

Water Efficiency Strategy for the UK

June 2017





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Foreword

Ambitious water efficiency is essential to the resilience of services, which we know from extensive research across the water sector is important to customers. In the face of pressures such as climate change, population growth and new ways of using water, it's abundantly clear that we need to make the water we do have go further. Water efficiency also prevents further damage to the ecosystem - another thing we know customers care about.

With this strategy, Waterwise sets a blueprint for what the world could look like if we all work together to deliver it. If we all really value water. I'm really proud of the work Waterwise has undertaken to produce this strategy - which is both visionary and pragmatic. Policy, regulatory and practical actions to deliver ambitious water efficiency in innovative ways are at its heart. I'm grateful for the continued support of the Water Efficiency Strategy Steering Group, and we look forward to working with colleagues across the UK to deliver the strategy and actions.

Nicci Russell
Managing Director, Waterwise



I'm grateful to Waterwise for their continued thought leadership - driving the agenda and UK ambition on water efficiency. Water efficiency is an essential part of delivering a resilient water supply to customers across the UK. The Water UK report on long term water resources, published in 2016, makes this clear. It also makes it clear that future UK droughts will be of longer-lasting impact - and will affect the whole of the UK. The Water Efficiency Strategy Steering Group looks forward to working with Waterwise to deliver this strategy and the actions it sets out.



Jean Spencer
Chair, Water Efficiency Strategy Steering Group
Executive Director, Anglian Water



Introduction

The UK faces a number of serious water challenges. Climate change is likely to lead to increasingly erratic weather patterns, meaning less certainty over river flows and rainfall, and more floods and droughts. This casts doubt on the assumptions around the reliability of traditional water sources like groundwater abstraction or reservoirs. Climate change could also mean that the UK will be required to produce more food, as other parts of the world become less suitable for agriculture, meaning increased water use in the UK for irrigation. At the same time, increased population means a greater demand for public water supply now and in the future. Finally, the ways we use water are changing, and some of these ways use more water.

The extremes of weather and changes in demand will put an increasing strain on water infrastructure. The links between water and energy will become more critical, because water is required for power generation and fuel production and at the same time energy is also used to pump, treat and heat water. The interrelationship between water supply and the health of the natural environment will become increasingly stark. Half of

ivers in England are over-abstracted now: summer river flows may be significantly lower in coming decades, and there will be competition for water between public water supply abstraction, power station cooling and agricultural irrigation. On the wastewater side, lower river levels also cause issues for effluent dilution.

Water efficiency has a significant role to play in addressing the challenges faced by the water sector and beyond. It is one of the few tools that can address both climate change mitigation and climate change adaptation. It can help the UK meet its climate targets and make the country more resilient to droughts and floods. Water efficiency can reduce pressure on existing infrastructure and offset the need for new infrastructure. It can help reduce water and energy bills for households and businesses. It can create skilled jobs and offer export opportunities for UK innovation. It is at the interface of engineering, social science and information and communication technology (ICT) and is a modern high-skills sector that could create jobs.



Waterwise

Waterwise is an independent, not for profit organisation with the vision that water will be used wisely, everywhere, every day. We are supported by water companies, product manufacturers, consultancies and others working in managing demand for water. We developed the consultation document with our supporters and input from government and regulators.

The strategy

Waterwise developed this strategy to raise ambition and delivery on water efficiency in the UK, building on work to date in the sector. We consulted on it between November 2016 and January 2017. 22 responses were received from organisations including

water utilities, consultancies, academics, professional and consumer bodies, businesses, an industry association and regulators, in addition to private individuals.



What is water efficiency and what is our vision?

Being water-efficient is using the appropriate amount of water required to carry out the specific task. By improving water efficiency less water is wasted and its economic, social and environmental value is maximised. Water efficiency has an important role to play in the green economy, an inclusive society and a thriving environment. Water reuse and rainwater harvesting also have a strong role to play in efficient urban water management.

Water efficiency is something we can all be a part of everyday - as shown in the themes for Water Saving Week (Figure 1), run annually by Waterwise in March.

A final strategy and action plan

Waterwise is proud of this strategy and the clear path it sets to more ambitious water efficiency - for people, the economy and the environment. We're also proud of the collaborative way in which it's been developed, and grateful for the input of our supporters and others. This strategy is designed not to sit on the shelf - the Water Efficiency Strategy Steering Group has been formed to develop actions from the strategy and enable delivery in partnership across a range of organisations. The group is chaired by Jean Spencer, Executive Director, Strategic Growth and Resilience at Anglian Water, and members include the majority of water companies across the UK. We have also had input from UKWIR and the Department for Communities and Local Government.

Long-term planning is essential for resilience and we recognise this in the strategy. However, there will be many necessary and likely changes in the next five years and we believe this is the right timescale within which to review the strategy, with annual progress reports in between.

The Water Efficiency Strategy Steering Group will work with a wide set of stakeholders to progress the actions outlined in this strategy. A monitoring report will be produced by Waterwise in August 2018 to demonstrate progress made.

Thanks to Waterwise Supporters

This strategy would not have been possible without our Waterwise supporters, who through their funding enable us to continue driving the policy and strategy agenda towards a more resilient and sustainable future. Their continuing support will help us to continue to deliver the strategy actions in partnership with the wider water sector.



Recommendations are in **boxes** throughout the document. A table of actions has been developed at the end of each main chapter.

The timeframes are:

- Short term | 6 to 12 months
- Medium term | 12 months to 2 years
- Long term | 2 to 5 years

Our vision for this strategy is:

'A UK in which all people, homes and businesses are water-efficient'



Figure 1 Water saving week



Why do we need to become more water-efficient in the UK?

Water scarcity

In September 2016 Water UK published its Water Resources Long Term Planning Framework (2015-2065) report.¹ Using new modelling techniques and a 50-year planning horizon, the report considered the impacts of climate change, population growth, environmental protection measures and water use trends on water availability. It identified that we are facing longer, more frequent droughts and more acute droughts in future than previously thought - and that these will affect the whole of the UK. It set out that the difference between supply and demand could be significant by the 2040s (Figure 3).

The report outlined extended water efficiency practices (smart metering, tariffs, retrofitting 65% of properties, new home standards of 105 litres per head per day and reduced leakage through active leakage control and pressure management) as well as enhanced water efficiency (all new homes achieving 105 litres per head plus extensive retrofitting of existing homes and large-scale mains replacement for leakage). It also highlighted policy and regulatory interventions to deliver the 'extended' demand management strategy cost-effectively. Without significant innovation and increased water efficiency we will need expensive and inflexible large water transfer schemes and new supply options to be built.

