

Supporting sustainable water use among Scotland's consumers

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Contents

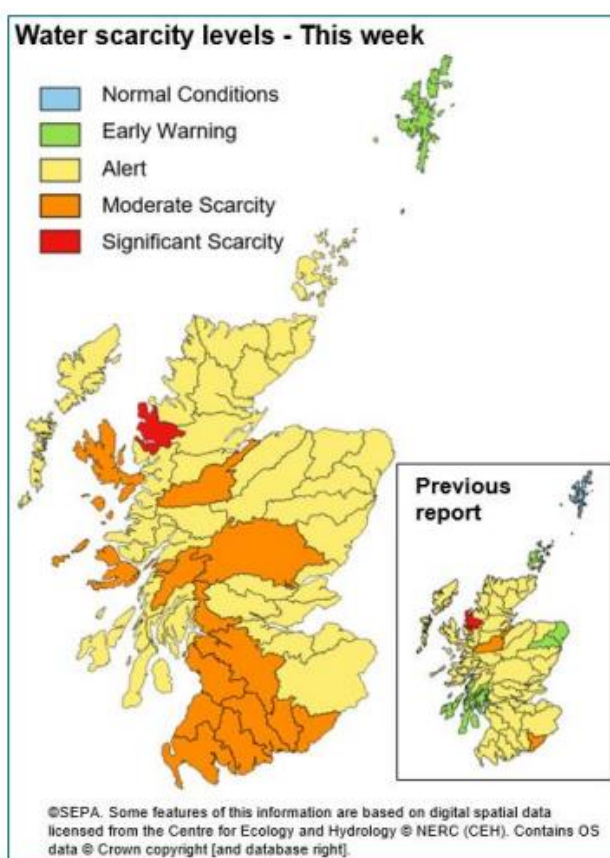
Executive Summary.....	3
1. Who we are	7
2. Policy background.....	7
3. Methodology	9
4. Key findings.....	10
5. Next steps	16

Executive Summary

While historically Scotland has been viewed as a nation with plentiful water supplies, climate change means that more frequent and severe incidents of droughtⁱ are predicted in futureⁱⁱ.

June 2023 saw most parts of Scotland being issued with water scarcity warnings, with several catchment areas, including Loch Maree in the northwest Highlands and the Esk area of Dumfriesshire, receiving the highest-level warning for water shortages.ⁱⁱⁱ

Figure 1 – Water scarcity levels in Scotland for the week of 15th June 2023 (Source: Scottish Environment Protection Agency, SEPA)



Instances of extreme drought are likely to become more common within the next twenty years. One study predicted that the number of extreme drought events in Scotland will increase from an average of one event every 20 years (from the baseline period of 1981-2001), to one event every 3 years in the near future (2021-2040).^{iv}

Water scarcity occurs when the demand for water exceeds the amount of water available to a given population, over a range of spatial and temporal scales.^v Unless managed, demand for water supplies in Scotland is expected to increase, as the population grows and as summer temperatures become warmer. The demographic shift from western parts of the country to the east will also create additional pressure on water supplies in areas of the country which experience lower rainfall and have fewer renewable water resources.

Water consumption among households in Scotland is already high relative to other countries with a similar climate. On average, each individual in Scotland uses around 180 litres of water per day, compared to an average of 144 litres per day for England and Wales. By comparison, in the Netherlands, average consumption per person, per day is around 133 litres; in Germany it is on average 126 litres per day; and in Denmark water consumption averages around 109 litres per person per day.^{vi}

Taking steps in the present day to help consumers to use water more efficiently can help to relieve some of the future pressures on the water environment. It may also help to offset some of the cost associated with building new infrastructure, such as reservoirs, dams, pipelines and water pumping stations.

A cultural shift towards a common acceptance of the value, and the finite nature, of water in Scotland is necessary for consumers to be engaged in a move towards more sustainable consumption of water. To achieve this there is benefit in learning from the experiences of other countries who have been concerned with water insecurity for longer and developing an understanding of which policy interventions worked, which were less effective, and why.

In order to better understand consumer behaviours and attitudes in relation to water use in the home, and how consumers may be encouraged to use water more sustainably, Consumer Scotland commissioned researchers at the University of Glasgow to carry out a literature review. The key findings from the literature review are summarised in Part 4 of this report. These findings have helped inform our policy recommendations (set out in Part 5 of this report). The full literature review is published for reference alongside this report. In addition, Consumer Scotland is currently in the process of conducting a piece of deliberative research exploring consumer views on how Scotland's water sector adapts to climate change. It is anticipated that this research will shape our understanding of how consumers view different water efficiency measures, and some of the key enablers and barriers to behavioural change.

Our key findings and next steps are as follows:

1. Water consumption among Scottish consumers is relatively high and, when asked, consumers tend to significantly underestimate their water usage. Consumers in Scotland are not always aware of the ways in which saving water is linked to climate change adaptation.

Recommendation - Scottish Government, Scottish Water, SEPA, and other water industry stakeholders to coordinate consistent public messaging around 'common sense' water saving behaviours. This might include evaluating the need for a 'myth-busting' campaign on a national scale tackling the perception that high rainfall amounts to abundant water supplies in Scotland year-round, or a campaign targeting specific water 'wasting' behaviours. There is also room for more education around water and energy efficiency settings for white goods, as consumers do not always appear to be taking advantage of these.

2. Providing integrated advice around water and energy efficiency can help consumers to understand some of the benefits of adopting water efficient behaviours, including lower energy bills and lower domestic carbon emissions.

Recommendation - Scottish Government to provide necessary resource and funding for partnerships between Scottish Water and advice agencies to take place, which enable greater provision of joined up advice to consumers around making their home more water and energy efficient: a 'whole home' approach.

3. A number of water and energy efficient appliances and devices exist on the market, but there is a need to improve consumers' access to information to better enable them to understand the options available to them and the impact of their purchase choice.

Recommendation - Scottish Government to consider ways to capitalise on plans to introduce a UK-wide mandatory water efficiency labelling by 2025, including how to make labels work best for consumers. To be most effective, it is important that labels provide the relevant information, in an accessible manner, to enable consumers to understand the impact of their purchase choice and the sustained behavioural changes that need to accompany it.

4. The new water efficiency labelling scheme and subsequent advances in water efficient appliances and devices have the potential to deliver more impact if accompanied with updated water efficiency standards for new homes and retrofits.

Recommendation – Scottish Government to consider ways to ensure water efficiency is higher up the agenda for those responsible for providing housing, including developers and local councils. This may include a review of building standards and legislation to consider how they might be revised to incorporate minimum standards when it comes to the instalment and retrofit of water efficient appliances.

5. Consumers are generally highly satisfied with the water and wastewater services they receive in Scotland. Consumers expect Scottish Water to maintain high ethical standards of business, including by behaving truthfully and with integrity, and by continuing to educate consumers about their water use. Consumers also want to see water suppliers actively invested in tackling leakages and reducing their own water footprint.

Recommendation – Scottish Water to retain their role as a credible 'messenger' for household water conservation by proactively seeking to maintain high ethical business standards. As part of this, it is important that Scottish Water continues to deliver impactful public education campaigns around water use and behaviours, and that it continues to invest in leak reduction measures, with a focus on regions where the drinking water supply or quality might be threatened by water shortages or population growth in future.

6. There is a lack of published research into household water use and attitudes to water conservation specific to Scotland. As both the regulatory environment and household experiences of water scarcity vary significantly within the UK, findings from studies conducted in other countries and regions cannot necessarily be applied to Scotland.

Recommendation – Funding to be made available to research institutions to conduct further analysis of Scottish consumers' water use habits and drivers for behavioural change. Scottish Government to invest in innovation by scoping out opportunities for research, development and testing of new technologies around water reuse in homes and communities.

1. Who we are

- 1.1. Consumer Scotland is the statutory body for consumers in Scotland. Established by the Consumer Scotland Act 2020, we are accountable to the Scottish Parliament.
- 1.2. Consumer Scotland's purpose is to improve outcomes for current and future consumers and our strategic objectives are:
 - to enhance understanding and awareness of consumer issues by strengthening the evidence base
 - to serve the needs and aspirations of current and future consumers by inspiring and influencing the public, private and third sectors
 - to enable the active participation of consumers in a fairer economy by improving access to information and support

2. Policy background

The effects of water scarcity in Scotland

- 2.1. While the west coast of Scotland is generally wetter than the east, both areas are likely to experience increases in extreme droughts in future.^{vii} The west of the country is rocky, with no ground water reserves. The topography of the west of Scotland means that without regular rainfall, rivers, lochs and burns quickly start to dry out. There are ground water reserves in the east of Scotland, making it more resilient overall, but the eastern parts of Scotland tend to receive less rainfall.
- 2.2. During extended periods of drought, river and reservoir levels drop, which can have adverse effects on biodiversity and water quality. Warmer, drier summers also cause areas of peatland and bog to dry out and this releases carbon into the atmosphere. This represents a risk not just in terms of higher carbon emissions, but also because dissolved organic carbon will likely be released into water systems, degrading the quality of drinking water, increasing treatment costs, and posing a risk for water security^{viii}. During the summer of 2021, low water levels caused water quality issues in reservoirs in Dumfries and Galloway, where an increase in the presence of manganese led to consumers complaining about the water quality^{ix}.
- 2.3. Around 3% of households in Scotland are serviced by private supplies, rather than the public water supply. These households have little to no water storage capacity and are likely to become increasingly vulnerable to water shortages as the climate changes, particularly during peak demand in hot weather. During the drought in 2018, following significant water scarcity between July and September, local authorities reported over 500 private water supplies running dry nationwide^x. There is no statutory duty for Scottish Water or the Scottish Government to provide water for private households during water scarcity events. However, in practice, Scottish Water does provide support through the provision of bottled water to those on a private supply during periods of water shortages^{xi}.

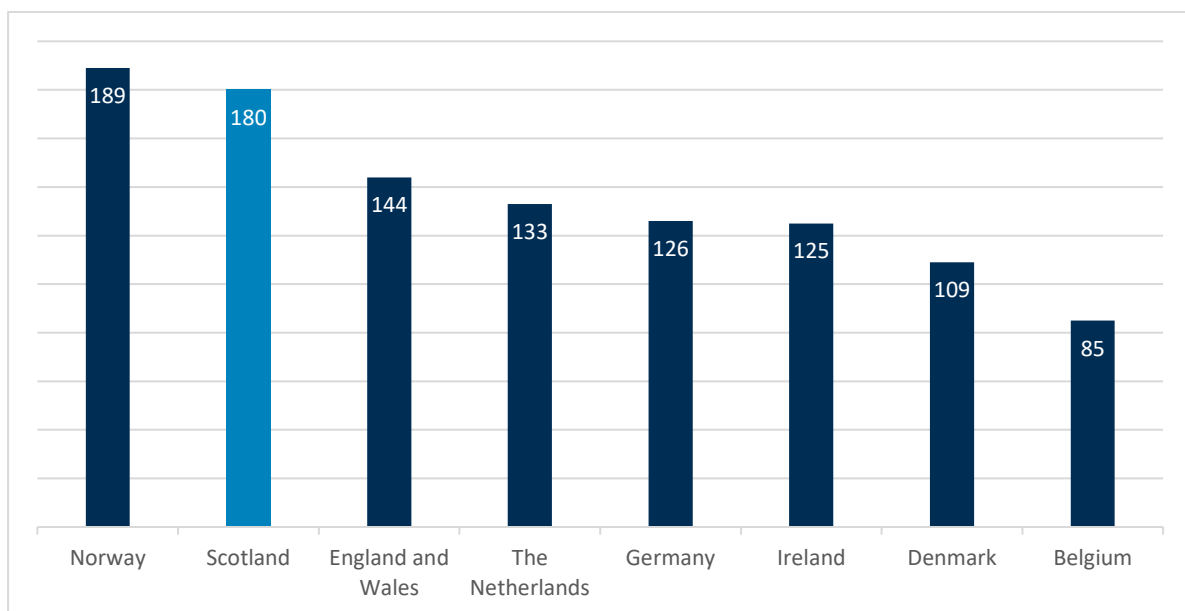
- 2.4. The Scottish Environment Protection Agency (SEPA) has the power to temporarily suspend water abstraction licences during periods of significant water scarcity as a way to manage water resources. Droughts and abstraction bans pose a risk to several key economic sectors in Scotland that rely on the ability to abstract plentiful supplies of freshwater, including agriculture, aquaculture, whisky and hydropower. As an indication, the 2017/2018 drought is estimated to have cost Scottish agriculture £161 million – representing 6% of total agricultural output during that period – through impacts on crop yields and livestock numbers.^{xii}
- 2.5. Plans to expand the production of hydrogen as a ‘super-fuel’ to help the UK achieve net zero by 2050 also rely on the availability of plentiful supplies of water^{xiii}. While the Scottish Government has published their 5-year Hydrogen Action Plan^{xiv} to support the development of a hydrogen economy in Scotland, any elevated levels of abstraction of surface and ground water will have the potential to amplify the impacts of drought and water scarcity.

Household water use in Scotland

- 2.6. Water consumption among households in Scotland is high. On average, each individual in Scotland uses around 180 litres of water per day^{xv} compared to an average of 144 litres per day for England and Wales^{xvi}. Household water consumption rose during the COVID-19 pandemic, when people spent more time at home. In 2019-2020, each individual in Scotland used around 165 litres of water a day.^{xvii} Although water consumption fell slightly from 2021-2023, a return to pre-pandemic levels has not yet taken place.^{xviii}

Figure 2 – Comparison of average daily water consumption per person per day across several European countries (Source: EurEau; Scottish Water)

Water consumption in Scotland is also higher than other European countries with a similar climate. In the Netherlands, average consumption per person, per day is around 133 litres; in Germany, it is on average 126 litres; and in Denmark it averages around 109 litres per person per day. Belgium has one of the lowest rates of household water consumption, averaging at around 85 litres per person per day.



- 2.7. In Scotland, there is a widely held perception that high rainfall amounts to abundant water supplies year-round. Many consumers are unaware of the volume of water they use, and struggle to conceptualise volumes of water in terms of litres^{xxix}. In a poll of 2,190 UK adults, 53% of respondents from Scotland (compared to 43% from the rest of the UK) believed that they used less than 20 litres of water per day, with only 13% estimating that they used over 100 litres per person per day^{xx}. Similar research by the Energy Saving Trust suggests that many consumers are unaware of the volume of water consumed by appliances, which lead to them underestimating their total water use.^{xxi}
- 2.8. Water use varies seasonally and in Scotland and the UK, in common with other countries, it is highest during the summer months^{xxii}. Consumers increasing their household water consumption as a result of warmer weather places additional strain on water supplies during periods of low rainfall. This can particularly impact on rural communities, where seasonal tourism causes the demand for water to rise significantly. For example, in 2018 demand on the Isle of Arran increased by 30% due to dry weather and tourism, and water had to be delivered from the mainland via ferry to keep homes and businesses in supply.^{xxiii}

The interaction between water efficiency and reducing carbon emissions

- 2.9. Scotland has set a target date for net zero emissions of all greenhouse gases by 2045, and Scottish Water has committed itself to net zero emissions by 2040.^{xxiv}
- 2.10. Abstracting, pumping, treating and heating water, and pumping and treating wastewater consumes energy and releases greenhouse gas emissions. In the UK, 6% of all carbon emissions are associated with water use. By far the largest proportion of this - 89% - comes from heating water in homes, including through boilers and use of white goods such as washing machines, electric showers and dishwashers.^{xxv} The remaining 11% comes from pumping and treating water as part of the supply and sewage network^{xxvi}.
- 2.11. As the UK Climate Change Committee has highlighted in their Third Climate Change Risk Assessment, when compared with other climate adaptation strategies, water efficiency measures have some of the highest cost-benefit ratios (i.e. the benefits greatly outweigh the costs, to a degree of 10:1 or higher).^{xxvii} As such, investment in greater water efficiency measures are a low-cost, high-payoff option to help deliver reductions in carbon emissions and reach net zero targets.

3. Methodology

- 3.1. The literature review was carried out by Professor Jude Robinson and Mr. Anthony Kadoma at the University of Glasgow between January and April 2023. The review aimed to identify and evaluate existing research on consumer knowledge, behaviours and attitudes in relation to water use and disposal in the home. The researchers undertook a systematic review and at the same time looked at smaller-scale studies, studies using qualitative and mixed research methods, and grey literature such as reports and web pages. Their review aimed to give special attention to 'what worked' in order to ensure that lessons learned could be captured and applied. The researchers also remained sensitive to intersectional issues of socio-economic and geographic inequalities and vulnerabilities when studying the impact of water scarcity on households.

3.2. A total of 165 items were identified during the review. As noted by the researchers, however, due to being a water abundant nation, there is currently little published research on household water conservation in Scotland. As a result, the researchers also looked at evidence from the rest of the UK, as well as international examples of schemes, initiatives and campaigns designed to reduce household water use.

3.3. The next section of this report summarises key findings from the literature review. An analysis of the results of the review have helped inform our policy recommendations in Part 5 of this report. The full literature review – with a more detailed explanation of the methodology used - is available for reference on Consumer Scotland’s website.

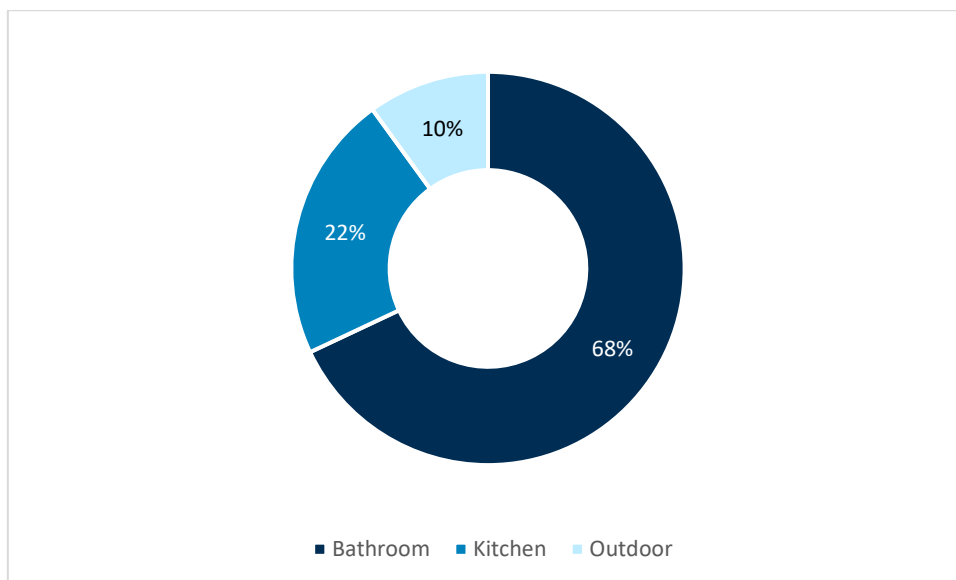
4. Key findings

Household water use

4.1. This section analyses findings from the literature around household water consumption and use in Scotland and the UK more widely. It looks at patterns of water use in the kitchen and bathroom, as well as general patterns of water use amongst different population demographics.

Figure 3 - Breakdown of water use in the home by area (Source: Energy Saving Trust)

Showers, lavatories, baths and bathroom sinks consume more than two-thirds (68%) of household water use; a fifth (22%) is consumed in the kitchen, through washing dishes, washing clothes and general cleaning; with outdoor water use accounting for less than 10% of household water consumption.



Kitchen water use

4.2. Research suggests that consumers are not always using tap water in efficient ways. For example, a survey conducted in England found that over 50% of people run the tap before drinking to get their water to the desired temperature, instead of filling a water jug to keep in the fridge for later^{xxviii}.

- 4.3. White goods, including dishwashers and washing machines, account for a significant portion of water consumption in the kitchen. A full dishwasher is more water and energy efficient than washing by hand and may offer more cost efficiency for consumers over time.^{xxxix} However, a survey of 86,000 people across Britain found that more than half of respondents (52%) do not have or use a dishwasher. The majority of those that do use a dishwasher say that they fill it to full capacity (77%), but only half say they use an eco-setting designed to save water and save money.^{xxx}
- 4.4. In comparison to dishwashers, a vast majority of the population do use a washing machine to do their clothes washing. However, one third of respondents (33%) in one study stated that they did not know the efficiency rating of their washing machines^{xxxix}.
- 4.5. Overall, the evidence indicates that there are opportunities available to reduce household water consumption within the kitchen by encouraging behavioural changes. In particular, there is room for more education around energy efficiency settings, as consumers do not always appear to be taking advantage of these for white goods.

Bathroom water use

- 4.6. The evidence suggests that a significant proportion of people in the UK engage in practices that involve high levels of water waste in the bathroom. Only about half (53%) of people in Scotland turn off the tap when they brush their teeth^{xxxix}. Another study found that 31% of people run bathroom taps to 'cover' the sound of them using the toilet^{xxxix}.
- 4.7. It is estimated that around 22% of UK household water is used for toilet flushing^{xxxix}. The percentage of UK household water used for flushing has declined over the last twenty years, as the UK government's Water Supply (Water Fitting Regulations) 1999 prohibited the installation of toilets that use more than 6 litres of water in a single flush. However as 73% of Scotland's housing stock was built before 1982, many older toilets are likely to be in use. There is scope to replace them with low flush cisterns or for households to add displacement devices in their cisterns to limit flow^{xxxix}.

Water savers and high-water users

- 4.8. There has been some research carried out exploring the links between socio-demographic factors, including age, education, household composition and income, and patterns of water consumption. However, none of these studies are specific to Scottish households.
- 4.9. The literature suggests that larger, higher-income households tend to consume more water overall, as they are likely to have more bathrooms, be less concerned about the costs of water, and to use water for outside irrigation of gardens and pools^{xxxix}. At the same time, more affluent households with higher educational levels (classified as IMD 1) in England and Wales judge themselves more motivated to make the conscious decision to save water (38%) compared the least affluent households (28%)^{xxxix}.
- 4.10. Household water use appears to be affected by lifestyle and employment patterns, as older people and people who work at home consume more water than households where members are in school or working outside the home^{xxxix}. There is emerging data that after the COVID-19 pandemic 2020-2022, more people are choosing to work at home

(remote working), or spend a period of time working at home (hybrid working)^{xxxix}. It is also predicted that, by 2045, the population of Scotland will consist of fewer people aged 0-30 years and an increased number of people aged 74+ years^{xl}. These changes in employment patterns and demographics further point towards an increase in household demand for water in years to come.

Water technologies and innovations

4.11. This section reviews the literature on the potential for water meters, and new technologies and innovations, to assist households to save water.

Smart water meters

4.12. At their most basic, household water meters give a unit measurement of the volume of water consumed, with no additional information linking consumption to water practices^{xli}. With smart water meters, households and water companies are provided with real-time readings of water use, which can enable the identification of areas for remedial action. Smart water meters can improve water literacy by providing households with accurate data about their water use. There is evidence that unmetered residents are less 'water conscious' and less aware of the water scarcity crisis in the UK than people with a water meter^{xlii}.

4.13. Households in the UK with smart water meters consume around 18% less water than those without them^{xliii}. A study looking at data from over 150,000 consumers fitted with a water meter as part of Southern Water's compulsory metering scheme in areas of southern England found an overall 22% decrease in household consumption in the two years after meter installation^{xliv}. Households with smart water meters are also more likely to be aware of and report leaks, which leads to water savings^{xlv}.

4.14. A significant limitation in drawing comparisons between the use of water meters in Scotland compared to consumers in England and Wales is that most households in Scotland pay for their water at a fixed price based on their Council Tax band, with no variation in this price regardless of how much water is used. In contrast, the volume of water that consumers in England and Wales use has a direct impact on their total water bill.

4.15. The evidence suggests that it is difficult to convince consumers billed at a fixed price to invest in meters, as they have fewer incentives to reduce their water footprint. While Scottish Water currently offers to fit water meters (with households meeting the cost of installation) there has not been a large uptake so far.^{xlvi}

4.16. One UK-wide study found that, among unmetered households, a significant barrier to installing water metering is the uncertainty around whether water bills will go up as a result^{xlvii}. We encourage further research to understand the factors that would increase consumer receptibility to smart water meters and the impact that metering would likely have on different consumer groups.

Water saving and water reuse technologies

- 4.17. Water saving technologies, which include low-flow shower heads, dual-flush toilets, tap aerators, and save-a-flush water displacing devices for toilet cisterns, have the potential reduce overall water consumption. However, figuring out how to support and incentivise consumers to voluntarily invest in buying and installing new water saving technologies will require careful consideration.
- 4.18. There are a plethora of water saving devices available for UK customers to buy, and the literature suggests that many consumers are unsure which products would improve their water efficiency, and to what degree^{xlviii}. That said, there are plans to introduce mandatory water efficiency labelling across the UK in 2025, which should make it easier for consumers to make positive choices to save water^{xlix}.
- 4.19. Case studies have shown, however, that some households conversely end up increasing their water consumption after installing a water saving device or water efficient appliance as they believe that they have effectively ‘solved’ their water problem via technology– an effect referred to as ‘offsetting’^l. A study conducted on Australia’s Gold Coast supported this conclusion, finding that an initial 30% reduction in water usage when residents used technology to monitor their shower time was not sustained and water usage returned to pre-installment levels after 4 months.^{li} This suggests that water efficiency labelling schemes should be delivered alongside messages around environmental conservation, energy costs and other forms of behavioural interventions, to reduce the risk that they trigger an adverse reaction in the form of ‘off-setting’ behaviours.
- 4.20. Rainwater and greywater – which is wastewater from showers, baths, washbasins, washing machines and kitchen sinks – can be collected and, after treatment, be used around the home for purposes that do not require drinking water quality, such as toilet flushing or garden watering. Greywater reuse offers opportunities for reducing household consumption of mains water. While starting to become more common, for a host of reasons, including cost of installation, lack of regulations to cover the quality of reused water and negative public perception of water quality in greywater systems^{lii} there has not been widespread uptake in the UK so far. Globally, water reuse systems are common practice in countries such as Japan, Australia and USA, where they are supported by quality control regulation^{liii}. Opportunities remain for further research exploring whether, and how, support for greywater systems can shift over time and any present opportunities for greywater recycling uptake within new housing developments.

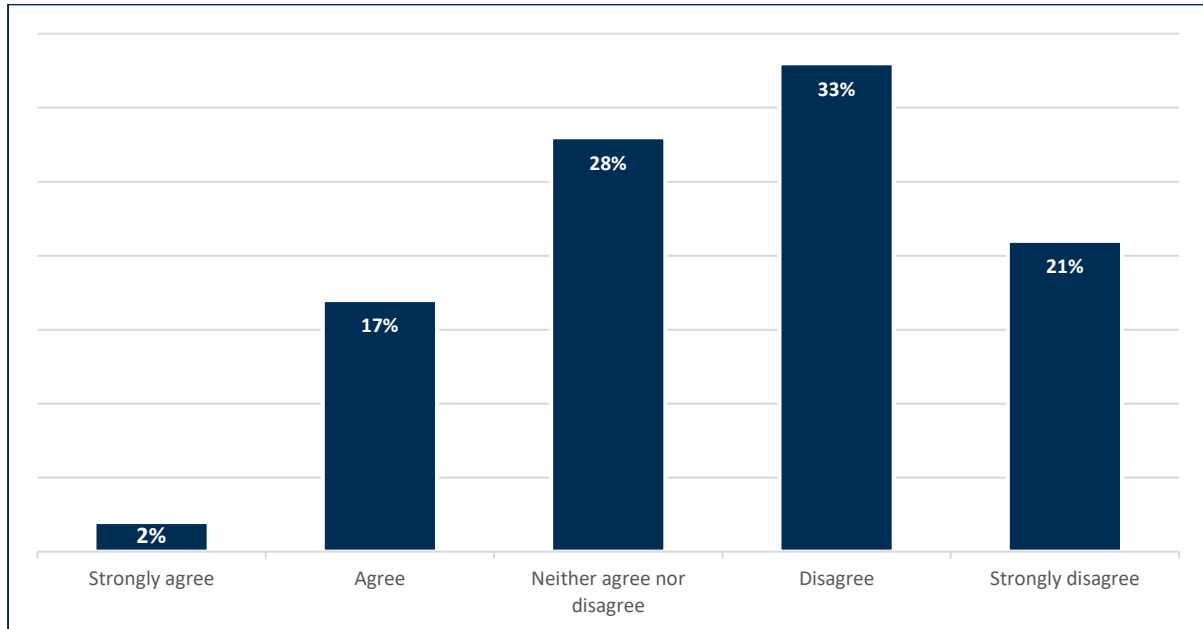
Attitudes towards water conservation

The value of water

- 4.21. Encouraging people to appreciate the value of water in Scotland is an important precursor to the development of strategies to reduce water usage. There is a knowledge gap to address here, as a majority of consumers, as of yet, would not appear to connect actions to conserve water with climate change. Research commissioned earlier this year by Consumer Scotland found that, while most consumers (77%) in Scotland are concerned about climate change, only around one in five (19%) are concerned about how much water is used in their home.

Figure 4 - More than half of consumers in Scotland are not concerned about how much water is used in their home, with only around 1 in 5 stating they are concerned.

Proportion of respondents answering Strongly Agree, Agree, Neither Agree nor Disagree, Disagree or Strongly Disagree to the statement: "I'm concerned about how much water is used in my home".



Weighted base: 2,265

4.22. The evidence suggests that identifying as ‘environmentally conscious’ is not a necessary precursor to adopting water saving behaviours and even those who would define themselves as ‘committed environmentalists’ do not always engage with water saving practices in their day-to-day life^{liv}. Research also indicates that the notion of a ‘right to water’ is sometimes misconstrued by consumers to mean that they have the ‘right’ to consume a certain amount of water^{lv}.

4.23. Water saving behaviours tend to be influenced by past experiences of living with water scarcity, with those who have experienced drought becoming more ‘water conscious’ as a result^{lvi}. Consumer Scotland’s research has found that, while 19% of Scottish consumers report having experienced flooding, far fewer have experience of water scarcity (4%) or drought events (1%).^{lvii} This means that it will take time and resources to not only help people understand how Scotland is likely to be impacted by water shortages, but to motivate them to make changes. There is evidence showing that other water abundant countries with high rates of water consumption, like Norway, also struggle to communicate water scarcity to their population, despite national concern for their environment^{lviii}.

Effectiveness of water conservation campaigns

4.24. Campaigns by Scottish Water (‘Water is always worth saving’ and ‘Your water, your life’) emphasise the importance to the health of people and the environment^{lix}. There is evidence that positive water conservation campaigns, designed to enhance the value of water to the public, can lead to a reduction in household consumption^{lx}.

- 4.25. Water conservation campaigns tend to receive more sustained engagement when they combine messages around the issue of water scarcity (the 'why') with information and practical tips around strategies for households to reduce their water consumption (the 'how')^{lxvi}. The same logic applies when evaluating the effectiveness of water saving technologies, where interventions that give additional advice and support after the installation of meters and technologies tend to generate greater water efficiency savings^{lxvii}.
- 4.26. Previous research carried out by the Customer Forum for Water during the Strategic Review of Charges (2021-2027) regulatory period indicated that consumers are generally highly satisfied with the water and wastewater services they receive in Scotland. Moreover, there was a clear expectation from consumers that that Scottish Water, as a public company, maintain high ethical standards of business, including by behaving truthfully and with integrity. Consumers saw communication and education as part of Scottish Water's ethical business practices, and called for both future and current customers to be educated about water and their usage and behaviours, through work in schools, training and communication campaigns.^{lxviii}
- 4.27. Research has also found that levels of leakage can act as an 'attitude' barrier to consumers adopting water saving behaviours. Consumers want to see water suppliers actively invested in tackling leakages and reducing their own water footprint.^{lxix} Scottish Water reports that 454 mega litres (around 27%) of treated water is lost to leakages per day in Scotland^{lxx}. The volume of water lost through leakage has decreased annually since the targeted leakage reduction programme was initiated by Scottish Water in 2006. Continuing to make progress on leak reduction sends an important message to consumers about the value of water and will give greater legitimacy to water conservation campaigns initiated by Scottish Water. At the same time, detecting and repairing the remaining leaks is becoming more of a challenge, and to maintain the same rate of progress, innovative solutions may be necessary to find and fix leaks.
- 4.28. To take one successful international example, as part of the Danish government's water reduction strategy in the 1990s, water companies were required to reduce the level of leakage to below 10%, or risk fines. Currently only 7.6% of piped water is lost in transit in Denmark. It is worth noting that these targets were set at the same time as standards were implemented regarding water meters for consumers, and Denmark now has a low rate of water consumption compared to other countries, at 101 litres per person a day.^{lxxi}

Pricing structures

- 4.29. The fixed price model for water charges in Scotland presents a challenge for the promotion of water efficiency measures, as consumers are often unaware of how much water costs. Meanwhile, those that do, know that whatever they use they will be charged the same amount^{lxxii}.
- 4.30. In addition, it is the responsibility of householders to maintain and repair customer supply pipes. On average, as much as 25-30% of overall leakage can be from the pipework within private properties rather than leaks in the public distribution network. The current pricing model means that many consumers are unaware of the extent of leakage in homes

and lack incentives to fix leaks if they do not experience issues with water pressure or quantity^{lxviii}.

- 4.31. While charging water and wastewater disposal according to unit cost (metering) can contribute to lower water use, it is also capable of exacerbating existing inequalities, leading to people and families on low incomes consuming less water than they need, with higher-income consumers making few or no reductions to their consumption^{lxix}.
- 4.32. Increasing block tariffs (IBTs) offer an alternative strategy, as '*a price intervention with a social conscience*', by initially fixing a volume of water at a low price to ensure essential needs are met, with an additional higher rate for water consumed above the initial rate^{lxx}. In a review of international literature to assess whether IBTs would balance affordability against conservation needs, it was noted that while it is possible to design a system for IBT pricing thresholds for essential water consumption to match household characteristics, detailed household information is needed to ensure that the pricing thresholds are fair. Countries with IBTs such as Spain, the United States and Australia derive detailed household water information from smart water meters, but the low penetration of household metering would make this challenging in Scotland.
- 4.33. In addition, the success of IBTs also depends on detailed billing systems to make it clear to households what their charges relate to, so they can adjust their water consumption to avoid the higher tariff. Without detailed, real time information on their household water usage, there is a danger that some people will minimise their water consumption to exceptionally low levels to avoid inadvertently entering the high tariff zone. Important to keep in mind is the fact that not every household has the same needs or ability to save water. Households with children, or those with disabilities, for instance, may have higher than average water needs.
- 4.34. Ultimately, before metering is explored as a policy option, further research and testing is necessary to ascertain consumer views on the issue, to explore the likely impact on different consumer groups, and to determine if the benefits outweigh the costs associated with a large-scale roll-out.

5. Next steps

- 5.1. It is important that effective measures are identified and implemented to support consumers in Scotland to use water more sustainably and to help manage the growing pressures on Scotland's water resources. In order to better manage their water consumption, consumers need to be better informed about their water use and in some cases, more targeted interventions may be required. Our evidence suggests the following actions as a means of delivering greater water efficiencies:

Scottish Government, Scottish Water, SEPA, and other water industry stakeholders to coordinate consistent public messaging around 'common sense' water saving behaviours.

- 5.2. As most households in Scotland have never experienced water scarcity, it will take time and resources to not only help people understand the ways in which Scotland is likely to be impacted by water shortages, but motivate them to make changes. For water efficiency

gains to reach a sufficient scale and magnitude to help offset significant infrastructural investment, there is a need for a coordinated approach between the Scottish Government, SEPA, Scottish Water and other water industry stakeholders to conduct a long-term programme of public awareness to encourage a better understanding of the intrinsic value of water resources.

- 5.3. When designing water-saving campaigns, it may be useful to think about targeting known issues. An example might involve an education campaign targeting visitors to islands and other remote areas, to provide better protection to rural water supplies that are put under pressure during peak tourism season. Another option might involve designing a ‘myth-busting’ campaign on a national scale tackling the perception that high rainfall amounts to abundant water supplies in Scotland year-round. There is also room for more education around energy efficiency settings, as consumers do not always appear to be taking advantage of these for white goods.

Scottish Government to provide necessary resource and funding for partnerships between Scottish Water and advice agencies to take place, which enable greater provision of joined up advice to consumers around making their home more water and energy efficient.

- 5.4. Making the linkages between water and energy more explicit gives consumers greater incentives to engage in water-saving behaviours and to invest in water and energy efficient technologies. This is especially relevant for Scotland, where most consumers are billed at a fixed price for their water but pay for most of their energy according to their usage.
- 5.5. Scottish Water reports that reducing time in the shower by 2 minutes each day could save 5,000 litres of water and give a combined energy saving of £130 per household each year^{lxxi}. Modelling similar figures for different ‘common sense’ behaviours, such as turning off the tap while brushing teeth, or filling the kettle only to the extent needed or washing dishes in a bowl, may be one way to effectively demonstrate to consumers the financial benefits of household water conservation.
- 5.6. Advice agencies should be adequately funded so that they can provide integrated advice around water and energy efficiency. Taking such a ‘whole home’ approach would entail providing consumers with information which identifies each of the options available to them to make their property more water and energy efficient, as well as advising on appropriate funding. Partnerships between advice agencies and suppliers are an effective way to achieve this joined up approach. We encourage opportunities to build on the partnership between Home Energy Scotland and Scottish Water, which saw water saving devices being delivered to Scottish consumers alongside energy efficiency support and funding.^{lxxii}

Scottish Government to consider ways to capitalise on plans to introduce UK-wide mandatory water efficiency labelling, including how to make such labels work best for consumers.

- 5.7. The introduction of mandatory water efficiency labelling across the UK for appliances such as dishwashers and showers is a welcome intervention. Water labels can empower consumers to make informed choices around water efficient appliances and promote technological innovation amongst manufacturers. To be most effective, it is important that

labels provide all the relevant information to enable consumers to understand the impact of their purchase choice and the necessary behavioural changes that need to accompany it, which should reduce the risk of the 'off-setting' effect.

- 5.8. It is important to engage consumers and gather their insights during discussions about labelling schemes, to ensure that the information is presented in a clear, accessible manner. There are benefits to providing a combined water and energy label and leveraging the fact that many consumers will already be familiar with and understand energy efficiency labels. Providing this information together may also enhance overall understanding of how upgrading to more water efficient appliances may deliver benefits for consumers in terms of savings in energy bills.

Scottish Government to undertake review of building standards and legislation to consider how they might be revised to incorporate minimum standard requirements when it comes to the instalment and retrofit of water efficient appliances.

- 5.9. As technology continues to improve, opportunities exist for water efficient appliances to be incorporated into new homes and retrofits. However, clear direction will need to be provided to those responsible for providing housing, including local councils and developers, to ensure that these opportunities are not missed.

- 5.10. Research by the Energy Saving Trust has found that the introduction of a water labelling scheme has the potential to deliver the most savings when linked to stringent building and manufacturing standards. Modelling suggests that this could reduce per capita water consumption in Scotland by 48 litres per day per person (30%) and save 5.94 million tonnes of CO₂ equivalent over 25 years.^{lxxiii} To maximise the value of the mandatory labelling scheme, the Scottish Government should be prepared to review and revise minimum requirements in building regulations to ensure that water efficiency measures are considered when building new homes and for major renovations.

Scottish Water to maintain high levels of trust with its customer base and to continue to invest in measures to reduce leakages.

- 5.11. Water conservation campaigns will carry more weight if the organisation delivering the campaign is seen as a credible source with knowledge on the issue and a partner in the process. For this reason, the levels of public trust and approval of the overall performance of water companies can either act as drivers, or can hinder, water conservation behaviour amongst consumers. To retain their role as a credible 'messenger' for household water conservation, Scottish Water should proactively seek to maintain high ethical business standards. As part of this, it is important that Scottish Water continues to deliver impactful public education campaigns around water use and behaviours, and that it continues to invest in leak reduction measures, with a focus on regions where the drinking water supply or quality might be threatened by water shortages or population growth in future.

Research institutions to conduct further analysis of consumer attitudes and water saving technologies, and Scottish Government to invest in innovation by scoping out opportunities for research, development and testing of new technologies.

- 5.12. The literature review identified a lack of published research into household water use and attitudes to water conservation specific to Scotland. As both the regulatory environment and household experiences of water scarcity vary significantly within the UK, findings from studies conducted outside of Scotland cannot necessarily be carried over to Scotland. For example, there is evidence that the introduction of smart water meters in the south and east of England has led to a reduction in household consumption, suggesting that providing households with a detailed breakdown of their water use is an effective means of promoting positive behaviour change. However, further research into consumer receptiveness to smart water meters is necessary to understand if the costs will be worth the benefits in the Scottish context and to inform future policy decisions.
- 5.13. It appears that most consumers are not adequately informed about the ways in which saving water is linked to climate change adaptation and achieving net zero targets. Even those who might define themselves as ‘environmentally conscious’ are not necessarily engaging in ‘common sense’ conservation measures. As such, there is room for further research into what might better aid public awareness of how these issues are interrelated.
- 5.14. In tandem with this, research, development and testing of rainwater and greywater recycling systems should continue to take place, with a view to these becoming more mainstream and cost-effective in future. Water recycling schemes should not be seen as a solution just to a ‘water sector’ problem, but rather as part of a wider agenda that covers decarbonisation and renewable energy – for example, greywater heat recovery presents an opportunity for households to reduce both their water and carbon footprints. There are opportunities for public bodies to offer grants and funding to such schemes on a smaller-scale to support their uptake in future.

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