenhouse gas emissions', Politics Home, 26 October 2018, <https://www.politicshome.com/members/article/uk-needs-to-retrofit-26-million-homes-by-2050-to-reduce-greenhouse-gas-emissions>

78 Channa H, Eco shower heads: everything you need to know, Which, 17 February 2023, <https://www.which.co.uk/reviews/electric-showers/article/eco-shower-heads-buying-guide-aklCM9Y5kuG5>

pounds in terms of the product and installation.⁷⁹ There is little will to pay for this. For example, a survey of Welsh adults found that just over a fifth (22%) said they would be willing to pay more for more water efficient products.⁸⁰

What is key, however, is that this could reduce future increases in bills for households if water demand increases unchecked. Reducing water demand could also create savings in bills in other areas, for example, in energy. As noted by Water UK every pound saved on water in the shower, a household saves £1.65 on energy.⁸¹

Comparing these savings to the costs of installing these new appliances, a study of a water efficiency £2,500 retrofit programme in a hotel in 2014 found that savings on bill increases would exceed the costs in just 1.25 years.⁸² Older research (from 2006) finds slightly longer payback times of, for example, 1.6 years for a dual flush retrofit device or 3.7 years for low use taps.⁸³

Research has also found that households with lower income and social status (as measured by the ACORN classification) are more receptive to water efficiency measures.⁸⁴ In a water efficiency programme in South East England, the two highest income, highest status groups reduced their consumption by 12%, but the lowest income, lowest status groups reduced consumption by 20%.

Difficulties retrofitting

Beyond cost, several other issues hinder retrofitting.

Firstly, there is a lack of readily available information on appliance water efficiency. This means households are rarely pushed to consider water efficiency when considering home improvements.

Even those who are considering it would find it time-consuming to compare different appliances and choose the most water efficient one. To address this problem, the government is planning on introducing mandatory water-efficiency labelling for appliances by 2025.⁸⁵ This has been done in Australia before, and delivered significant water reduction.⁸⁶ Defra's consultation estimated that this system could reduce consumption by 6.3 litres per person per day in 10 years and up to 31.4 litres after 25 years.⁸⁷

Secondly, retrofitting takes time, effort, and requires adjustments within the home or building. A review by the Department of Environment, Food, and Rural Affairs (Defra) of retrofitting policies highlights examples of this.⁸⁸ They note, for example, how the perceived inconvenience of retrofitting low flow showerheads has hindered uptake, and that people express worry about adapting to new technology. Others are concerned about potentially unaesthetic new appliances in their house. Defra suggests that people are more likely to engage when they are intending to refurbish their homes, have a meter installed for the first time or if there are other retrofits occurring such as energy-efficient devices.⁸⁹

Thirdly, there is low trust in water companies, and evidence suggests this makes customers less likely to cooperate with their water saving initiatives.⁹⁰ Recent surveys suggest levels of mistrust have increased recently, with customers almost twice as likely to say their water company puts the interests of shareholders or owners first (47%) rather than those of customers (25%) or the environment (27%).⁹¹ Recent controversies around leakage and spillage have certainly contributed to that.

Lastly, some water efficient appliances may be less desirable for customers. People have increasingly demanded showers or taps with high flow-rates,

79 CheckATrade, Toilet installation cost guide, October 2023, <https://www.checkatrade.com/blog/cost-guides/toilet-installation-cost/>

80 Malet-Lambert I, Public Attitudes to Water Efficiency in Wales, Government of Wales, August 2020, <https://www.gov.wales/sites/default/files/statistics-and-research/2020-08/public-attitudes-to-water-efficiency-in-wales.pdf>

81 Water UK, Brits urged to be 'water savvy' as small changes could help save almost £500 a year on bills, 16 November 2022, <https://www.water.org.uk/news-views-publications/news/brits-urged-be-water-savvy-small-changes-could-help-save-almost-ps500>

82 Barnard et al, Retrofitting for water efficiency: hotel case study, Water Efficiency Conference 2014, January 2014, <https://core.ac.uk/download/188253698.pdf>

83 Grant J, Greening the Housing Stock, no date, https://www.researchgate.net/figure/Cost-and-Benefits-of-Retrofit-Water-Efficiency-Measures_tbl4_238101509

84 Manousseli D, Kayaga S and Kalawsky R, Evaluating the Effectiveness of Residential Water Efficiency Initiatives in England: Influencing Factors and Policy Implications, Water Resources Management, April 2019, <https://link.springer.com/article/10.1007/s11269-018-2176-1>

85 Department for Environment, Food and Rural Affairs, Plan for Water: our integrated plan for delivering clean and plentiful water, 4 April 2023, <https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water>

86 Plibersek T, Water Efficiency Labelling and Standards scheme saves consumers \$1.5 billion in utility bills this year, 26 September 2022, <https://minister.dcceew.gov.au/plibersek/media-releases/water-efficiency-labelling-and-standards-scheme-saves-consumers-1-5-billion-utility-bills-year>

87 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

88 Department for Environment, Food and Rural Affairs, Water Retrofit Policies Review – The Household Perspective, May 2010, https://assets.publishing.service.gov.uk/media/60311e78e90e07660cc4388b/11544_WaterRetrofit_TechnicalReport.pdf

89 Ibid.

90 Ibid.

91 Hayter L, 'Staying afloat: public trust in water providers declines over 2022', Savanta, 28 February 2023, <https://savanta.com/knowledge-centre/view/staying-afloat-public-trust-in-water-providers-declines-over-2022/>

which are seen to offer a better experience.⁹² Persuading people to accept lower flow rates could be a hard task.

Barriers to more water efficient new builds

While future developments will make up a relatively small minority of the homes in 2050 (around 20%), they are much easier to make more water efficient. This is because there are already decisions being made about which appliances to use in a home or other building. If developers have more ambitious targets for water efficiency, they will install appliances that result in lower water demand.

One problem is that developers face little market pressure from consumers to improve water efficiency. This was confirmed by policy experts in our workshops.

For buyers of new builds, we'll tell people about water recycling in the environment, but water efficiency is seen as much less important than energy efficiency, both due to green reasons and the money - there's much bigger financial benefits from energy.

- Housebuilder in our workshops.

Instead, pressure comes primarily from government regulation. The government currently requires any new building development to be designed to deliver 125 litres per person per day on average. Some planning restrictions also require designs delivering less consumption.

Water efficiency targets could be more ambitious. Many developers are already going beyond current targets in order to be seen as water-efficient.

We went for a 110 minimum target, and we've achieved this for a number of years... This is driven both by a need to get compliance with regulations...but also we want to be seen as water efficient.

- Housing developer in our workshop.

There are other problems with the government targets. In particular, the propensity of different items to leak is not accounted for in the calculation of a house's projected water consumption.⁹³ So although dual flush toilets may lead to more water usage than single flush toilets - given their tendency to leak more often - they are counted as leading to less

water usage.

There is also little financial incentive from the government. Housing developers can benefit from a rebate if they design the house to a specification which would deliver under 100 litres per person per day. Yet, many are held back by the costs of water-efficient goods, and determine that achieving the rebate is not worth it financially.

If we got under 100l/p/d, we would get a few hundred pounds per house in rebate, but this often doesn't offer enough incentive. Either the rebate needs to be increased, or the goods needs to be cheaper to get to 100l/p/d.

- Housing developer in our workshop.

Gaps in plumbing skills

As explained earlier, leakage adds significantly to high levels of demand. Poor installation is a key driver of this - as it can mean fittings aren't robust or damage is caused during the installation.⁹⁴

The insurance sector pays out £2 million a day in 'escape of water' insurance claims. But further recognition of the lack of competency is needed. Over 95% of insurance claims are down to poor workmanship. If it's not installed properly, it won't work.

- Policy expert in our workshop.

Driving this are gaps in plumbing skills. Firstly, there is a risk of low availability of skills. Many plumbers are trained on apprenticeships, but one policy expert told us there's been a 25% drop in plumbing apprentices in the last 12 months. If there is low availability of trained plumbers, customers may have to find plumbers without sufficient training.

There is also no mandated training for plumbers in the UK. This is in contrast to Germany and Australia, for example, which both require training for several years for people to work as a plumber.⁹⁵ Such mandated training ensures that plumbing work is undertaken by someone with a minimum level of experience, reducing risk of poor installation. Germany's track record on leakage - losing just 6% of all water supply to leakage compared to the UK's 23% - is a testament to this.⁹⁶ While some of the UK's high leakage rate results from the supply network rather than households, around 30% of

92 Critchley R and Phipps C, Water and Energy Efficient Showers: Project Report, May 2007, https://www.waterwise.org.uk/wp-content/uploads/2018/02/United-Utilities_Water-and-Energy-Efficient-Showers_Project-Report.pdf

93 Water Resources Centre, Water Efficiency Calculator for new dwellings, no date, <https://wrcpartcalculator.co.uk/Calculator.aspx>

94 'Research into water leak insurance claims', Pham News, no date, <https://www.phamnews.co.uk/research-into-water-leak-insurance-claims/>

95 Sender W, Becoming a plumber in Germany: Great prospects for non-Germans ahead!, January 2022, <https://jobs26.com/becoming-a-plumber-in-germany-great-prospects-for-foreigners/>

96 EurEau, Europe's Water in Figures An overview of the European drinking water and waste water sectors, 14 July 2021, <https://www.eureau.org/resources/publications/eureau-publications/5824-europe-s-water-in-figures-2021/file>

leakage comes from homes.⁹⁷ This still means the leakage rate just from homes in the UK (around 8% of all water withdrawn) is proportionally larger than all leakage in Germany (from both homes and the wider system). Better training could help address this. It could also be particularly important if the water regulations change, meaning skills need to be updated.

Other countries, such as South Africa and Hong Kong, go beyond this and require a plumbing licence (a certificate issued by a government-recognised body) if a person wants to do plumbing work. This ensures a high level of quality assurance and standardisation across plumbing work. While there are certain 'approved contractor schemes' in the UK, whereby plumbers have been tested against certain criteria, we do not have such a licensing scheme.⁹⁸

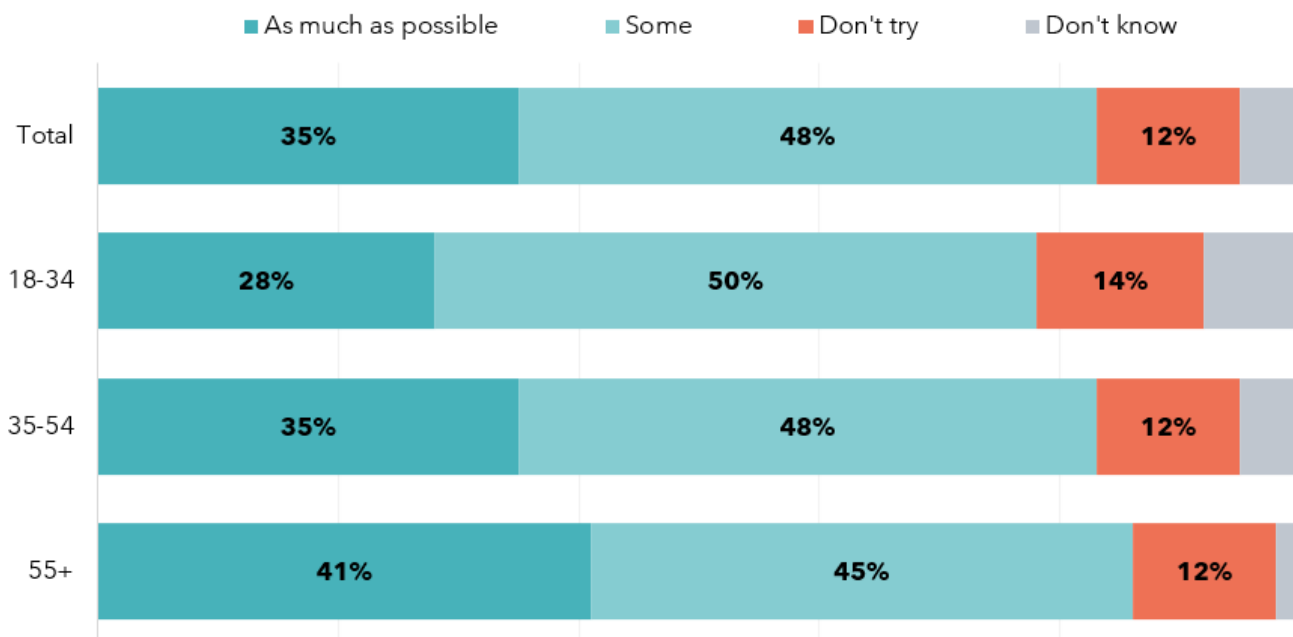
3.2 INSUFFICIENT EFFORTS TO CUT WATER

Low concern

Much of the public aren't fully engaged in trying to save water. Just over a third say they try to save as much as possible, while just under a half say they try to save some. Worryingly, younger people (aged 18-34) are a third less likely than older people (aged 55+) to say they try and save as much as possible.

Just over a third of people try to save as much water as possible

How much water do you try to save? By age



97 United Utilities, Household Leaks, no date, <https://www.unitedutilities.com/household-leaks>

98 WaterRegsUK, Welcome to WIAPS, no date, <https://www.waterregsuk.co.uk/wiaps/>

This low concern manifests in various practices that lead to excessive water usage - and people's practices often reflect less concern than what people report themselves. Demos's polling found that, for only three water saving measures (turning off the tap when brushing, waiting until you have a full load to use the washing machine or dishwasher and taking showers instead of baths), a majority of households either practised them or expected to in the future.⁹⁹ Other critical water efficiency measures such as installing smart water meters, buying more efficient household appliances and collecting rainwater had low levels of deployment amongst households.

Leaving the tap on while brushing teeth is a commonly cited example. Other surveys results differ, with some finding that 54% of people leave the tap on while brushing teeth and others that 10% always do and 28% sometimes do.^{100,101} If following the guidance to brush teeth twice a day for two minutes, people leaving the tap on could waste 24 litres of water per day (17% of average daily use). In reality, people brush their teeth for on average 45-70 seconds a day and the median tap flows at 3.2 litres per minute.¹⁰² Keeping the tap on therefore represents a water wastage of between 2.1 and 3.7 litres per day.

Showering too long is another common issue. People shower for about eight minutes on average - double the recommended time of four minutes, supported by multiple organisations.^{103,104,105} With a median flow rate of 7 litres per minute in the shower, this means excessive use of 28 litres per shower on average.¹⁰⁶

Low engagement with dual flush mechanisms also reflects low concern. As noted earlier, only 28% of people are aware of which flush on their toilet is dual flush.¹⁰⁷ While part of this is a problem of the design of the flush, part is also a problem of low engagement. When people are presented with flush designs and asked to actively determine which one is

the reduced flush, people only identify it incorrectly 23% of the time.¹⁰⁸ If they were more engaged, most people should therefore know which button on their toilet is the reduced flush.

It is possible to increase concern. For example, research on water efficiency interventions in South East England - which included information provided by plumbers - found that they led to a 20% decrease in consumption for one-person households, but just an 11% decrease for households of three or more.¹⁰⁹ The researchers suggest that this gap can be explained by closer engagement with the plumber in one-person households, strengthening the message.

Poor knowledge of water use

The public vastly underestimate how much water they use. When asked to estimate how much water their household uses, the median estimate is just 24 litres. In fact, the median household uses around 15 times more than this (349 litres). This means people are less alerted to the problem of excessive water usage and so less incentivised to respond.

People don't even have a metric to judge how much water they use given how much people underestimate their usage.
- Housebuilder in our workshop.

99 Demos, Addressing the UK's Water Dilemma, September 2023, https://demos.co.uk/wp-content/uploads/2023/10/Below-the-surface_Final-1.pdf

100 Water Magazine, Seven regions in England will face severe water stress by 2030 as Brits significantly underestimate their daily water usage, June 2023, <https://www.watermagazine.co.uk/2023/06/07/seven-regions-in-england-will-face-severe-water-stress-by-2030-as-brits-significantly-underestimate-their-daily-water-usage>

101 Water UK, Vast majority of Brits have no idea how much water they use each day, August 2020, <https://www.water.org.uk/news-views-publications/news/vast-majority-brits-have-no-idea-how-much-water-they-use-each-day>

102 The Dental Surgery, 10 Mistakes You Make While Cleaning Your Teeth, <https://www.thedentalsurgery.co.uk/mistakes-you-make-cleaning-your-teeth/>

103 Anglian Water, Lengthy showers are costing households in the East of England over £260 million a year, January 2023, <https://www.anglianwater.co.uk/news/lengthy-showers-are-costing-households-in-the-east-of-england-over-260-million-a-year/>

104 Smart Meters, Shortening showers to 4 minutes could save you £65 a year, no date, <https://www.smartenergygb.org/smart-living/smart-energy-tips/4-minute-showers>

105 Energy Saving Trust, Water saving products to help you cut water use at home, January 2021 <https://energysavingtrust.org.uk/top-seven-water-saving-products-to-help-you-cut-water-use/>

106 Energy Saving Trust, At home with water 2, February 2018, <https://energysavingtrust.org.uk/sites/default/files/reports/AHHW2%20final.pdf>

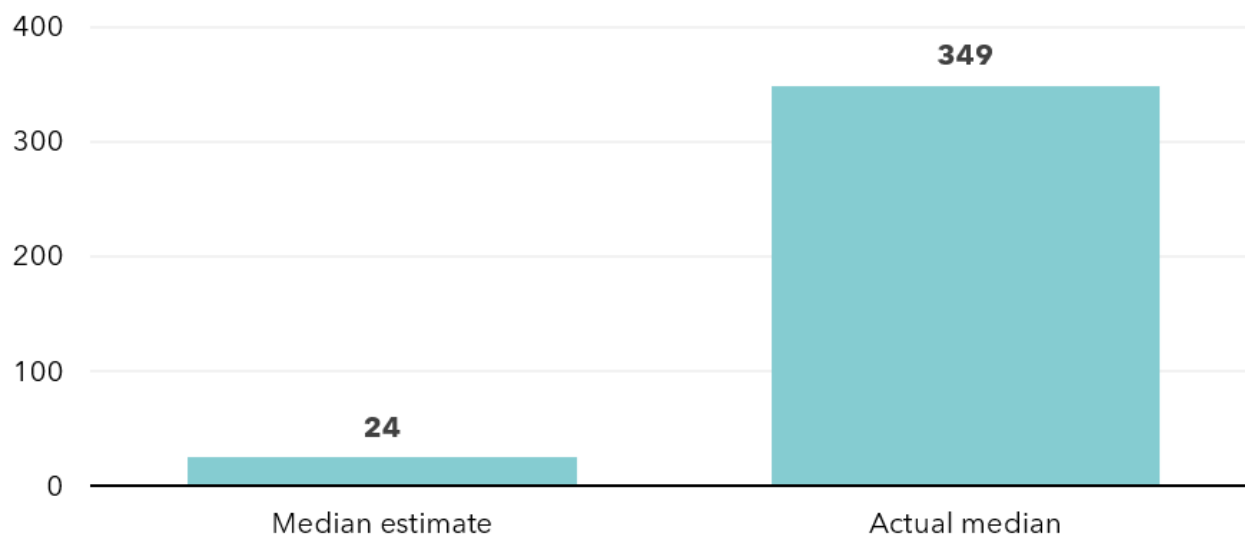
107 Waterwise, 'Why plumbers should be key partners in raising awareness of dual flush buttons', no date, <https://www.waterwise.org.uk/2022/11/16/why-plumbers-should-be-key-partners-in-raising-awareness-of-dual-brush-buttons/>

108 Affinity Water, Brits admit they don't know how to flush a toilet, August 2021, <https://www.affinitywater.co.uk/news/flush-a-toilet>

109 Manouseli D, Kayaga S and Kalawsky R, Evaluating the Effectiveness of Residential Water Efficiency Initiatives in England: Influencing Factors and Policy Implications, Water Resources Management, April 2019, <https://link.springer.com/article/10.1007/s11269-018-2176-1>

People typically think their household uses 24 litres of water per day, but actually households typically use 349

Daily usage of water per household (litres)



Source: <https://savanta.com/eu/knowledge-centre/poll/water-uk-public-polling-august-2020/>

Notes: the median response was that households use 20-39 litres of water, but assuming a linear spread of responses within this bracket, the median response would be 24 litres.

Part of the problem is low concern - as noted earlier - but part is also lack of ability to find that information. Smart metering could help that, as discussed in the next section.

and above that it's £4 per thousand litres.¹¹³ The results of this are not yet available - but success will likely depend on how well the blocked tariff is communicated to people.

Low market incentive for households

Water is relatively cheap, with annual bills ranging from around £372 to £504 in 2023, depending on the company.¹¹⁰ That's between 1.2% and 1.6% of median household income after tax. (£32,300).¹¹¹ In contrast, the median energy bill will be around 6.4% of household income.¹¹² This means there is little market incentive for households to reduce water consumption, particularly compared with other utilities.

Essential to providing a market incentive to cut water usage is water meters. Water meters measure the volume of water a household uses, and allow bills to reflect that. Without a water meter, households are charged based on their 'rateable value' - an estimate, last made in 1990, of the annual rental value of every home.¹¹⁴ Homes with higher rental values pay more for their water supply - but there is no relationship between the charges and the volume of water used. This may seem strange, but it in fact applies to 40% of households.¹¹⁵

Some companies are trying to shift these incentives. Affinity Water, for example, is trialling a 'rising block tariff', whereby the first 30,000 litres of water used each year is free, then for the next 245,000 litres used, it's £1.51 per thousand litres,

For those households without a meter, there is no financial incentive to cut usage. Accordingly, when more households have metres, consumption tends to be lower. As the below chart shows, when 30%

110 Lekarsi P, Water bills to rise by £31/year in England and Wales – but there are still ways you can cut costs, February 2023, <https://www.moneysavingexpert.com/news/2023/january/water-bills-rise-2023-save/>

111 ONS, Average household income, UK: financial year ending 2022, January 2023, <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/householddisposableincomeandinequality/financialyearending2022>

112 Bulbul N, 'What is the UK average gas and electric bill in 2023?', The Standard, July 2023, <https://www.standard.co.uk/news/uk/uk-average-gas-electric-energy-bill-cost-2023-b1092587.html>

113 Affinity Water, Everything you need to know about our WaterSave tariff trial, no date, <https://www.affinitywater.co.uk/billing/watersavetariff>

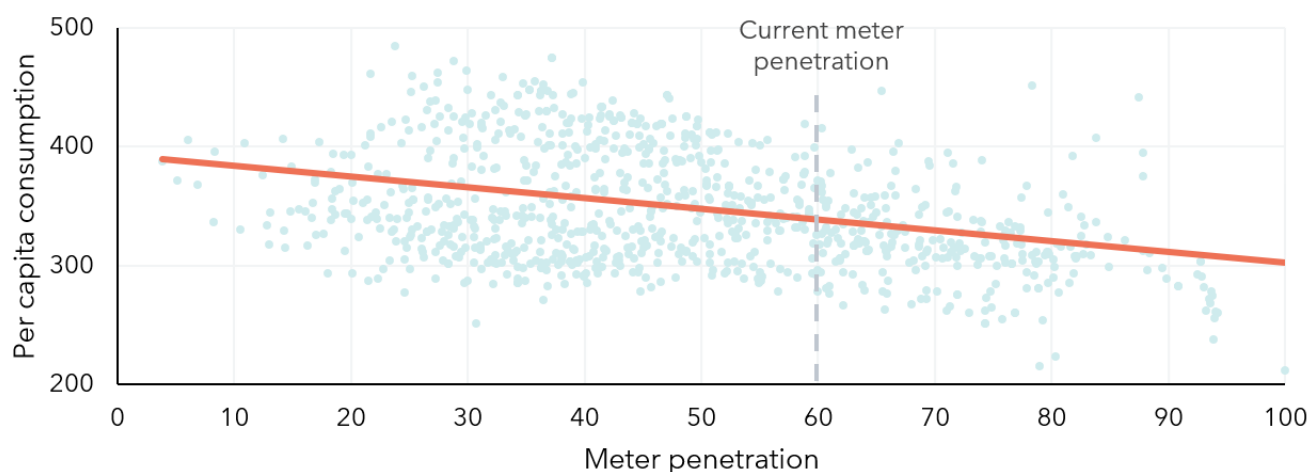
114 Ofwat, Unmetered customers, no date, <https://www.ofwat.gov.uk/households/your-water-bill/unmetered/>

115 Environment Agency, Appendix A: Smart metering in draft water resources management plans, January 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/appendix-a-smart-metering-in-draft-water-resources-management-plans>

of households had meters in a particular region between 1996 and 2016, they tended to have per household consumption of around 365 litres per day. For regions with the current national average of 60% penetration, they tend to have per household consumption of around 340 litres per day. The government expects this to increase to around 90% by 2050.¹¹⁶

The more households have water meters, the lower their average water consumptions

Average household water consumption (litres per day) and the proportion of household with meters, for water companies in England 1996-2016



More advanced, however, are smart meters. These are digital trackers of water use - meaning they track water usage at very regular intervals (around 15 minutes each), rather than just when the water meter is manually read. Some also allow consumers to track their water consumption through an online portal. This encourages consumers to reduce their usage and enables much quicker identification of leaks - reducing water pressure on society - while allowing consumers to have more accurate bills and reducing the cost of water meter readings for companies.¹¹⁷ The National Infrastructure Commission estimates that standard meters could reduce average consumption by 15%, with smart meters increasing this to 17%.¹¹⁸

Only around 14% of households have smart meters.¹¹⁹ Most companies are planning a rollout of smart meters which should mean 40% of households have smart meters by 2030, 63% by 2040 and 65% by 2050.¹²⁰ But this could be sped up. Frontier Economics, a consultancy, estimates that getting 80% of households to have smart meters by 2030 would require £2.5 billion investment.¹²¹ Yet, this alone would deliver savings for water companies of £3.3 billion. On top of that, it would deliver wider societal benefits - by reducing household bills and emissions - of at least £1.1 billion. The economic case, and wider societal and environmental case, is therefore clear.

116 Environment Agency, Appendix A: Smart metering in draft water resources management plans, January 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/appendix-a-smart-metering-in-draft-water-resources-management-plans>

117 Frontier Economics and Artesia Consulting, Cost benefit analysis of water smart metering, November 2021, <https://www.frontier-economics.com/media/we4lon3z/arfiva-cost-benefit-analysis-a4-full-report.pdf>

118 National Infrastructure Commission, Preparing for a drier future: England's water infrastructure needs, April 2018, <https://nic.org.uk/app/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf>

119 Environment Agency, Appendix A: Smart metering in draft water resources management plans, January 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/appendix-a-smart-metering-in-draft-water-resources-management-plans>

120 Environment Agency, Appendix A: Smart metering in draft water resources management plans, January 2023, <https://www.gov.uk/government/publications/a-review-of-englands-draft-regional-and-water-resources-management-plans/appendix-a-smart-metering-in-draft-water-resources-management-plans>

121 Frontier Economics and Artesia Consulting, Cost benefit analysis of water smart metering, November 2021, <https://www.frontier-economics.com/media/we4lon3z/arfiva-cost-benefit-analysis-a4-full-report.pdf>

Water companies can mandate the installation of a water meter - including a smart meter - and charge a house based on meter readings if it fits certain criteria. This includes homes in areas facing serious water stress (as determined by the Environment Agency, giving seven water companies the power to install in any house) or meeting other relatively broad criteria (e.g. has a power shower, or has a large bath).¹²² However, if a water company wants to mandate installation based on these broader criteria, it must inspect the home's appliances first. This makes the process more burdensome, and so it rarely happens in practice.

Unresponsiveness to efficiency measures

While the government and businesses can encourage take-up of water-efficient appliances, in the end it is households that determine how much water is used within them. This creates additional barriers. For example, if people know their appliances are water efficient, they sometimes use their water-dispensing appliances more freely than they otherwise would. This is called 'offsetting behaviour', and has been recorded in studies of people's water use.¹²³ Studies do find, however, that communicating about the water efficiency appliances can help mitigate this behaviour.¹²⁴

People may also remove efficiency appliances. A housing developer in our workshop told us that people often remove flow regulators (fittings which reduce water pressure) from appliances. This problem can be avoided if regulators are installed within the plumbing system, rather than on the appliance themselves. The regulators are then harder to avoid, but this comes at the expense of higher costs and the burden of installation.

Flow regulators can keep consumption under

100 litres, but people can take those out easily.
- Housebuilder in our workshop

Other appliances that encourage people to reduce use may also become less effective in the long-term. For example, shower monitors (which show people their water usage and beep after a certain amount of time) have been found to initially reduce shower duration by almost 30%, but that effect disappears after four months.¹²⁵

Barriers to outreach by water companies

The UK government does not currently have a programme on public communications around water efficiency. It has instead relied on water companies to inform and engage customers.¹²⁶ Water companies have a statutory responsibility to do this, and a study of ten water companies found that all were engaging in regular communications about water savings.¹²⁷ Water UK has been running a public awareness campaign on this for three years, called Water's Worth Saving, while individual companies are also running their own campaigns on the issue.^{128,129}

Yet, the National Audit Office (NAO) finds that there is no evidence that public communication efforts have had an impact on consumer behaviour at scale.¹³⁰ Part of the problem is lack of trust. As noted earlier, trust in water companies is low and has been declining. The research on ten water companies found that the companies felt they were not a trusted messenger for the issue of water saving.¹³¹ Some companies felt that they had to work with charities and NGOs to deliver those messages. Several felt that the government should also do more to promote water-saving behaviours. Four of the interviewed companies explained they were testing community-scale communication approaches to reduce consumption, with some success.¹³²

122 Lawson A, 'Thames Water has failed to install any smart meters yet in £70m green scheme', The Guardian, July 2023, <https://www.theguardian.com/business/2023/jul/25/thames-water-smart-meters-green-scheme>

123 Campbell H, Johnson R, Larson E., Prices, Devices, People, or Rules: The Relative Effectiveness of Policy Instruments in Water Conservation 1, Review of Policy Research, Policy Studies Organization, September 2004, <https://ideas.repec.org/a/bla/revpol/v21y2004i5p637-662.html>

124 Campbell H, Johnson R, Larson E., Prices, Devices, People, or Rules: The Relative Effectiveness of Policy Instruments in Water Conservation 1, Review of Policy Research, Policy Studies Organization, September 2004, <https://ideas.repec.org/a/bla/revpol/v21y2004i5p637-662.html>

125 Sewart R et al, Showering behavioural response to alarming visual display monitors: longitudinal mixed method study, Behaviour & Information Technology, May 2011, <https://www.tandfonline.com/doi/full/10.1080/0144929X.2011.577195>

126 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

127 Larbey R and Weitkamp E, Water Scarcity Communication in the UK: Learning From Water Company Communications Following the 2018 Heatwave, Front. Environ. Sci., 16 September 2020 <https://www.frontiersin.org/articles/10.3389/fenvs.2020.578423/full>

128 Affinity Water, Affinity Water launches 2022 Save Our Streams campaign to help customers save water, save money, and save our streams, October 2022, <https://www.affinitywater.co.uk/news/save-our-streams-2022>

129 Water UK, Public encouraged to save water as hot weather sees increases in demand, July 2022, <https://www.water.org.uk/news-views-publications/news/public-encouraged-save-water-hot-weather-sees-increases-demand>

130 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

131 Larbey R and Weitkamp E, Water Scarcity Communication in the UK: Learning From Water Company Communications Following the 2018 Heatwave, Front. Environ. Sci., 16 September 2020 <https://www.frontiersin.org/articles/10.3389/fenvs.2020.578423/full>

132 Ibid.

Part of the problem may also be expenditure, as water companies in the UK spend less on customer communication about water efficiency than many of our peer countries. In the UK, companies use less than 0.2% of their total expenditure on water efficiency communications, compared to 1% in the US and 6% in Australia.¹³³

Low engagement in the business water market

Unlike households, since 2017, some businesses can choose their water supplier. Ofwat expected this system to deliver 2% water efficiency savings over five years because water retailers could then more easily give customers support on water efficiency.¹³⁴ However, according to the NAO in 2020, Ofwat did not know if any savings had been realised.

The new approach may be held back by low awareness of the new system.¹³⁵ In 2019, almost half of the organisations who were eligible for joining the market were unaware of it.¹³⁶ Only 4% actually switched or renegotiated a deal during 2018-19, and only 3% did the year prior. Even those who did engage in the market rarely engaged in reforms around water efficiency.¹³⁷ Only 0.3% of those who switched and 4% of those who renegotiated received support on water efficiency or leakage control as part of their package.¹³⁸

3.3 LIMITED ACCESS TO OTHER WATER SOURCES

Rainwater

Capturing rainwater, and diverting this to uses in the house like toilet flushes, could greatly reduce demand pressures on our water system. By some estimates, rainwater could cover around 40-50% of household consumption.¹³⁹ However, this is not

particularly common in the UK.¹⁴⁰

A key barrier to these systems in existing homes and buildings is cost. The capital cost of installing a rainwater harvesting mechanisms is very high, with a 1,500 litre tank and rain capture system costing around £2,500.¹⁴¹ Given estimated annual savings of around £54 per year, it would take 46 years to make a return on the investment. Most households have little incentive to make such a long-term investment. The cost of repair also adds on top of this.

Rainwater harvesting, unless you're really keen into water efficiency, eventually the pumps will fail and you'll have to cover the costs. This could be several hundreds of pounds, despite only having saved tens of pounds.
- Housebuilder in our workshop

Smaller rainwater harvesting systems, like a water butt, can be much cheaper - sometimes as low as £30.¹⁴² These are a useful tool for saving water, but would not be appropriate for water in toilet flushing, and are instead used for external purposes such as in gardens or on cars. They therefore have a much smaller impact on overall water usage than larger systems.

For this reason, rainwater harvesting is often more supported in new builds, at the community level or in larger buildings, specifically in water-stressed areas.¹⁴³ In new builds, these systems can be installed more easily. In Cambridge, for example, a development of 3,000 new homes is becoming the largest rainwater harvesting system in Europe.¹⁴⁴ Water companies and the University of Cambridge are giving the homes a separate supply of recycled rainwater for use in toilets and watering gardens. They expect this to reduce consumption per person per day to around 80 litres.

In a Defra consultation, many respondents suggested that the installation of rainwater harvesting and

133 Lewis H et al, How much do water companies spend on customer engagement in the UK and internationally?, Waterwise, December 2018, https://www.waterwise.org.uk/wp-content/uploads/2018/12/International-Customer-Engagement-Report_Final2018.pdf

134 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

135 Ibid.

136 Ibid.

137 Ibid.

138 Ibid.

139 Owlshall, How Much Water Can A Rainwater Harvesting System Save?, no date, <https://www.owlshall.co.uk/guide/rainwater-harvesting/how-much-water-can-a-rainwater-harvesting-system-save/>

140 Melville-Shreeve P, Ward S, and Butler D, Rainwater Harvesting Typologies for UK Houses: A Multi Criteria Analysis of System Configurations, April 2016, https://emps.exeter.ac.uk/media/universityofexeter/emps/engineering/research/safesure/steeringgroupresources/publications/Rainwater_harvesting_typologies_for_UK_houses.pdf

141 BuildIt, Should I Install a Rainwater Harvesting System?, no date, <https://www.self-build.co.uk/i-install-rainwater-harvesting-system/>

142 B&Q, search of 'water butts', accessed November 2023, <https://www.diy.com/outdoor-garden/watering/rainwater-harvesting/water-butts.cat>

143 Department for Environment, Food and Rural Affairs, Consultation on measures to reduce personal water use Summary of Responses, July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998882/Summary_of_responses_for_the_consultation_on_measures_to_reduce_personal_water_use_.pdf

144 Department for Environment, Food and Rural Affairs, Plan for Water: our integrated plan for delivering clean and plentiful water, 4 April 2023, <https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water>

greywater reuse system in new properties should be mandated and incentivised through building regulations and by local authority planning processes.¹⁴⁵ There is international precedence for this. In most states in Australia, all new builds are required to have a rainwater tank for flushing toilets.¹⁴⁶ Belgium requires new builds to have a tank to catch rainwater as a way of alleviating flood risk - making diverting rainwater to household uses much easier.

Another solution is to implement rainwater harvesting in larger buildings or at the community scale. In the UK, some local authorities are already working on this, particularly by embedding rainwater harvesting into flood prevention activities. The London Plan tasks Local Flood Authorities with managing rainwater to reduce flood risk, and states that the top priority for managing rainwater should be using it as a resource (e.g., for irrigation or toilets).¹⁴⁷ The London Sustainable Drainage Action Plan outlines frameworks for implementing rainwater harvest in a range of buildings.¹⁴⁸ Many respondents to Defra's consultation also supported this approach, and Defra is considering incorporating rainwater harvesting in their minimum standards for sustainable drainage systems.¹⁴⁹

For systems in larger buildings and at the community level, support on capital costs would help. Yet, while there is a grant to support farmers installing these systems - offering between £2,500 and £35,000 to cover up to 50% of the costs - there is no grant for households or other businesses.^{150,151} In Defra's consultation, many farmers noted that rainwater

systems were not financially viable without grants.¹⁵²

Solar panels and heat pumps come with government grant. There is no equivalent or water reuse schemes or water harvesting, or anything in the water industry.

- Housing developer in our workshop

Greywater

Another option for water reuse could be greywater (water that has been already used in the sink or shower etc). This too faces multiple barriers. Environmentally, greywater contains bacteria, which can be very costly to remove. Studies also suggests that, if treating greywater in the home, the environmental impact can outweighs any benefits.¹⁵³ Economically, greywater reuse systems can cost thousands of pounds to install, and hundreds each year in maintenance.¹⁵⁴

Yet, various studies suggest greywater reuse can be justified in certain contexts, such as in water stressed areas or for businesses using large amounts of water (such as golf courses or football pitches).^{155,156,157} If treating greywater at scale and using significant amounts of water as some businesses do, the savings are then more likely to outweigh the costs. Some studies also suggest certain greywater reuse systems can be a good investment for households. A model of greywater systems in Taiwan, for example, found that, under scenarios of realistic bill increases, savings from reduced water use would exceed the costs within four to 12 years.¹⁵⁸ Water is about seven times more expensive in the UK than in Taiwan, so

145 Department for Environment, Food and Rural Affairs, Consultation on measures to reduce personal water use Summary of Responses, July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998882/Summary_of_responses_for_the_consultation_on_measures_to_reduce_personal_water_use_.pdf

146 Rainharvesting Systems, What Are The Rainwater Harvesting Regulations In The UK?, no date, <https://rainharvesting.co.uk/what-are-the-rainwater-harvesting-regulations-in-the-uk/>

147 Mayor of London, The London Plan, March 2021, https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

148 London Assembly, London Sustainable Drainage Action Plan, no date, <https://www.london.gov.uk/programmes-and-strategies/environment-and-climate-change/climate-change/surface-water/london-sustainable-drainage-action-plan?ac-64526=64513>

149 Department for Environment, Food and Rural Affairs, Plan for Water: our integrated plan for delivering clean and plentiful water, 4 April 2023, <https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water>

150 National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

151 Atlantis, Rainwater Harvesting System Funding Available Now, no date, <https://atlantistanks.co.uk/rainwater-harvesting-system-funding-available-now/>

152 Department for Environment, Food and Rural Affairs, Consultation on measures to reduce personal water use Summary of Responses, July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998882/Summary_of_responses_for_the_consultation_on_measures_to_reduce_personal_water_use_.pdf

153 Centre for Alternative Technology, Reusing Rainwater and Greywater, no date, <https://cat.org.uk/info-resources/free-information-service/water-and-sanitation/rain-and-grey-water/>

154 Greywater systems: can they really reduce your bills? <https://www.theguardian.com/lifeandstyle/2014/jul/21/greywater-systems-can-they-really-reduce-your-bills>

155 Van de Walle A et al, Greywater reuse as a key enabler for improving urban wastewater management, Environmental Science and Ecotechnology, October 2023, <https://www.sciencedirect.com/science/article/pii/S266649842300042X>

156 Oteng-Peprah N et al, Greywater Characteristics, Treatment Systems, Reuse Strategies and User Perception—a Review, Water Air Soil Pollut., July 2018, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6133124/>

157 Marsh J, 'More Golf Courses Need to Use Recycled Water', Environmental Protection, January 2022, <https://eponline.com/articles/2022/01/05/more-golf-courses-need-to-use-recycled-water.aspx>

158 Yi-kai Juan, Greywater Reuse System Design and Economic Analysis for Residential Buildings in Taiwan, November 2016, <https://www.mdpi.com/2073-4441/8/11/546>

the savings should be even larger in the UK.¹⁵⁹ More research is needed in the UK context to assess this potential.

3.4 GOVERNANCE OF THE WATER SECTOR

Lack of political leadership

Until recently, water was the responsibility of a Minister for Environmental Quality and Resilience. The latest reshuffle has seen a new Minister for Water and Rural Growth created, however, we still lack a Minister exclusively focused on the UK's water system. Ofwat, the regulator, works to improve the sustainability and efficiency of the sector, but has no statutory duty to advise the government on its water policy.¹⁶⁰ There is therefore no specific political leadership for the water sector.

The challenge of water efficiency and supply involves not just the water sector, but a range of stakeholders from appliance manufacturers, housebuilders, local authorities and planning departments, households and businesses using water and the third sector. Too often the discussion is concentrated on just the 'water industry' rather than considering all the stakeholders involved across business and society.

Reflecting this, the NAO found in 2018 that "Defra has not been sufficiently influential to ensure water efficiency is a priority across government".¹⁶¹

It recommended that Defra work more with departments who can help reform building and planning regulations, product labelling and product standards to enhance water efficiency. It also suggested Defra increase efforts to engage with local authorities to improve their water efficiency, as well as the departments for health and education, to improve water efficiency in schools and hospitals.

Similarly, staff at water companies feel like they have little ability to ramp up the concern in government for water stress. Meanwhile, housing developers have to work through the water companies, and also feel like their views are not well represented in government.

I don't feel we have much strategic power. We don't really have a national voice. The BRE [Building Research Establishment - a non-profit organisation aiming to improve building in the UK], you would expect them to look at this, but

I've only met with them once in the past four years and they didn't speak about water, only emissions.

- Water company in our workshops

The main convening body are the water companies, as they sit across the whole area, and try and speak with a common voice with various developers. There is not much leadership from government on this.

- Housing developer in our workshop.

On this basis, people in our workshops called for more political leadership, in particular if we want to instigate the ambitious behavioural change we want to see.

Not only is knowledge in government about the water industry woeful, you also never seem to see the same face. Political leadership on this would be really helpful.

- Housing developer in our workshop.

We need respected advocates to help champion the cause. Businesses on their own can't land all the messaging. The sector needs friends to change behaviour.

- Policy expert in our workshops.

Insufficient tracking of progress on water resilience

Currently, progress on water-efficiency is only publicly tracked ad-hoc via reports by the NAO, Ofwat, the National Infrastructure Commission, and other organisations undertaking similar research. This fragmented and irregular monitoring, without ministerial involvement, means parliament has no clear reference for holding the government accountable on its targets for demand-reduction. It may contribute to the lack of political discourse surrounding this issue.

This also means there are no agreed upon granular metrics against which to measure progress, such as meter penetration, average flow rates of household taps and showers, and use of rainwater and greywater harvesting. Data on each of these variables is either hard to find or non-existent. As an expression of this, the NAO highlights that Ofwat does not know whether efforts to decrease non-household water savings have been successful.¹⁶²

¹⁵⁹ Yi-kai Juan, Greywater Reuse System Design and Economic Analysis for Residential Buildings in Taiwan, November 2016, <https://www.mdpi.com/2073-4441/8/11/546>

¹⁶⁰ Ofwat, Our duties, no date, <https://www.ofwat.gov.uk/about-us/our-duties/>

¹⁶¹ National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

¹⁶² National Audit Office, Water supply and demand management, 11 June 2020, <https://www.nao.org.uk/wp-content/uploads/2020/03/Water-supply-and-demand-management.pdf>

SECTION 4

THE SOLUTIONS

The government needs to ramp up efforts to address the looming crisis of water stress. This must begin with improved governance of the water system - with a focal point within government committed to coordinating stakeholders in their efforts to enhance water resilience. It must be followed by improvements to the market incentives to cut water usage, particularly by expanding metered billing and exploring blocked tariffs. Lastly, there must be an expanded push from water companies to improve the water efficiency of buildings, including through regulatory change, better plumbing training, integrated retrofit planning and investment in harvesting other water sources.

4.1 STRENGTHENING NATIONAL LEADERSHIP FOR WATER

A minister for water

Water is one of the essentials of life, alongside food and shelter. Surprisingly, whilst HM Government has a Minister for Food and a Minister for Housing, the UK has not had a dedicated Minister for Water for nearly a decade.

As this report outlines, the UK faces a national challenge to maintain its water supply to take into account our growing population and the impact of climate change. This national challenge will require national leadership. Numerous levers need to be pulled and not just with the water industry

but growing broader into the private sector, to housebuilders, manufacturers of white goods and those that install machines which utilise water. We also need clearer communication. As our survey of the public has shown, and other research confirms, there is a worrying lack of engagement by the public in the need to be more water efficient. Politicians need to show leadership and help to educate the public on the current state of our water supply and encourage the public to take appropriate water efficiency measures. The public needs to know that if every one of us takes the right steps, we can maintain our water supply. This is a full-time job for the next thirty years.

A dedicated Minister for Water is essential to bring together the various strands of policy, focusing on both the supply of water and related issues such as sewage.

Currently, HM Government does not regularly update the public on our progress towards achieving higher levels of water efficiency and resilience. This makes it harder to raise public awareness about the challenges we face and galvanise the system. The new Minister for Water should also come before Parliament annually to update it on the progress towards achieving the Plan for Water and HM Government's water targets, identifying any policy changes that are required in order to increase the UK's water resilience.

A re-established National Water Council

While a Minister would be an important step in providing a clearer vision for water resilience they cannot do this on their own. Alongside Defra, they also need to bring together stakeholders from across the public sector, consumers and experts.

This is why the UK needs to re-establish the National Water Council, to provide advice to the Minister for Water on the action needed to maintain the UK's water supply, reduce sewage and connect all the various stakeholders together. The Council would bring together Defra officials, Ofwat, water companies, the Environment Agency, the Consumer Council for Water, building developers, household appliance manufacturers, heavily water-reliant businesses and other relevant organisations (e.g. Watersafe UK, the Chartered Institute of Plumbing and Heating Engineering) on a quarterly basis. The aim would be to develop a shared and coherent framework that lays out the vision and responsibilities for each stakeholder in reducing water demand.

Our research has found that although many stakeholders are concerned about the future access of our water supply, there is a lack of coordination of activity. Defra's Plan for Water is an ambitious start, but it will need to bring together all parts of our economy and society into a truly national effort. Unlike its predecessor, the new National Water Council does not need to be a big statutory body with a large staff. But like the Industrial Strategy Council and National Infrastructure Commission, we need a single point of focus.

4.2 A MARKET WHICH PROPERLY VALUES WATER

Compulsory smart meters for all households

We need to better monitor our use of water to cut down on leaks and encourage water efficiency. Evidence shows that one of the most effective ways to achieve this is to install smart meters into homes. A smart water meter allows the household to monitor water consumption automatically, allowing for faster leak identification and encouraging water efficiency.

Current plans suggest that 40% of households will have smart meters by 2030. But as evidence shows, if this was doubled to 80%, the financial benefits would outweigh the costs for water companies privately, and would deliver societal benefits on top of that.¹⁶³

One of the barriers to implementing smart meters is regulation that only allows water companies to implement compulsory metering in water stressed areas. This slows down implementation and unnecessarily increases cost. This regulation is not up to date with the UK's growing water needs or the potential impact of climate change.

The government should make the installation of smart meters compulsory for all households, without household inspection. This will speed up the implementation of smart meters and ensure that the UK is more resilient in the future. The growing financial demands on the water industry, particularly in light of the Plan for Water's proposed investment into tackling sewage, means that there is a risk that without financial support, the installation of smart meters could be put on the backburner.

Given the financial benefits of smart metering and the need for urgent action to improve the UK's water efficiency, the HM Government should offer to cover the installation cost of smart meters over the next decade so that by 2033 every household has a smart meter. This will cost £250m per year.¹⁶⁴ In return for this investment, the UK Government should agree with water companies that any of the demand reduction attributable to smart meters that avoid the need for further water infrastructure should be reinvested into water resilience programmes and infrastructure, ensuring the long term supply of water in the UK. This would unlock £1.72 of additional investment into our water infrastructure for every £1 spent by the government - a good return on investment.

To ensure the public are on board - facilitating the ease of implementation - HM Government should publicly make the installation of smart meters a national priority. It should run a public awareness campaign around this policy, announcing it in media channels with high engagement and with a compelling narrative around addressing the water crisis.

Exploring rising block tariffs

Affinity Water are currently trialling a rising block tariff for consumers, whereby the price of water increases the more a consumer uses it, starting with a free allocation of water. The aim of the block tariff is to incentivise consumers to use less water, as they generate financial savings through doing so. Research by Affinity Water has found that over half of

¹⁶³ Frontier Economics and Artesia Consulting, Cost benefit analysis of water smart metering, November 2021, <https://www.frontier-economics.com/media/we4lon3z/arqiva-cost-benefit-analysis-a4-full-report.pdf>

¹⁶⁴ Based on £2.5bn cost spread evenly across 10 years

its customers think that this approach is fairer.¹⁶⁵

Although this rising block tariff is still in the trial phase, Ofwat are supporting this by highlighting this work and providing platforms for information sharing between water companies.¹⁶⁶ This has the potential to deliver significant reductions in demand.

Once the findings from this trial have been delivered, Ofwat should commit to a consultation on whether a rising block tariff should become the standard tariff for all households. This should be done in consultation with consumer groups, water companies and other experts to ensure that it is fair to customers.

There are other options that could also be explored such as seasonable tariffs (where the price of water goes up in the summer when there is increased demand for water) or daily tariffs (where the price of water goes up during peak times of the day). However, it is important that we explore different methods of paying for water usage that could encourage more efficient use of our resources.

4.3 BUILDINGS WITH MODERN STANDARDS OF WATER-EFFICIENCY

Regulatory review

Defra is already taking important steps on regulation. They are introducing mandatory water-efficiency labelling for products, which can help boost access to information and the salience of water efficiency. They are also considering higher standards for the water-efficiency of appliances. Defra should build on this, and review and clarify various other aspects of regulation around water.

Firstly, we should put in place a more ambitious minimum target for water-efficiency in newbuilds of 100l/p/d for those in water stressed areas (with the rebate included) and 110 in all other areas. Requiring all new homes to be built at 110l/d per person would only cost an additional £9 per home.¹⁶⁷ Some housebuilders are doing this already, but often only if they see a benefit to being perceived as water-efficient. This added ambition on water efficiency should be seen as a public good, rather than

something incentivised only by private gain. Defra should therefore provide a regulatory push on this.

Second, Defra must also follow up on its commitment to review the 1999 water regulations.¹⁶⁸ In particular, Defra should include minimum requirements for the design of dual flush toilets, ensuring a much higher proportion of people use them as intended. They should also clarify the regulations around rainwater and greywater harvesting for new build homes, as stakeholders have identified confusion around the regulations to installing greywater systems within homes.¹⁶⁹

Third, Defra should review the models for calculating household water efficiency in new developments. Currently, the models do not reflect the propensity of certain fittings and appliances to cause leakages. Defra should mandate that this aspect is considered within the calculations. For example, if appliances which are highly associated with leakages are being fitted, the model should add a certain number of litres into the calculation of average household consumption.

Fourth, Defra should use regulation to limit the removal of certain water-efficient appliances and devices from homes. It would be too hard, and potentially intrusive, to regulate the removal of devices that fit externally onto the appliance (like shower-heads or certain tap regulators). However, Defra should regulate the removal of devices that are internal to plumbing for appliances (like flow regulators within the piping) which would usually require plumbers to remove. To do this, Defra should mandate that plumbers should not be able to replace water-efficient devices with less water-efficient devices in homes unless there is a clear reason to do so, with permission from the relevant water company required. Fines should be used for non-compliance.

Mandated plumber training

DLUHC should create a registered plumber scheme, which involves training plumbers to a specific standard and certifying them. In implementing this, DLUHC should learn from the certification required of electricians. Currently, if you want complex

¹⁶⁵ Ofwat, Conclusions on charging innovation to support affordability, March 2023, <https://www.ofwat.gov.uk/wp-content/uploads/2022/09/Conclusions-on-charging-innovation-to-support-affordability.pdf>

¹⁶⁶ Ofwat, Conclusions on charging innovation to support affordability, March 2023, <https://www.ofwat.gov.uk/wp-content/uploads/2022/09/Conclusions-on-charging-innovation-to-support-affordability.pdf>

¹⁶⁷ Waterwise, Advice on water efficient new homes for England, October 2019, <https://database.waterwise.org.uk/wp-content/uploads/2019/10/Advice-on-water-efficient-homes-for-England061118.pdf>

¹⁶⁸ Department for Environment, Food and Rural Affairs, Plan for Water: our integrated plan for delivering clean and plentiful water, 4 April 2023, <https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water>

¹⁶⁹ Department for Environment, Food and Rural Affairs, Consultation on measures to reduce personal water use Summary of Responses, July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998882/Summary_of_responses_for_the_consultation_on_measures_to_reduce_personal_water_use_.pdf

electrical work done on your house, you either need to get the work checked by the building control department in your local authority (which is costly), or hire a registered electrician who can certify this themselves. To become registered, electricians must pass a course explaining the regulations and be assessed by one of three certifying organisations looking at the electrician's qualifications, their quality of work and various work and record keeping practices.^{170,171,172}

Similarly, given the potential impacts on water stress, the structure of the building and people's bills, complex plumbing work (e.g. installing a new toilet or shower) should either be registered by the local authority or require self-certification by a registered plumber. This would incentivise all plumbers to get registered. Registration should require plumbers to undertake an exam which proves a level of knowledge expected from an intermediate apprenticeship (equivalent to five GCSEs, and expected to require around a year of training).¹⁷³ This exam should test knowledge around the 1999 water regulations and the plumbing issues which are most likely to cause leakages.

As part of the training for registration, DLUHC - supported by Defra - should encourage plumbers to advise households about water efficiency - and inform them how to do this. DLUHC should provide information to plumbers about current household consumption compared to the average, the target consumption to ensure sustainability, and the potential bill savings. They should ask that plumbers relay this to consumers.

To ensure training is up-to-date, when Defra completes its review of the 1999 water regulations, DLUHC should mandate all registered plumbers to take a short course in the following year which explains how the water regulations have changed and tests knowledge on that.

An 'All-In-One' approach to household retrofitting

As identified by the Plan for Water, 80% of the homes that we are going to live in by 2050 have already been built.¹⁷⁴ As a consequence, the UK will need to embark on an ambitious period of retrofitting homes if we want to improve our water efficiency.

However, it is not simply our water efficiency that needs to be improved, but our energy efficiency and the overall quality of our housing stock.

In recent years, HM Government has launched numerous schemes to improve the energy efficiency of our homes, such as the Green Homes scheme was an attempt to retrofit homes through the provision of grants to households to install energy efficiency measures.¹⁷⁵ The Labour Party have proposed retrofitting energy-efficient products into 19 million homes, at an estimated cost of £60 billion over ten years.¹⁷⁶ They intend to work with local authorities and businesses to coordinate the programme. Including water-efficient products, such as flow regulators within the plumbing system or water-efficient taps, in such a programme could help deliver important gains. However, it is likely that any future government regardless of political orientation is going to have a policy agenda to retrofit the UK's existing homes.

The danger is that this only focuses on energy efficiency, rather than considering all the improvements needed for our housing stock. In our recent *Triple Dividend* briefing series with Centre for Ageing Better and Dunhill Medical Trust, we identified that we need to look not just at energy efficiency, but also safety and hazards such as mould and damp.¹⁷⁷ The same is true for water efficiency.

HM Government should launch an immediate consultation on the future of home improvement and retrofitting schemes to ensure that we design a process which covers not just energy efficiency, but water efficiency, hazard removal as well as digital connectivity and other necessary improvements. The All-In-One Scheme should look at ways to improve the experience for households, minimise disruption

170 Indeed Editorial Team, Domestic vs commercial electrician: what's the difference?, April 2023, <https://uk.indeed.com/career-advice/finding-a-job/domestic-vs-commercial-electrician>

171 Milligan R, Electrical installation regulations: don't get left with unregistered electrical work, June 2018, <https://trustedtraders.which.co.uk/articles/electrical-installation-regulations-don-t-get-left-with-unregistered-electrical-work/>

172 NICEIC, Your assessment, no date, <https://niceic.com/for-the-trades/professional-standards/your-assessment/>

173 Reed, Intermediate Apprenticeships: What you need to know, no date, <https://www.reed.co.uk/career-advice/intermediate-apprenticeships-what-you-need-to-know/>

174 Department for Environment, Food and Rural Affairs, Plan for Water: our integrated plan for delivering clean and plentiful water, 4 April 2023, <https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water>

175 Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, Green Homes Grant: make energy improvements to your home (closed), 28 August 2020, <https://www.gov.uk/guidance/apply-for-the-green-homes-grant-scheme>

176 Turner L, 'Starmer commits Labour to huge £60bn retrofit plan', Housing Digital, September 2021, <https://housingdigital.co.uk/starmer-commits-labour-to-huge-60bn-retrofit-plan/>

177 Demos, The Triple Dividend Part 2, September 2023, https://demos.co.uk/wp-content/uploads/2023/09/Triple-Dividend-Part-Two_FINAL.pdf

and maximise the efficient deployment of resources to ensure that the overall quality of our housing stock is improved, not simply part of it.

To help fund retrofitting, the government should also consider using the fines imposed on water companies for not meeting their performance commitments. There is precedence for this, with the fines imposed on water companies for pollution being used to fund environmental and water quality improvements.¹⁷⁸ If the government helped fund the retrofitting through fines for companies failing on water efficiency commitments, this would help legitimise the campaign.

An 'All-In-One' approach to home improvement would need coordination between DLUHC, Defra and the Department for Energy Security and Net Zero. Local coordinating agencies, such as the Centre for Ageing Better's *Good Home Hub* proposal, could coordinate local plumbers, energy efficiency and insulation providers and other trades to ensure that homes receive all the efficiency improvements they need.¹⁷⁹

Water efficiency must be fully integrated into the plan for retrofitting the UK if we are going to meet our targets and ensure our water resilience.

Create a rapid "Greywater Review" to explore whether greywater use could significantly boost the UK's water resilience

The potential for using greywater as a way to reduce the pressure on drinking water and free up capacity of drinking water for more non-essential uses has not been a feature of the UK policy debate. However, given the potential demand for water in future years and the impact of climate change, this is something that needs to be rapidly considered.

Our consultation with stakeholders has identified a willingness to explore this from within the water industry and businesses, but we need to rapidly consider the evidence base and whether there would be a significant benefit in using greywater in the UK context.

This review should look at:

1. Existing technology and near-term future technological developments that could enable the UK to utilise greywater
2. The state of the UK's water infrastructure and its adaptability to the use of greywater systems
3. The financial cost and benefits of deploying greywater solutions
4. The current regulatory landscape and potential barriers to deployment of greywater within the UK
5. Incentives and policies that could be put in place to encourage businesses to use greywater

Given the urgency and the long time scales that would be required to deploy greywater solutions within the UK's water infrastructure, we recommend that this rapid review should report to Defra within 12 months. This will ensure that there is time for further consultation and for action to be taken that can realistically contribute to the UK's medium-term needs for water resources.

178 Department for Environment, Food & Rural Affairs and HM Treasury, Water company fines to be channelled into environmental improvements, 30 November 2022, <https://www.gov.uk/government/news/water-company-fines-to-be-channelled-into-environmental-improvements>

179 Centre for Ageing Better, Improving homes: Good Home Hubs, no date, <https://ageing-better.org.uk/improving-homes-good-home-hubs>

CONCLUSION

It is clear that, unless we bring the whole country together to meet our targets, the UK faces a water crisis. Many policy makers and the public have not considered the risks that we face through growing domestic demand for water and climate change.

If we fail to act, the impact could be severe - with higher consumer bills, temporary usage bans, delays to building, environmental degradation and reduced resilience to droughts. These in turn could have significant economic, social and environmental costs. And the business case for working on this problem now is incredibly strong - from the water company, household, business and consumer perspective. Kicking the can down the road - delaying the needed investment - means much higher costs in the future.

We have been here before. For many decades, the government was warned about the lifespan of RAAC concrete - the type used in many UK buildings which, after being deemed at risk of crumbling in September 2023, led to the mass closure of schools.¹⁸⁰ Successive governments failed to act, until the crisis hit. The Covid-19 pandemic was a similar experience, as government's failed to deliver on recommendations years earlier to improve preparedness.¹⁸¹ The consequences were tragic. If we also fail to act now on the looming water crisis - disregarding it because the consequences are not currently as tangible - the pressure will pile up and eventually the crisis will hit. Allowing this to happen would be negligent to Britain's future.

The government has already taken steps in the right direction, with clear targets to reduce household water consumption and non-household water use. Still, several barriers stand in the way of progress. Buildings are not designed with water-efficiency as a priority, with inefficient and faulty appliances widespread. High cost, difficulties in implementation and surrounding regulation hold back progress on addressing this problem. People are also not concerned enough about water-efficiency, driven

by poor knowledge of water usage, low market incentives, and barriers to outreach by water companies. There are also not enough efforts to use water from sources such as rainwater and grey water. Cutting across all of these barriers, there is also not sufficient leadership in government for the water system.

Our recommendations encompass a holistic approach to address these barriers. They target the governance of the water system, the market for water, and the proactive efforts from government, water companies, and plumbers to address water-inefficient buildings. They paint a picture of a much stronger water sector - one first with clear leadership and strategy, consistent messaging, and collaborative activities, second with consumers provided with clear incentives to reduce usage, and thirdly with revamped efforts to build and retrofit homes to a much greater standard of water-efficiency.

By delivering these actions, we can navigate the challenges ahead and secure a sustainable water future for generations to come.

¹⁸⁰ Booth R, 'Raac crisis: who knew what and when about crumbling concrete in England', *The Guardian*, 4 September 2023, <https://www.theguardian.com/uk-news/2023/sep/04/raac-crisis-who-knew-what-when-crumbling-concrete-england>

¹⁸¹ Doward J, 'Government under fire for failing to act on pandemic recommendations', *The Guardian*, 19 April 2020, <https://www.theguardian.com/world/2020/apr/19/government-under-fire-failing-pandemic-recommendations>

Licence to publish

Demos – Licence to Publish

The work (as defined below) is provided under the terms of this licence ('licence'). The work is protected by copyright and/or other applicable law. Any use of the work other than as authorized under this licence is prohibited. By exercising any rights to the work provided here, you accept and agree to be bound by the terms of this licence. Demos grants you the rights contained here in consideration of your acceptance of such terms and conditions.

1 Definitions

a 'Collective Work' means a work, such as a periodical issue, anthology or encyclopedia, in which the Work in its entirety in unmodified form, along with a number of other contributions, constituting separate and independent works in themselves, are assembled into a collective whole. A work that constitutes a Collective Work will not be considered a Derivative Work (as defined below) for the purposes of this Licence.

b 'Derivative Work' means a work based upon the Work or upon the Work and other pre-existing works, such as a musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which the Work may be recast, transformed, or adapted, except that a work that constitutes a Collective Work or a translation from English into another language will not be considered a Derivative Work for the purpose of this Licence.

c 'Licensor' means the individual or entity that offers the Work under the terms of this Licence.

d 'Original Author' means the individual or entity who created the Work.

e 'Work' means the copyrightable work of authorship offered under the terms of this Licence.

f 'You' means an individual or entity exercising rights under this Licence who has not previously violated the terms of this Licence with respect to the Work, or who has received express permission from Demos to exercise rights under this Licence despite a previous violation.

2 Fair Use Rights

Nothing in this licence is intended to reduce, limit, or restrict any rights arising from fair use, first sale or other limitations on the exclusive rights of the copyright owner under copyright law or other applicable laws.

3 Licence Grant

Subject to the terms and conditions of this Licence, Licensor hereby grants You a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) licence to exercise the rights in the Work as stated below:

a to reproduce the Work, to incorporate the Work into one or more Collective Works, and to reproduce the Work as incorporated in the Collective Works;

b to distribute copies or phono-records of, display publicly, perform publicly, and perform publicly by means of a digital audio transmission the Work including as incorporated in Collective Works; The above rights may be exercised in all media and formats whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats. All rights not expressly granted by Licensor are hereby reserved.

4 Restrictions

The licence granted in Section 3 above is expressly made subject to and limited by the following restrictions:

a You may distribute, publicly display, publicly perform, or publicly digitally perform the Work only under the terms of this Licence, and You must include a copy of, or the Uniform Resource Identifier for, this Licence with every copy or phono-record of the Work You distribute, publicly display, publicly perform, or publicly digitally perform. You may not offer or impose any terms on the Work that alter or restrict the terms of this Licence or the recipients' exercise of the rights granted hereunder. You may not sublicense the Work. You must keep intact all notices that refer to this Licence and to the disclaimer of warranties. You may not distribute, publicly display, publicly perform, or publicly digitally perform the Work with any technological measures that control access or use of the Work in a manner inconsistent with the terms of this Licence Agreement. The above applies to the Work as incorporated in a Collective Work, but this does not require the Collective Work apart from the Work itself to be made subject to the terms of this Licence. If You create a Collective Work, upon notice from any Licensor You must, to the extent practicable, remove from the Collective Work any reference to such Licensor or the Original Author, as requested.

b You may not exercise any of the rights granted to You in Section 3 above in any manner that is primarily intended

for or directed toward commercial advantage or private monetary compensation. The exchange of the Work for other copyrighted works by means of digital file sharing or otherwise shall not be considered to be intended for or directed toward commercial advantage or private monetary compensation, provided there is no payment of any monetary compensation in connection with the exchange of copyrighted works.

c If you distribute, publicly display, publicly perform, or publicly digitally perform the Work or any Collective Works, you must keep intact all copyright notices for the Work and give the Original Author credit reasonable to the medium or means You are utilizing by conveying the name (or pseudonym if applicable) of the Original Author if supplied; the title of the Work if supplied. Such credit may be implemented in any reasonable manner; provided, however, that in the case of a Collective Work, at a minimum such credit will appear where any other comparable authorship credit appears and in a manner at least as prominent as such other comparable authorship credit.

5 Representations, Warranties and Disclaimer

a By offering the Work for public release under this Licence, Licensor represents and warrants that, to the best of Licensor's knowledge after reasonable inquiry:

i Licensor has secured all rights in the Work necessary to grant the licence rights hereunder and to permit the lawful exercise of the rights granted hereunder without You having any obligation to pay any royalties, compulsory licence fees, residuals or any other payments;

ii The Work does not infringe the copyright, trademark, publicity rights, common law rights or any other right of any third party or constitute defamation, invasion of privacy or other tortious injury to any third party.

b Except as expressly stated in this licence or otherwise agreed in writing or required by applicable law, the work is licenced on an 'as is' basis, without warranties of any kind, either express or implied including, without limitation, any warranties regarding the contents or accuracy of the work.

6 Limitation on Liability

Except to the extent required by applicable law, and except for damages arising from liability to a third party resulting from breach of the warranties in section 5, in no event will licensor be liable to you on any legal theory for any special, incidental, consequential, punitive or exemplary damages arising out of this licence or the use of the work, even if licensor has been advised of the possibility of such damages.

7 Termination

a This Licence and the rights granted hereunder will terminate automatically upon any breach by You of the terms of this Licence. Individuals or entities who have received Collective Works from You under this Licence, however, will not have their licences terminated provided such individuals or entities remain in full compliance with those licences. Sections 1, 2, 5, 6, 7, and 8 will survive any termination of this Licence.

b Subject to the above terms and conditions, the licence granted here is perpetual (for the duration of the applicable copyright in the Work). Notwithstanding the above, Licensor reserves the right to release the Work under different licence terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this Licence (or any other licence that has been, or is required to be, granted under the terms of this Licence), and this Licence will continue in full force and effect unless terminated as stated above.

8 Miscellaneous

a Each time You distribute or publicly digitally perform the Work or a Collective Work, Demos offers to the recipient a licence to the Work on the same terms and conditions as the licence granted to You under this Licence.

b If any provision of this Licence is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Licence, and without further action by the parties to this agreement, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

c No term or provision of this Licence shall be deemed waived and no breach consented to unless such waiver or consent shall be in writing and signed by the party to be charged with such waiver or consent.

d This Licence constitutes the entire agreement between the parties with respect to the Work licenced here. There are no understandings, agreements or representations with respect to the Work not specified here. Licensor shall not be bound by any additional provisions that may appear in any communication from You. This Licence may not be modified without the mutual written agreement of Demos and You.

DEMOS

Demos is a champion of people, ideas and democracy. We bring people together. We bridge divides. We listen and we understand. We are practical about the problems we face, but endlessly optimistic and ambitious about our capacity, together, to overcome them.

At a crossroads in Britain's history, we need ideas for renewal, reconnection and the restoration of hope. Challenges from populism to climate change remain unsolved, and a technological revolution dawns, but the centre of politics has been intellectually paralysed. Demos will change that. We can counter the impossible promises of the political extremes, and challenge despair – by bringing to life an aspirational narrative about the future of Britain that is rooted in the hopes and ambitions of people from across our country.

Demos is an independent, educational charity, registered in England and Wales. (Charity Registration no. 1042046)

Find out more at www.demos.co.uk

DEMOS

PUBLISHED BY DEMOS DECEMBER 2023

© DEMOS. SOME RIGHTS RESERVED.

15 WHITEHALL, LONDON, SW1A 2DD

T: 020 3878 3955

HELLO@DEMOS.CO.UK

WWW.DEMOS.CO.UK