If we do not take action the impacts of water scarcity will be wide-ranging, from pressure on river flows and biodiversity to constraints on economic development, power shortages, reduced food production and stresses on social cohesion and access to water. Some of these impacts are being seen already. Yet despite their diversity, they are not widely understood beyond the parts of government, regulators and the water sector that are directly involved with managing water resources.



Figure 2 Proportion of carbon emissions from heating water in the home, excluding space heating (Environment Agency and Energy Saving Trust, 2009)

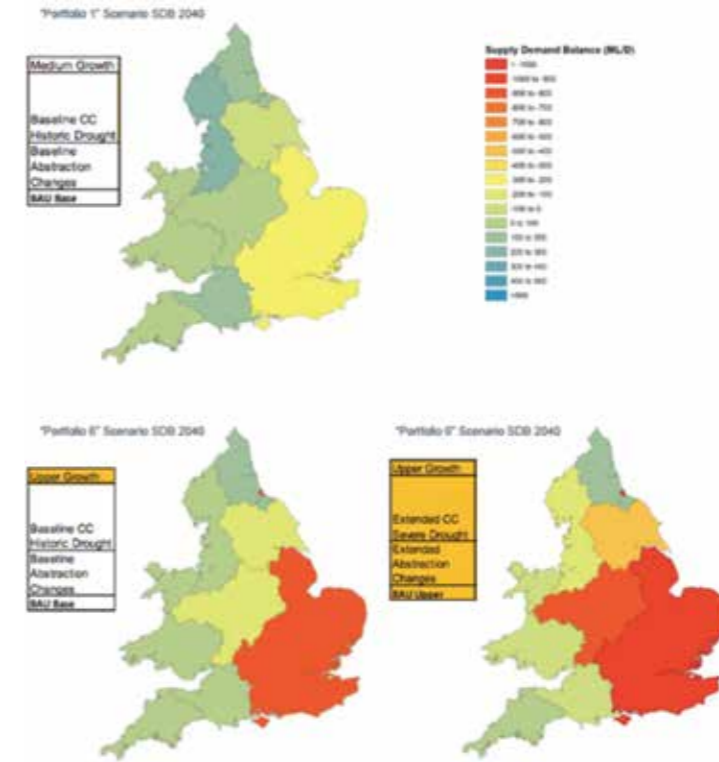


Figure 3 Supply demand deficits project to the 2060s (Water UK, 2016)

Water energy food nexus

Managing water, energy or food in isolation can lead to unintended impacts in each area. There is increasing investment and research in taking a 'nexus' approach to integrate these. To date the area most explored has been the water-energy nexus and joining up retrofit programmes.

Heating water in homes for cooking, personal washing and cleaning produces 5% of the UK's greenhouse gas emissions and a quarter of CO₂ emissions from homes – it is the second biggest use of energy in homes, after space heating, and before gadgets and appliances. Wasting less hot water in homes – through more efficient fixtures and fittings and more efficient use of hot water from taps and showers - can help meet carbon targets. Wasting less hot and cold water will reduce the carbon footprint of the water industry, which would as a result need to pump and

treat less water and wastewater (and will in turn make the sector more resilient to climate change as less water is needed). The water industry produces 1% of total UK greenhouse gas emissions and Scottish Water is Scotland's largest user of electricity. In short, wasting less water cuts carbon emissions, decarbonises the economy and supports the creation of new green jobs and technologies.

There has been some progress in joining up programmes across the UK, but this varies significantly by water (and energy) company. This strategy proposes several actions for assessing progress to date and sharing knowledge and best practice for joining up the water-energy nexus. The links between water and fuel poverty also need to be considered, with water efficiency able to help affordability of both services.

¹ Water UK, 2016



A. How far are we from best practice?

There is currently no agreed definition of delivering best practice water efficiency, although there are many approaches emerging. These are being investigated by the International Water Association.

An international assessment released in May 2016 ranked London 34, Birmingham 28, and Manchester 26 out of 50 major cities for water efficiency (Copenhagen ranked first). These low scores reflect the opportunities for water efficiency retrofitting, metering, water reuse and innovative water charging schemes² to improve water efficiency.

The latest assessment of water company performance by the Consumer Council for Water identified a slight increase in water consumption in England and Wales over the past year to 140 litres per person per day.

	2011-12	2012-13	2013-14	2014-15	2015-16	Trend
Industry Average	145.8	140.1	141.5	138.6	138.6	
Water and Sewerage Companies						
Anglian*	144.8	136.2	135.1	133.4	135.4	
Dwr Cymru	152.1	144.4	144.6	141.5	138.5	
Northumbrian	146.2	140.5	141.2	141.9	144.7	
Severn Trent	125.0	120.9	129.3	126.4	130.4	
South West	134.5	136.7	136.9	134.6	136.6	
Southern	156.7	143.4	140.8	134.8	132.0	
Thames	160.6	154.7	156.2	150.9	149.3	
United Utilities	132.0	128.0	129.1	130.0	130.0	
Wessex	139.8	136.3	138.4	138.8	138.1	
Yorkshire	136.0	133.4	136.2	133.0	133.1	
Water Only Companies						
Affinity	157.6	148.5	154.7	148.3	152.2	
Bournemouth	146.4	142.4	144.1	138.4	133.6	
Bristol	142.0	141.0	144.0	143.0	141.1	
Cambridge	140.7	133.1	130.1	130.5	132.9	
Dee Valley	138.3	135.5	132.9	130.4	134.9	
Essex & Suffolk	153.0	147.4	151.9	151.0	150.7	
Hartlepool	123.7	123.1	124.7	119.9	127.5	
Portsmouth	160.0	149.0	148.0	145.5	143.3	
South East	167.2	159.4	155.6	148.2	161.2	
South Staffs	135.6	127.6	131.0	129.0	128.9	
Sutton & East Surrey	168.6	161.5	166.5	161.1	157.9	
* Anglian includes Hartlepool						

Figure 4 Per capita consumption 2010 to 2015 (CCWater, 2016)

Their key findings include³:

- Over the past five years, there has been a downward trend in the amount of water that households are using each day, although fluctuations can be seen throughout the years. However, in 2015-16, there was a slight increase in the amount of water that customers use each day (Figure 4).
- Unmetered households use more water (around 30 litres per person per day more) than metered households.
- In Scotland domestic water use accounts for 841.64 MI/d or 150 litres per person per day (2013-14). A declining trend has been observed since (2008/09⁴). Average water use in Northern Ireland is 145 litres per person per day⁵.

Water UK has developed a dashboard called "Discover Water". This now includes water consumption and leakage data at the individual water company level.

There is an opportunity for this dashboard to combine data from several indicators in order to rank companies on their water efficiency performance.

There are many international examples of water efficiency best practice which we could learn from; parts of Spain and Denmark have managed to reduce per capita consumption of water to 100 litres, without

Reflect best practice water efficiency and include baseline values against which water efficiency and resilience can be measured/ compared - in the Water UK dashboard and future resilience indicators

the use of greywater recycling or large-scale rainwater harvesting⁶; Denver in the USA and Singapore have developed mass public engagement programmes either through government intervention or marketing; Israel has implemented circular economy principles with 100% reuse of wastewater for agriculture; Singapore has developed closed loop wastewater systems; and Japan has implemented widescale rainwater harvesting through legislation.

The Water UK long term water resources planning framework developed a water resources zone based approach to per capita consumption targets in its scenarios. This recognised the variation within and between companies and how greater water efficiency could be achieved. Figure 4 illustrates how a target that reflects the initial consumption could be applied rather than a flat target for all water resource zones. In the US, approaches that assess best practice water use and water budgets at a household level have been used and there have been nationwide and statewide comparative assessments.

Feedback from the consultation responses suggested more work on wider water footprints and virtual water use for sectors of the economy; using distribution input⁷; using per household consumption; and using a multi-channel approach where both physical devices and consumer behaviour are measured. Monitoring of external variables was also suggested to target programmes including average peak demand, maximum

per capita demand, population, demand restrictions and annual rainfall. Targets also need to be based on reported water savings rather than assumptions, in order to drive water efficiency.

These indicators of water efficiency could be used in the 'outcome delivery incentives' in Ofwat's regulatory framework for England and Wales - to reward or penalise water companies based on water efficiency delivery.

Indicators for water-reuse and non-potable water use have also been suggested. These reduce transport of water and associated energy use and carbon emissions.

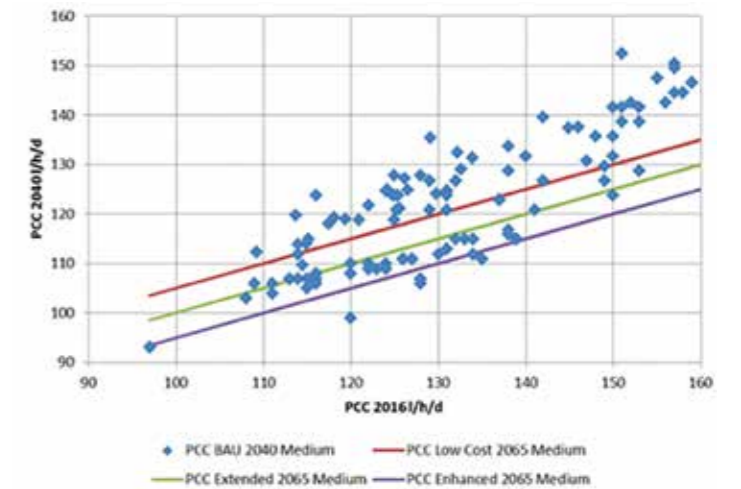


Figure 5 Developing water resource zone based per capita consumption targets⁸

Develop indicators/ targets around per capita consumption and best practice

² Arcadis, 2016
³ CWater, 2016

⁴ Climatexchange, 2017
⁵ NI Water, 2017

⁷ Average amount of drinking water entering the distribution system to be supplied to consumers in an appointed water company's area of supply. This is essentially total demand for water as it includes consumption, leakage, water taken unbilled and distribution system operational use

⁶ IWA, 2016
⁸ Water UK, 2016

Actions Table: Why do we need to become more water-efficient in the UK?

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Include water efficiency measures in energy efficiency and fuel poverty retrofit/ advice programmes	A1	Review joint water and energy efficiency programmes in England, Wales and Scotland	Water companies, Energy Saving Trust, CCWater, SaveWater South East, Waterwise	Short term
	A2	Joint meeting of Water UK Water Efficiency Network, Energy UK Energy Efficiency Network, Ofwat and Ofgem	Water UK, Energy UK, Ofwat, Ofgem, water companies, energy companies, CCWater, Waterwise	Short term
The Water UK dashboard and future resilience indicators should reflect best practice water efficiency and include baseline values against which water efficiency and resilience can be measured/ compared” to match with recommendation in main text	A3	Research demand management impacts on resilience. Collate all water company water efficiency programmes’ potential, to quantify how big a role water efficiency could potentially play in delivering UK resilience	Waterwise, water companies, Environment Agency	Medium term
Develop indicators/ targets around per capita consumption and best practice	A4	Review water company 2019 business plans against best practice for water efficiency	Ofwat, Waterwise	Medium term
	A5	Review best practice/ achievable levels from the Water Efficiency Evidence Base	Waterwise, water companies, consultancy	Medium term
	A6	Review demand management - including water efficiency - targets in the context of Ofwat ODIs for water companies in England and Wales	Waterwise, Ofwat, water companies and consultancies	Medium term
	A7	Water UK and UKWIR work on per capita consumption to consider water efficiency implications	Water UK, UKWIR, water companies	Medium term



B. Water, people and communities

Water efficiency requires people and communities to get on board in one way or another. New products have to be chosen, understood and used by people, individuals have to decide to engage with 'smart' technologies, and changes made to water-using behaviours must be made by people themselves.

There is a growing and identified trend in the UK towards resource-efficient behaviour. In recent years advice programmes and incentives have targeted energy efficiency, but Waterwise research indicates that households are also keen to be more efficient with water (see some of the key messages from our tracker survey in Box 1).



Key findings from Waterwise and Ideal Standard Water Efficiency Annual Tracking Survey in Great Britain (GB) (2016)

- 86% of adults that pay for their water via a fixed rate take actions to specifically reduce their water use, rising to 94% among those with a water meter.
- 82% of GB adults with a water meter reduce their water usage in order to save money.
- In 2015 70% of respondents reported taking actions to try and save water, rising to 88% in 2016.
- There appears to be a lack of communication regarding water efficiency with 62% (in 2015) and 67% (in 2016) of respondents reporting having had received no help, information or free water-saving devices in the past year. This is highest in Wales, where 85% report not having received it.
- 18% of those that do not take any action to save water did so because they "had not thought of saving water before"

To highlight the importance of people and communities to water efficiency, Waterwise has developed a workstream focussing specifically on work in this area. The key aims of this workstream are to improve water sector understanding of approaches to behaviour change, customer engagement and community participation (new ideas and best practice), as well as to boost the quality and robustness of research and data collection in this area.



Water efficiency and customer participation

Water efficiency, particularly at scale, is an invaluable tool in driving customer participation – as well as using water efficiency programmes to get customers to help deliver water savings, it can contribute to multi-layered relationships to help inform, track and improve customer service and outcomes across companies.

For water companies in England and Wales, Ofwat’s focus on customer engagement helps to put people and communities at the forefront of water efficiency work. It’s recent ‘Tapped in’ report on engagement sets out the reasons why water companies should be working to turn passive customers into active participants, setting out a continuum of customer engagement and involvement (below).

The customer participation continuum	CUSTOMER PARTICIPATION	Increasing active customer participation to bring these ideas to life.
	ENGAGING AND INVOLVING	Involvement of customers or their representatives. Making it easy for them to propose specific ideas or solutions to achieve change.
	LISTENING AND ACTING	Listening to different customer groups and acting on what is heard in order to achieve business objectives.
	LISTENING AND UNDERSTANDING	Understanding what is important about water in the lives of different customer groups.

Figure 6 Customer participation continuum



A UK water sector Leadership Group on Water Efficiency and Customer Participation will help raise ambition on water efficiency by:

- Driving top-level commitment and progress to scaled up water efficiency as a tool to increase customer participation as well as resilience;
- Supporting the sector in aiming high on both counts, through innovative approaches, and sharing best practice;
- Developing the use of water efficiency as a tool to develop customer participation across companies’ services, and as a result improve the tracking and quality of customer service; and
- Helping companies move from seeing customers as recipients of services, to seeing them as active participants in the delivery of those services

- Implement a UK Water Sector Leadership Group on Water Efficiency and Customer Participation

Creating a water-saving culture

To accomplish widescale water efficiency, a water-saving culture must be developed throughout the UK. We know that most people take some actions to save water, but we also know that there is a lot more to do. Water efficiency needs to become the norm across all activities throughout everybody’s lives - wasting water should be seen as going against the norm.

In order to achieve this, water efficiency activities must be scaled-up across the board, by all parties – nobody should be reporting having received no help or information.

- Develop a water-saving culture
- Recognise that developing a water-saving culture is a shared endeavour

Working together to communicate water efficiency

Consistent and co-ordinated messages are important for effective communication and vital to developing a water-saving culture. But there is a lack of consistent messaging

and little co-ordinated joint action between water companies and this may become even more difficult if competition is introduced for household customers in the future.

Co-ordinated Action

SaveWater South East, a partnership of six water companies in the South East, the Environment Agency and Waterwise is a good example of co-ordinated action. It was set up to increase the awareness of water as a finite resource and create a water-saving culture by working together via joint communications and projects.

SaveWater South East is also working with other stakeholders interested in water efficiency. The outcomes from this partnership could help inform wider regional or national water efficiency programmes.



The 2012 drought highlighted the importance and benefits of having joined-up messaging. However, it also demonstrated issues around a lack of awareness and understanding in the community on water resources issues such as supply and groundwater. This was the first time that a new range of 'Temporary Use Bans' were implemented for domestic and business customers. A project for UK Water Industry Research found that businesses and households would like better communication in the run-up to a drought.

Earlier communication around the drought led to some customers having a better understanding of the issues, which may have supported reduced consumption.

Findings from Australia⁸ indicate that as watering restrictions and communications are removed consumption can increase. These experiences emphasise the importance of continuous water efficiency messaging, not only at times of drought.

- The water companies and the Met Office, CEH, EA, NRW and SEPA should combine resources to provide a water information system for the UK that includes drought and water supply, to inform customers and policy makers
- Develop a national water efficiency communication/engagement platform

Developing a national large-scale combined communication platform, involving water companies, government and other key stakeholders would enable a consistent voice around water efficiency. This could then feed into regular local communications to ensure messages were continually reinforced - whatever the weather. An example is the "three P's" (pee, poo and toilet paper) messaging approaches shared by the whole sector but delivered by each water company in their own way.

Information provided by tools such as the UK Drought Portal can feed into a national communications platform. The portal allows communication of drought at a higher resolution and easier comparison between different parts of the country. There is also a need to communicate water demand and water storage for each water company to help raise awareness of water resources amongst the general public. The Water UK Discover Water dashboard could be extended to include this.

Sharing knowledge and improving skills

Traditional skillsets within the water sector do not include social science and behaviour change approaches. Recent research (Lewis, 2016) highlighted the importance of increasing awareness of the range of behaviour change methods available and improving the capacity and confidence of water companies to properly evaluate behaviour change programmes.

To address this skills gap, Waterwise is developing a behaviour change handbook specifically designed for water efficiency practitioners.



What factors are barriers to the use of behaviour change techniques in the water sector?

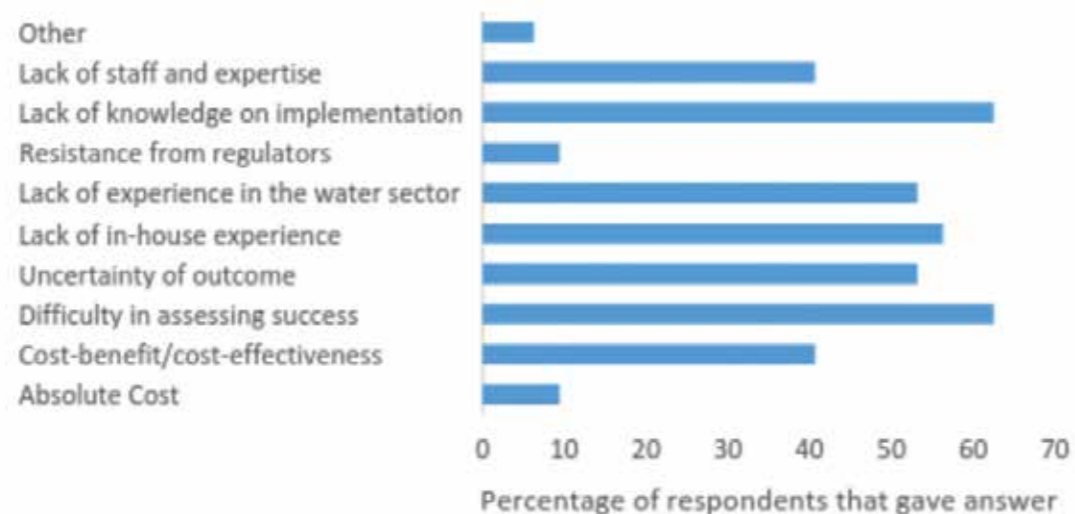


Figure 7 Water utility responses on behaviour change¹⁰

To ensure that work is taken forward on a robust evidence base, a Water Efficiency Database was developed through the Waterwise Evidence Base work programme. This publicly-available online database acts as a searchable library of water efficiency projects and research (see related recommendation under “Water company Delivery and Regulation”).

There is a great deal of knowledge, expertise and new research being undertaken in the academic world that is of great benefit to those delivering water efficiency on the ground. To harness this information and ensure successful knowledge-sharing, a Water Efficiency Social Science Network will be set up. This network will bring together academics and water sector professionals to share findings and experience.

- Increase the amount and quality of integrated behaviour change and retro t/metering programmes in AMP7



Actions Table: Water, people and communities

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Implement a UK Water Sector Leadership Group on Water Efficiency and Customer Participation	B1	Group to regularly meet building on the commitment to use water efficiency as an enabler of greater customer participation in water management	Waterwise, water companies	Short term
Develop a water-saving culture	B2	Evaluate the regional messaging approach from SaveWater South East (engagement and facilitation for retrofit) Review the #thinkwater campaign and potential for standardised social approaches	SaveWater SouthEast, Water companies, Waterwise	Medium term
Communication/ engagement	B3	Research to underpin a national water efficiency engagement programme in PR19	Water companies, Waterwise, CCWater, SaveWater South East	Medium term
	B4	Based on above research, undertake a national water efficiency engagement programme in PR19	Waterwise, CCWater, Water companies, SaveWater South East	Medium term
	B5	Implement targeted water efficiency engagement projects in partnership based on the national platform	Waterwise, Blueprint for Water, SaveWater South East	Medium term
Increase the amount and quality of integrated behaviour change and retrofit/metering programmes in AMP7	B6	Publish a bestpractice guide on multi-channel and long lasting behaviour change	Waterwise	Medium term
	B7	Develop a consistent approach for reporting results of behaviour change for evaluation.	Waterwise, Water Efficiency Network, Water companies	Medium term
	B8	Evidence base review of behaviour change projects	Waterwise, Water Efficiency Network, Water companies	Medium term
	B9	Agent based modelling of water efficient behaviours	Waterwise, Water Efficiency Network, Water companies	Long term
Combine resources (the water companies and the Met Office, CEH, EA, NRW and SEPA to provide a water information system for the UK that includes drought and water supply, to inform customers and policy makers	B10	Trial communication of water demand (i.e. at the city/ region level) for one company or SaveWater SouthEast in the Discover Water portal	Water companies, Waterwise, SaveWater SouthEast	Medium term
	B11	Link Water Situation Reporting into the Discover Water Portal Develop an app similar to the Australia Bureau of Meteorology Water Storage app (for South East at least)	Environment Agency, Water UK, Natural Resources Wales Waterwise, SaveWater SouthEast	Medium term



C. Water wise cities

This strategy addresses the International Water Association's Water Wise Cities principles. There is increasing awareness of the need for collaborative action at the city level between local governments, urban professionals and individuals to find solutions to managing water in cities. Three paradigm shifts include:¹³

- Resources are limited: we need to do more with less
- City densification is both an opportunity for economic growth and a threat to liveability
- An uncertain future underlies the planning of our cities



This strategy proposes delivering regenerative water services and 'water-wise' communities. This section focuses on urban water use including:

- Social housing;
- Water efficiency in new developments; and Retrofits.
- Water efficiency needs to be integrated in the approach and habits of planners, developers, and home owners. Incentives and standards can support this.

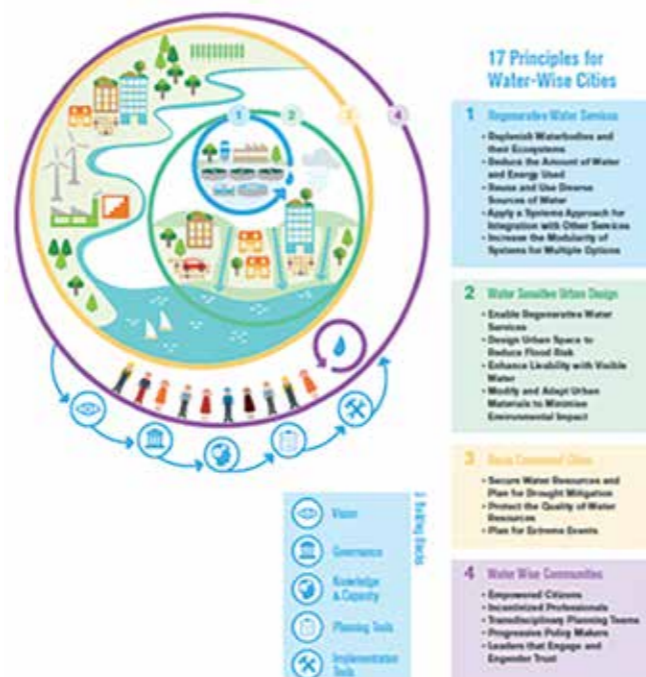


Figure 8
IWA Water-Wise
Cities Principles

Social housing

Social housing stock makes up a significant proportion of properties across the UK - an average of 18% across the UK in 2012.¹⁴ Local authorities and housing associations regularly run retrofit programmes (fixing and amending water-using fittings in homes) and there is an opportunity to procure water-efficient devices to help reduce water and fuel poverty. Waterwise research (for the Greater London Authority) revealed that 80% of social housing in London has baths but not showers – this is in part because much of the stock was constructed before showers were considered a standard fitting, and in part because social housing standards such as Decent Homes do not require installation of showers as part of refurbishment.¹⁵ This is significant as an average bath uses 80 litres of hot water compared with 32 litres for a 4-minute shower with a water-efficient shower head.

In Wales “Guidance on water and associated energy efficiency for the Welsh Housing Quality Standard for retrofit programmes”

was published in 2012.¹⁶ [EST & EAW, 2012;](#)

The guidance set out the key reasons for saving water in social housing and detailed what providers can do in procurement and retrofit programmes. It was estimated that if every social housing property in Wales had water-efficient taps and a retrofitted toilet and shower, combined energy and water bills could be reduced by £3.5 million a year. Similar guidance could be developed for the Scottish Housing Quality Standard or the Decent Homes Standard in Northern Ireland.

New social housing is often on new developments mixed with private rent, private ownership and affordable homes. Improving water and energy efficiency is important across all properties but will have a large impact on affordability of water and energy bills for vulnerable customers in social housing. All new-build social housing should include high standards of water efficiency and this can easily be procured.

Water efficiency should be included in social housing standards (i.e. Decent Homes and Welsh Housing Quality Standard). Any refit or upgrade of existing social housing should include the installation of showers in homes where there is only a bath. Voluntary guidance and partnerships with water companies should be developed.

Water-efficiency in new developments

The Housing White Paper set out a need for 225,000 to 275,000 or more new homes per year to keep up with population growth and deal with historical under-supply. [DCLG, 2017](#). However, if these homes are not built to higher levels of water efficiency there will be an increased demand for water and it is likely that they will need to receive a retrofit visit in the future.¹⁷ We shouldn't be building homes that waste water.

Water efficiency in new developments has been improving, although the Housing White Paper if implemented remove much of the requirement for developers and councils to do this. There is a significant opportunity to reduce water use in new developments and a need to understand actual vs reported water use figures. Changes to Part G of the building regulations in 2010 for England and Wales require that the water use of a home (calculated using the Water Efficiency Calculator for New Dwellings) be no more than 125 litres per person per day.

The optional Technical Standards in the National Planning Policy Framework (England) set out how local planning authorities can develop Local Plan policies requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day in areas of water stress. The definition of water stress for this purpose is different to that for water metering, and evidence can come from water companies and other sources. Builders can either meet this based on the 'water calculator' approach or the AECB- based fixture based approach (based on good practice and best practice flow rates). The Water Calculator, described in Section D, will be updated to promote higher levels of water efficiency.

In Scotland Section 7 on Sustainability was introduced to the Scottish Building Standards and Environmental Assessment methods in 2010. This benchmarks building performance based on 'Bronze' (mandatory) and 'Bronze +', 'Silver', 'Gold' and 'Platinum' (all voluntary)

linked to flow rates based on the AECB approach.¹⁸

Although water-efficient fixtures and fittings are often no more expensive than inefficient products there is still a perception that they cost more for developers and affect marketability of homes. There is an opportunity to address this through an incentive related to the infrastructure charges posed by water companies on new developments (now possible due to the move to charging rules through the Water Act 2014, rather than Ofwat signing off all charges schemes). A variable infrastructure charge linked to the installation of labelled water-efficient fittings and fixtures would incentivise greater water efficiency in new developments. Some water companies are taking forward such schemes. Part of the developer cost saving could be put towards a fund for water efficiency behaviour change in those homes or delivering wider water neutrality in the area.

The Building Research Establishment's Environmental Assessment Method BREEAM development accreditation scheme is the most commonly-used assessment of water efficiency for non-households. The water component provides up to five credits towards an overall score for a building. A potential limitation with this approach is that it doesn't currently require products to meet an approved standard (e.g. based on a water label) and this in turn doesn't help transform the market for water-efficient products and appliances beyond the non-household sector. BREEAM assessment is often a local planning requirement.

Behaviour change and awareness of water-efficient products is also key to ensuring projected savings are realised. New home packs from developers should include details on water-efficient devices. New tenant packs could also be introduced by social housing providers or in the private rented sector.

¹⁵ Waterwise, 2009

¹⁶ EST and EA Wales, 2012

¹⁷ UK Government, 2017

¹⁸ BRE, 2012

Variable infrastructure charges

Waterwise is trialling this approach with Southern Water in Eastleigh. Developers in Eastleigh are being offered a 50% discount in their water infrastructure connection charge for new builds if they use fittings rated A or B under the European Water Label. The scheme is simple and easily verifiable and uses market incentives to reward developers for environmental improvements. It means that developers can improve environmental standards at no cost and with almost no administrative burden, householders get higher quality fittings and lower running costs and there are benefits to the aquatic environment and improved water security. The discount is funded by Southern Water customers but should be offset by the water efficiency savings generated. This trial is a good example of public, private and third sector organisations working together to develop solutions that work for everyone.

Other water companies - such as Severn Trent Water and Anglian Water - are working on similar approaches for water efficiency or water reuse and there is an opportunity to share knowledge in this area.

New planning frameworks with an increased role for local communities should take forward water neutrality partnerships – with homes, businesses, schools and hospitals in the area receiving a water efficiency retrofit to avoid an increase in overall demand as a result of new local development. For example, Neighbourhood Planning in England gives communities powers to set such policies through a neighbourhood plan and when they grant planning permission through Neighbourhood Development Orders and Community Right to Build Orders for specific development.

Local Area Agreements should require water efficiency in local planning policies.

Pilots and incentives should be developed to provide community-scale water provision and sustainable urban drainage – building resilience to flooding and scarcity. Severn Trent Water and a range of partners are trialling physical changes (homes and streets), behaviour change, and independent testing facilities in their Urban Demonstrator Project.¹⁹ Water neutrality concepts could also form part of these policies. The Thames Gateway project investigated water neutrality. An Alliance for Water Efficiency Study²⁰ has also highlighted that this concept is being applied in many regions across the USA.

- Implement variable infrastructure charges for new developments to encourage water efficiency measures
- Link water efficiency standards for buildings to water labelling and incentives
- Take forward water neutrality partnerships via new planning frameworks with an increased role for local communities
- Require water efficiency in local planning policies via Local Area Agreements
- Provide guidance for local councils (Government) on how they should interpret their water efficiency duties (Water Act 2003)
- Require all new developments to meet the 110 litres/person/day, using the fittings performance method Table 2.2 Maximum fittings consumption optional requirement level

Actions Table: Improving water efficiency in our urban environment

Retrofits

With less than 1-2% of the total building stock each year being new build, 70% of total 2010 building stock will still be in use in 2050. The built environment is currently responsible for over two thirds of total carbon emissions and a majority of public water supply use.

Waterwise research suggests that a partnership approach to water efficiency is the most cost-effective. Partnership retrofitting and behaviour change programmes tend to show greater uptake, greater engagement and greater water, carbon and financial savings, and to be more innovative than solo approaches. There is a role for social enterprises, cooperatives and community organisations to work together with government and the water sector to deliver water efficiency. The establishment of partnerships and trusts for re-source efficiency could also deliver social and economic benefit to local communities.

Tools like the Royal Institute of Chartered Surveyors (RICS) SKA refurbishment guide should drive greater water efficiency retrofitting in non-households and we would like to see the building sector adopting these type of approaches as standard.

As we scale up delivery of water efficiency across the UK there may be a skills and capacity gap. A partnership approach between the water companies, plumbers, builders and others to identify these gaps can help with long term delivery.

Recommendations	Action Number	Action	Organisations recommended to be involved	Timing
Water efficiency should be included in social housing standards (i.e. Decent Homes and Welsh Housing Quality Standard). Any re fit or upgrade of existing social housing should include the installation of showers in homes where there is only a bath. Voluntary guidance and partnerships with water companies should be developed	C1	Review guidance developed for Wales and implementation	Welsh Government, EST Wales, Waterwise	Medium term
	C2	Build on the SaveWater SouthEast toolkit and promote this across England	SaveWater SouthEast, water companies, Waterwise, National Housing Federation (England)	Medium term
	C3	Review standards and guidance in Scotland	Scottish Water, Scottish Government, Waterwise	Medium term
	C4	Review standards and guidance in Northern Ireland	Northern Ireland Water, Northern Ireland Government, Waterwise	Medium term
Implement variable infrastructure developer charges for new developments to encourage water efficiency measures	C5	Compile a list of approaches being developed by water companies	Waterwise, water companies, Ofwat, developers, CCWater	Short term
	C6	Assess impacts of incentives with projected vs actual consumption	Waterwise, water companies	Medium term
Increase water efficiency of new homes	C7	Identify how many local authorities have included the 110 l/p/d Per capita consumption requirement in local planning	Defra, Environment Agency, water companies, DCLG, local authorities	Short term
	C8	Review evidence on actual water efficiency and impacts on behaviours at lower levels of per capita consumption, specifically in new build housing.	Water companies, Waterwise	Short term
Take forward water neutrality partnerships in new planning frameworks with an increased role for local communities. Require water efficiency in local planning policies via Local Area Agreements	C9	Develop guidance for water efficiency in neighbourhood planning and for local groups responding to planning consultations	Waterwise, DCLG, local authorities	Medium term
	C10	Introduce water neutrality concepts for large developments	Water companies, Waterwise	Medium term
Link water efficiency standards to water labelling and incentives	C11	Update the Waterwise/ BMA Water Calculator (used for finding labelled products for new developments) in light of changes to building regulations	Waterwise, BMA, water companies	Short term
Provide guidance for local councils (Government) on how they should interpret their water efficiency duties (Water Act 2003)	C12	Include a commitment to developing guidance for local authorities in the Defra 25 year Environment Plan	Defra, DCLG, Water UK	Long term



D. Products and labelling

Innovative water-efficient products are being developed all the time, but customers aren't always aware of them. An effective water labelling scheme is essential for transforming the market so that consumers can be aware of and buy water-efficient devices. The UK currently has the European Water Label and the Waterwise CheckMark to help identify water-efficient products - but these aren't universal to all stores and products. As of 2015 the Water Label had 88 registered brands and 8,000 registered products, and there has been some increase in use of the label in stores and online. The links with building standards and the Waterwise/ BMA water calculator have driven use of the label for new developments. We can learn from experience in Australia and the USA to further develop and strengthen water labelling the UK.

The US Environmental Protection Agency's Watersense labelling scheme has saved more than 1.5 trillion gallons of water since

2006 (around 6.8 million megalitres), 78 mega tonnes of carbon dioxide, and USD\$32.6 billion in savings in consumer water and energy bills. In 2015, 16,110 labelled products were available.²² The programme also extends to labelling of new homes and through social media and drought communications is well integrated into overall water efficiency programmes.

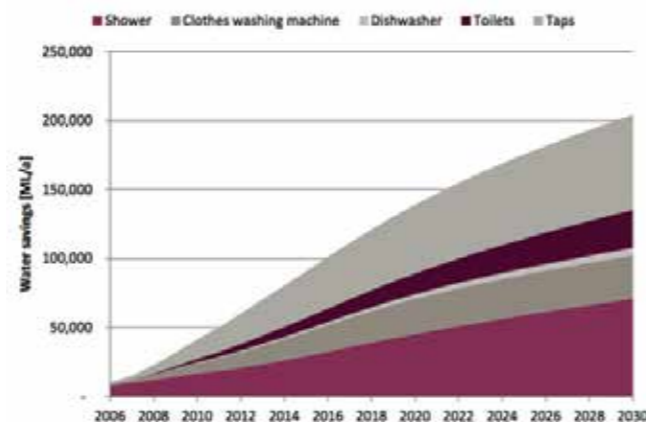


Figure 10 Historical and projected water saving from water labelling and increased water efficiency in Australia²¹



Figure 9 The European Water Label

The latest review of the Water Efficiency and Standards Labelling (WELS) scheme in Australia calculated a saving of 70,000 ML/year water (Figure 10), 5.5 MT/year of carbon dioxide, and AUD\$520m/year in household utility bill savings. The labelling scheme has been combined with a range of wider programmes including rebates on efficient products and appliances to help transition the market.

Strengthening adoption of water labelling

A labelling scheme on its own isn't the end goal. We need further uptake of labelling and promotion on kitchen, garden and bathroom products, in stores, on websites and linked to building/ procurement standards. Incentive programmes that require a label, such as reductions to developer charges or rebate programmes for water customers, can also help this market transformation. A mandatory label would increase use of water-efficient products in water company incentive and retrofit programmes and via new build planning regulations. This strategy proposes further development of the voluntary and incentive schemes already in use in the UK, alongside working with government to develop a mandatory labelling scheme for the UK, drawing on evidence of labelling impact to date.

Rebate schemes have been essential for driving market transformation and the uptake of the Water Efficiency and Standards Labelling scheme in Australia. For example, the rebate scheme in Western Australia was funded by the state government and delivered through the water company and resulted in 170,000 new water efficient washing

machines being installed. The number of Perth households installing dual-flush toilets increased from 36% in 1992 to 84% in 2006 and purchase of front-loading washing machines increased from 7% to 25%. Rebate programmes run by water companies in the UK could better support a market transformation than current free giveaways which are untargeted and have uncertain take-up rates. This would enable consumer choice, which is especially important where homeowners are refurbishing their kitchens and bathrooms. Rebate schemes could also target specific items such as toilets.

The government in Northern Ireland is considering amending the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 to include a performance rating for water fittings. This could be linked to the Water Label to support changes in other parts of the UK. This effect was seen with the plastic bag charge implemented in Wales, then Scotland, Northern Ireland and England.

Many UK water companies are keen to see a mandatory water label, as has been the case with energy, with the energy label now widely available and recognised at point of sale.

- Undertake an independent review of the effectiveness of the Water Label
- Work with government to develop a mandatory labelling scheme for England and Wales, drawing on evidence of labelling impact to date
- Trial rebates as a method to incentivise customers to purchase water-efficient devices and for stores to stock these
- Consult on mandatory water efficiency standards (Northern Ireland)
- Link public sector water standards to the water label to encourage manufacturers to use the label and produce more efficient products
- Review BREEAM accreditation and link the water components to the Water Label to help support a wider market transformation
- Retain zero VAT rating post Brexit for water-efficient devices listed in the HMT/ Defra ECA Green List

Water calculator

Waterwise and the BMA produced The Water Calculator to link the Water Label with Part G of the building regulations and the Code for Sustainable Homes. The calculator has won awards and is used daily by a range of architects and other building industry professionals.

There is a need to modernise the calculator so that it reflects the latest water efficiency technology, changes to building standards, and opportunities to link with incentive schemes around water company developer charges and public procurement. The calculator could also be extended to provide a portal for new non-domestic water retail companies to provide water efficiency options for their customers.

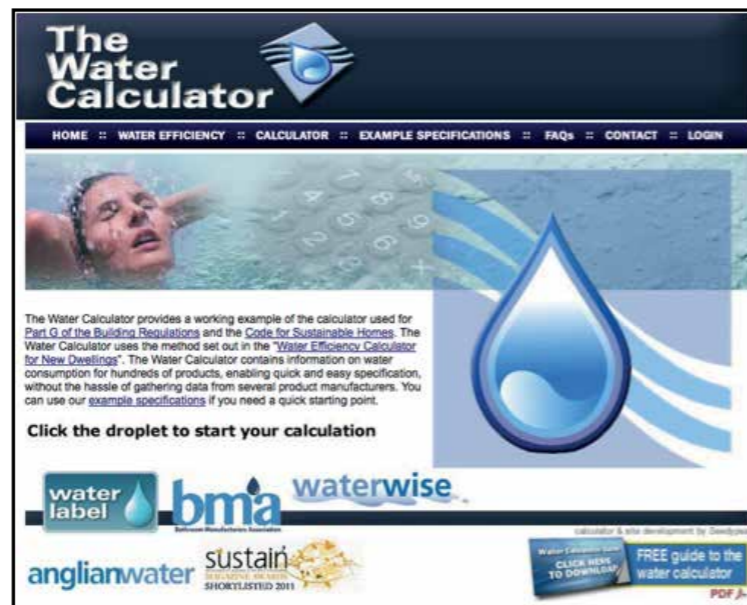


Figure 11 Screenshot of The Water Calculator website

Rainwater harvesting and greywater reuse

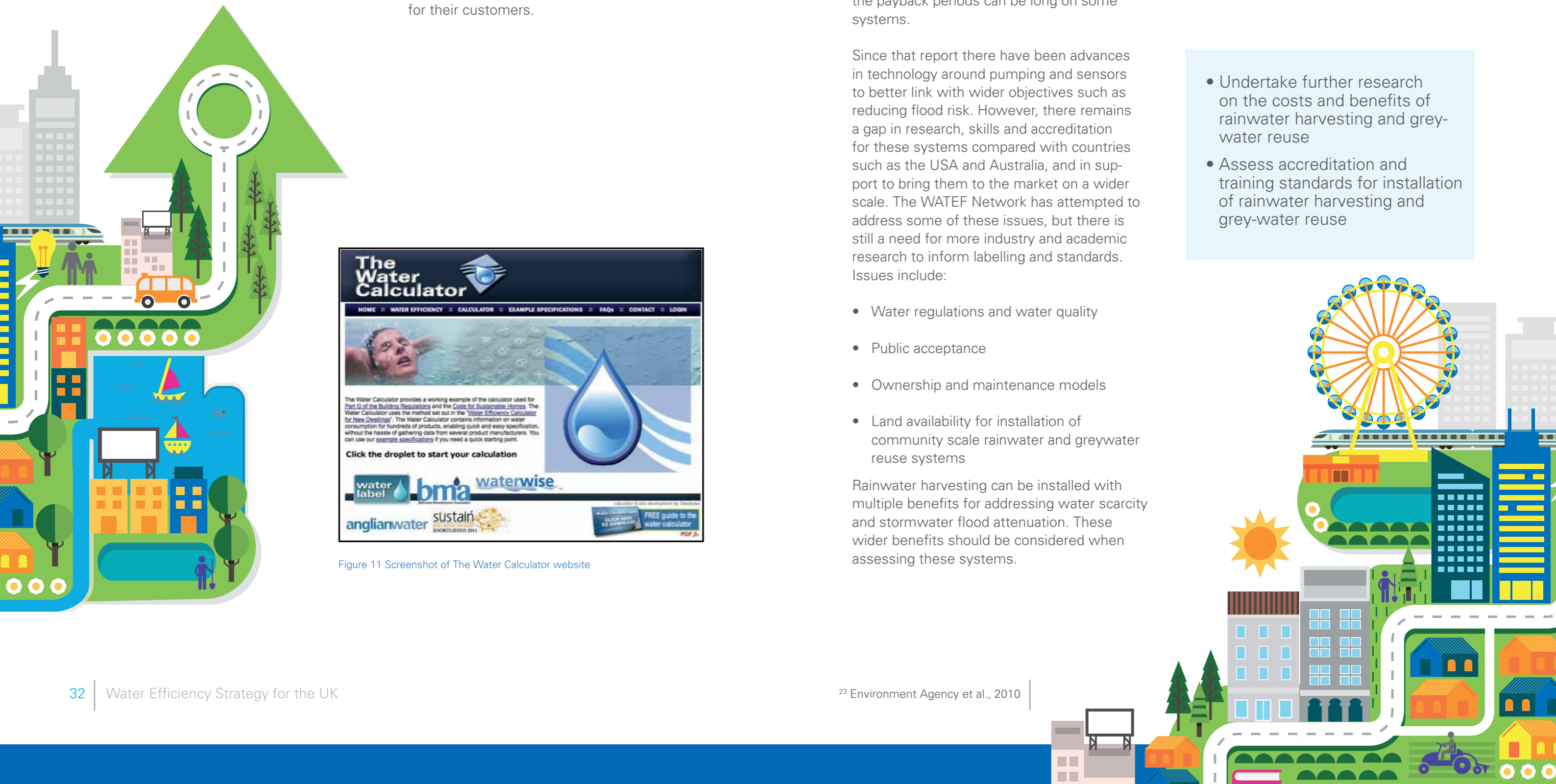
Rainwater harvesting and greywater reuse have been implemented with mixed experience in the UK. A report on the carbon implications of these systems in 2010 suggested that due to pumping and treatment they are often more carbon intensive than the public water supply.²³ Additionally, the payback periods can be long on some systems.

Since that report there have been advances in technology around pumping and sensors to better link with wider objectives such as reducing flood risk. However, there remains a gap in research, skills and accreditation for these systems compared with countries such as the USA and Australia, and in support to bring them to the market on a wider scale. The WATEF Network has attempted to address some of these issues, but there is still a need for more industry and academic research to inform labelling and standards. Issues include:

- