

Department for Environment, Food and Rural Affairs

Measures to reduce personal water use consultation

Background to CIWEM

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector. The Institution provides independent commentary on a wide range of issues related to water and environmental management, environmental resilience and sustainable development.

CIWEM welcomes the opportunity to respond to DEFRA on its consultation on measures to reduce personal water use. This response has been compiled by our Water Resources specialist panel Chair, Rob Lawson, with assistance from the wider panel.

Response to consultation questions

1. Do you consider that the current approach in Building Regulations (i.e. a mandatory minimum standard for new homes but with local authorities in water stressed areas having discretion to ask for a higher standard through a Building Regulations Optional Requirement) is effective? a. Yes b. No c. No view

Please give reasons to support your answer.

No, we do not think this is effective. Where possible, product-level standards for water using devices should be used either instead of, or linked to whole-building standards. This is because property level standards as enshrined in the current water use calculator include assumptions of appliance use rates and allow those using them to 'trade-off' between appliances and thus reduce the overall effectiveness of the property-level standard.

Product-level standards could be explicitly linked to new water labelling, as presented in the recent report by Energy Saving Trust for Waterwise and Defra¹. Analysis of this intervention in the recent Water UK report indicated that tightening minimum standards and building regulations for water using products could deliver around 1,000 Ml/d of savings in water use by 2065, compared to current ambition². This includes savings from products installed in existing homes, but product-level standards in new homes will be important part of market transformation.

2. Do you consider that the current minimum standard of 125 litres per person per day and optional requirement of 110 litres per person per day should be changed, and if so what might be an appropriate new standard? a. Yes b. No c. No view

¹ <https://www.waterwise.org.uk/resource/phase-2-water-labelling-project-summary-report/>

² Water UK, 2019. Long-term pathways for PCC reduction (not yet published). Artesia.

Please give reasons to support your answer.

Yes, we would recommend a single product-based target equivalent to a whole building standard of 100 l/h/d for all new households.

There should be greater ambition on water efficiency in Building Regulations. The current level as stated is less than recommended by National Infrastructure Commission³, the Committee on Climate Change⁴ and the 'Bricks and Water' report⁵. Several water company plans, including Thames Water, Severn Trent Water and Portsmouth Water also show more ambition than this for their forecast metered household consumption over the next 10 years.

We believe the current minimum standard and optional standard should be changed from just a whole building standard to include product-level standards, based on flow rates specified as part of a water labelling scheme. These standards would be volumes per product, e.g. litres per flush for toilets, litres per cycle for dishwashers and washing machines and flow rates for showers and taps (in litres per minute).

Volume/flow rate specifications do not make any assumptions about ownership or frequency of use and therefore provide a clear way of driving technological improvement in water using products.

PCC varies in relation to the water using products installed, household occupancy, the basis of the household bill⁶, property type (e.g. whether there is a garden), household affluence and behaviour. Therefore, PCC will vary from house to house and potentially from area to area. This means that setting a single value PCC target for new homes is not appropriate. Such values would also need to move in line with the forecast PCC in the rest of the population (e.g. at least every five years).

These factors influence our position that whole-building PCC values are not appropriate, as they are presented at the moment. Product level standards overcome the issues we highlight above.

Given the recommendations in other reports, combined with the ambition in current water resources plans, we would recommend a single product-based target of 100 l/h/d for all new households.

3. Are there any other issues relevant to using Building Regulations to set water efficiency standards that the government should consider?

We recommend that building regulations should be linked into any new water labelling programme. Such a link would provide housebuilders with a very simple and straightforward

³ <https://www.nic.org.uk/publications/preparing-for-a-drier-future-englands-water-infrastructure-needs/>

⁴ <https://www.theccc.org.uk/wp-content/uploads/2019/07/2019-Progress-Report-Summary.pdf>

⁵

https://www.policyconnect.org.uk/sites/site_pc/files/bricks_water_report_wsbfb_web_summary.pdf

⁶ All new households are metered so this is not a factor in this case.

way of specifying products – particularly toilets, showers and taps (and white goods where relevant) for installation in new homes. Water efficient products are on the market at the same price as less efficient products so this will not cost house builders more, and in fact enable them to promote the benefit of lower household running costs to prospective buyers.

4. To what extent do you agree or disagree that Government should work with water companies and local authorities to run partnership retrofit and behaviour change programmes in existing homes?

- a. Strongly agree
- b. Slightly agree
- c. Neither agree nor disagree
- d. Slightly disagree
- e. Strongly disagree
- f. Don't know

Please explain your answer

We strongly agree that government should work with water companies and other stakeholders in this area.

Water companies are already delivering extensive home audit programmes which include retrofit and behaviour change initiatives. The scale of these programmes will be ramped up over the next 5-10 years, and at present most water companies who are delivering these programmes, consider that their plans will not reach as many households as they can without further support.

Therefore, we believe that additional support in these programmes from Government will improve the uptake rate of home audits and enable water companies to deliver these audits to more households. This could be done through a carefully considered campaign to raise awareness and promote the benefits of water efficiency. Such a campaign should consider which messages 'cut through' most effectively with different parts of the population, from saving money on water and energy bills, reducing carbon footprint and preserving the river and wetland environment.

5. To what extent do you agree or disagree that information on water efficiency should be displayed on water using products?

- a. Strongly agree
- b. Slightly agree
- c. Neither agree nor disagree
- d. Slightly disagree
- e. Strongly disagree
- f. Don't know

Please explain your answer

We strongly agree. Recent work by Water UK⁷ has demonstrated that a mandatory, government-led water labelling scheme, linked to tightening building regulations and minimum standards could reduce the demand for water in England and Wales by approximately 2,300 Ml/d by 2065, compared to the current ambition in water company plans.

This study also demonstrated that the marginal cost of this type of labelling programme is approximately £7 per million litres. In broad terms, this is about one hundred times more cost-effective than supply schemes such as new river abstractions or reservoirs. Water labelling benefits also significantly outweigh costs so that £1 spend on this intervention delivers £64 of benefits.

6. To what extent do you agree or disagree that providing information about products' water efficiency changes peoples' purchasing behaviour and reduces their use of water?
- a. Strongly agree
 - b. Slightly agree
 - c. Neither agree nor disagree
 - d. Slightly disagree
 - e. Strongly disagree
 - f. Don't know

Please explain your answer

We strongly agree. Evidence from Australia⁸ indicates that more efficient products (i.e. with higher star ratings under the Australian WELS scheme) make up greater proportion of market share over time. For example:

The dominance of 4 star and above taps has grown from 57% to 82%, with the portion of 5 and 6 star taps increasing substantially from 23 to 44% of available product.

In this example, the increase in the market share for efficient taps is most marked but other key products including showers, toilets and white goods also show this trend (although to a lesser degree for showers and toilets). This demonstrates how water labelling can influence purchasing behaviour.

Provided that the more efficient products do not compromise the user experience, then the promotion of more efficient products via labelling will inevitably result in reduced water use.

7. To what extent do you agree or disagree that water efficiency labels should be linked to building standards and minimum standards?

⁷ Water UK, 2019. Long-term pathways for PCC reduction (not yet published). Artesia.

⁸ For example: University of Technology Sydney (2015) EVALUATION OF THE ENVIRONMENTAL EFFECTS OF THE WELS SCHEME.

- a. Strongly agree
- b. Slightly agree
- c. Neither agree nor disagree
- d. Slightly disagree
- e. Strongly disagree
- f. Don't know

Please explain your answer

We strongly agree. The recent work by Water UK⁷ indicates that a government-led mandatory water labelling linked to building regulations and minimum standards scheme delivered an additional 1,000 MI/d reduction in demand compared to a labelling scheme without these links. This link also improved the cost effectiveness and benefit-cost ratio of water labelling by over 100%.

8. How else could government or water companies encourage people to use more water efficient devices/appliances at home?

Water companies already offer free water efficient devices to their customers – e.g. low-flow showerheads, tap aerators or displacement devices to go in toilet cisterns. This is in addition to the water audits referred to in question 4. However, uptake by households of products and audits is relatively low. Therefore, greater government support of these initiatives would be welcomed, as described in our response to question 4.

More broadly, we believe water labelling is likely to be the most effective long-term intervention to promote more efficient water using products in the home. Labelling will drive market transformation through tightening standards, in the same way that we have seen market transformation in energy using products, via the EU energy label. Such initiatives will eventually result in more efficient products being used in every home in the country, as the standards tighten over time, and as the market responds to these tightening standards.

Other measures such as retrofits and incentives have the potential to bring forward some of the savings from water labelling over time, but cannot deliver the wholesale change in the market that labelling can.

9. To what extent do you agree or disagree that people should pay for water according to how much they use?
- a. Strongly agree
 - b. Slightly agree
 - c. Neither agree nor disagree
 - d. Slightly disagree
 - e. Strongly disagree
 - f. Don't know

Please explain why

We strongly agree. Payment based on consumption is the fairest way to charge for water services and will encourage society to place a greater value on water. Coupled with appropriate tariffs, metering can signal where and when water is scarce, and show when actions need to be taken to conserve a resource under stress.

Metering will improve companies' understanding of customer demand. Universal metering in a wide area (e.g. in a district metered area or a wider part of a water resource zone) will eliminate the need to estimate consumption and will enable companies to understand other parts of the water balance, notably leakage.

Household meters that are installed in the road or pavement will register leaks that occur on customer's supply pipes. Leaks on these pipes are judged to account for about 22% of total leakage across England and Wales⁹. Therefore, metering external to the property will not only encourage increased levels of water efficiency, but will also help to reduce leakage.

Metering will also reduce water lost via internal plumbing. It is estimated that approximately 4.1% of WCs are leaking and average leakage is 215 litres/toilet/day, which is equivalent to 397 MI/day nationally¹⁰

CIWEM considers that metering should be compulsory in areas where water resources are stressed, and areas at risk of becoming stressed. This should be implemented as soon as practical, alongside improved tariffs and measures to protect those with low incomes such that their water services remain affordable.

Compulsory metering should also be an option that water companies are able to implement outside areas of serious water stress, if their customers support it.

It is important to note that metering will not always result in a household becoming more water efficient, mainly because water consumption tends to be relatively price inelastic (prices have to increase significantly before price has an effect on consumption). Hence for most consistent effect, universal metering needs to be accompanied by socially acceptable tariffs that encourage water efficiency and protect low income households.

10. To what extent do you agree or disagree that the amount of households charged by metered volume should be increased beyond and/or faster than what is already planned by water companies?
 - a. Strongly agree
 - b. Slightly agree
 - c. Neither agree nor disagree
 - d. Slightly disagree

⁹ <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>

¹⁰ https://www.waterwise.org.uk/wp-content/uploads/2018/08/Leaky-Loos-Phase-II_Final-report.pdf

e. Strongly disagree

f. Don't know

Please explain why.

We strongly agree – please refer to the answer to question 9.

11. If you agree that the amount of households charged by metered volume should be increased, what do you think would be the best or most appropriate approach? Do you have suggestions for increasing metering other than what is mentioned above?

The legislation¹¹ should be changed to allow water companies outside areas of serious water stress to implement compulsory metering programmes if supported by customers as part of a resilient and cost-efficient water resources plan.

12. Are there any other issues we need to consider with regard to increasing metering?

We are mindful that potential negative impacts on low income customers of a faster, more widespread transition to metered charges must be mitigated.

13. To what extent do you support or oppose use of smart water meters instead of manual meters?

a. Strongly support

b. Slightly support

c. Neither support nor oppose

d. Slightly oppose

e. Strongly oppose

Please explain why.

We strongly support use of smart meters. Smart metering has no clear and agreed definition but is characterised by:

1. measurement of consumption in greater detail.
2. communication via networks and allowing data to be used by customers and utilities.
3. storage of data at predefined intervals.
4. enabling communication between the supplier and the consumer¹².

Smart metering is still in its infancy in the UK. It is being rolled out by Thames Water at present and Anglian Water will start smart metering households in AMP7. Results are not conclusive but it is estimated that reductions in consumption due to smart metering are

¹¹ The Water Industry Act 1999 and subordinate regulations

¹² Based on Foundation for Water Research (2015) Smart meters and domestic water usage. FR/R0023. May 2015.

around 1-2% greater than for conventional meters. Smart meter also brings a range of other benefits including:

- Data from smart meters can be used by water companies to significantly improve their understanding of network operations and leakage.
- Smart metering provides the basis for more informed customer engagement
- Smart metering enables development of tariff structures, which have the potential to reduce consumption further.

Smart energy metering is preceding the roll-out of smart water metering and it is important that the water industry learns from the energy sector. There will also be synergies from smart water and energy metering, for example in understanding, managing and reducing energy used for heating water in the home.

14. To what extent do you support or oppose use of incentives to encourage customers to use less water?

- a. Strongly support
- b. Slightly support
- c. Neither support nor oppose
- d. Slightly oppose
- e. Strongly oppose

Please explain why.

We strongly support the use of incentives. Households should be incentivised to use water more efficiently through innovative programmes such as Green Redeem which operates in a similar way to a supermarket loyalty card. Other incentives, for example at a community level have been shown to be effective where individual benefits are less of a driver. An example is the River Itchen Challenge, run by Southern Water, which offered community rewards to two villages in the Itchen catchment if they were able to reduce their consumption.

15. What incentives could water companies use to reduce customer use of water?

See question 14.

16. To what extent do you support or oppose the use of RWH and GWR schemes at individual level?

- a. Strongly support
- b. Slightly support
- c. Neither support nor oppose
- d. Slightly oppose

e. Strongly oppose

Please explain why

Rainwater harvesting – slightly support

Individual household RWH systems can be retrofitted to existing households or installed in new builds. There are a wide range of designs and operating models each with their own pros and cons, and costs and benefits. Therefore, it is difficult to provide a single summary response to this question without getting into these details.

Despite this, CIWEM believe that individual household RWH systems can have a role to play, particularly in new builds. This is where the economics of installing RWH systems is likely to be best and where the greatest reductions in water use can be achieved. This is because 'designing in' RWH generally means more storage and more efficient water using products (particularly toilets) and therefore less demand on traditional potable networks).

The main disadvantage of individual household RWH is that these systems can run out of water during dry weather, and so require potable supplies to be provided when demand across the water network is at its highest. Appropriate design and sizing of storage tanks, combined with the use of very efficiency toilets will mitigate, but not remove, this risk.

Greywater recycling – neither support or oppose

Individual household GWR is a more challenging technology than RWH, due to the requirement for some form of water treatment but has the benefit of providing a more continuous supply of water than RWH. Retrofits of GWR systems are more challenging than installation in new builds. However the 'yuck' factor amongst users and the need for regular maintenance of the treatment system means that in trials, most homeowners find these systems challenging and they can become unused.

It is harder to see how individual household GWR systems could gain a greater foothold in the market without some form of intervention from government or significant change in current water services or charges.

17. To what extent do you support or oppose the use of RWH and GWR schemes at community scale?

a. Strongly support

b. Slightly support

c. Neither support nor oppose

d. Slightly oppose

e. Strongly oppose

Please explain why

Rainwater harvesting – Slightly support

Community-level RWH schemes provide greater economies of scale than the same measure at a household level. Successful community level RWH schemes will require careful design and construction, partnership working and community buy-in. Appropriately designed schemes should be more cost-effective and perform better than individual household systems. However, the larger schemes also bring their own issues in terms of ownership and maintenance responsibilities. Community level schemes are being included in some developments around the country¹³ but each one is distinct, so it is difficult to draw generic conclusions from them.

Greywater recycling – Neither support nor oppose

Community level GWR schemes are likely to be more challenging than the Albion Water model of greenwater recycling, which takes all effluent and treats it to a non-potable standard¹⁴. GWR would require the wastewater from each property to be separated out into greywater (from baths and showers, for example) and 'blackwater' (toilet and sink wastewater).

18. How can government or water companies most effectively encourage people to reuse water in their homes?

'Formal' reuse – via RWH or GWR – could be encouraged through greater government support for these technologies, e.g. through subsidy or through regulation.

Informal reuse (e.g. using washing up water to water the garden) is much more of a behavioural issue and is addressed under question 22.

19. Do you have any evidence/views/comments on the potential impacts on water bills for various customers and geographical regions should the management of supply pipes be transferred to water companies?

CIWEM does not have any evidence on this.

Transferring supply pipes to water company ownership is likely to have two bill effects. Firstly, if water companies detect supply pipe leaks more quickly, then any metered households with a previously undetected supply pipe leak will see a reduction in their bill. Unmetered households will not experience this benefit. Secondly, the cost of managing this asset is likely to lead to an increase in all bills.

Companies would need to estimate this in their business plans based on their assessment of the size of this asset base in their region. We would expect that there would be cross-subsidies, as there are for the cost to serve at the moment, so that the estimated cost of supply pipe repairs would be averaged across all customers.

20. Of the alternative options above, which is your preferred? Please explain why or if you have other ideas.

CIWEM supports the increased use of metering/smart metering in general and recognise the benefit this strategy would bring to better detect supply pipe leaks. We consider that other options would be required to improve performance on the repair and maintenance of supply

¹³ For example, <https://eddington-cambridge.co.uk/about-us/sustainability>

¹⁴ <https://www.albionwater.co.uk/property-and-developers/what-we-do/our-services>

pipes. Transfer of ownership to water companies is likely to be the most effective option in this regard.

21. What other options are available to reduce leakage from customer supply pipes?

No comments.

22. What are the main barriers to changing behaviours to reduce personal water use? Please rank your top three options by order of importance:

- a. Insufficient access to support and advice
- b. Insufficient information about personal water usage
- c. Insufficient information about water scarcity
- d. Lack of financial incentive
- e. Investment in more water efficient equipment is prohibitively expensive
- f. Difficulty in changing habits
- g. People feel they are already doing all they can to reduce water use
- h. Hygiene reasons
- i. Other (please specify)

This is a very big question and selecting from the options above does not enable us to do it justice! We would recommend reframing the question to consider why changing water using behaviours is challenging. In this context it is important to consider that water use is rarely an end in itself – it provides a function – for example in personal hygiene, house cleaning, relaxation, maintaining an attractive garden or a clean car. In some cases, these functions cannot be provided without water, and reducing water use through behaviour change would reduce the quality of the activity (a shorter shower, a less attractive garden etc).

Water using behaviour is also often habitual and largely unconscious. Daily and weekly routines are built around morning ablutions, evening washing up, weekend laundry etc. Behaviour also reflects social expectations regarding cleanliness and hygiene.

The water using infrastructure in our homes has evolved to satisfy these habits and functions. We now mostly shower daily, use baths for relaxation and use generous amounts of potable water for garden watering. This is possible because of improved water heating systems, en-suite bathrooms, outside taps and hosepipes.

In addition, water is a very reliable and relatively low-cost utility, that many households still pay for based on a relatively arbitrary fixed charge. This not only makes the financial incentive for water efficiency weak; it also means that the appreciation of the value of water in general is very low: we can nearly always turn on the tap and use as much as we want.

We strongly believe that all these issues need to be considered in the round and in much more detail, in order to determine effective behaviour change strategies.

23. Which organisation(s) (if any) should communicate about how to reduce personal water use? Please select all that apply.
- a. Water companies
 - b. Government
 - c. Local government
 - d. Environmental non-governmental organisations, for example environmental charities
 - e. Other – please specify

Please explain your answer

All of the organisations you identify have a role in promoting water efficiency. The other key organisation is Waterwise.

We strongly believe that all stakeholders should work together to achieve lower levels of water use. In addition to those identified above, we would also include:

- Water-using product manufacturers and trade bodies
- Retailers
- House builders
- Professional trade bodies for plumbers and heating engineers
- Social science, water science and data science academics.

This could be achieved via a water saving forum with a clear mission and set of objectives to achieve its stated aims which could be held to account by Ofwat. It should use existing activities such as the Water UK Demand Forum, Waterwise groups and relevant publications, conferences and social media to maximise its impact.

An important function of a water saving forum would be to continue the work by Waterwise and water companies and others to determine the most effective ways of reducing consumption. This will need to consider the existing evidence base, the requirements for further research, the design of this research and how the findings should be shared. This work is likely to involve a diverse range of specialists from water resource planners, and behavioural experts, to builders and plumbers.

24. If there are any further matters that you would like to raise or any further information that you would like to provide in relation to measures to reduce personal water use, please give details here.

Leaky loos

The change in regulations to allow the installation of toilet cisterns with a drop valve mechanism enabled the widespread installation of dual flush toilets in UK homes. This has helped reduce water use overall, over the past 20 years. However, these mechanisms are prone to leakage and this is resulting in increased rates of leaky loos. It is estimated that approximately 4.1% of WCs are leaking and average leakage is 215 litres/toilet/day, which is equivalent to 397 MI/day nationally.

This could account for as much as 5% of total consumption, and the problem will only get worse without intervention, as the mechanisms on more toilets fail. This situation is made worse by the toilet cistern overflowing into the toilet itself, which can make it difficult to detect the leak.

We recommend:

- Government works with water companies to improve the detection and repair rates for existing leaky loos
- Government considers how to improve the specifications for toilet cistern mechanisms, through building and/or water supply fittings regulations, to minimise the loss of water from leaky loos in the future

Personal water use outside the home

In our consultation response we have assumed that (to this point) personal water use equates to household consumption. However, increasingly personal water is a large proportion of water use in non-households such as commercial premises. This is because of the decline in process-based industries and the rise of the service sector.

We don't believe that most people mentally differentiate between how they use water at work, or in other locations outside the house, and how they use it at home. There is therefore a strong case for developing a more integrated approach to water efficiency that covers both households and non-household properties.

There is strong anecdotal evidence that the creation of a retail market for water services to non-households in England has made it harder to understand how much water is used by commercial properties and to promote water efficiency in these premises. The demand from non-households makes up approximately 22% of total water supplied and so is a significant part of the water balance that is currently very under-served by water efficiency activity. We strongly recommend that this is an area for attention.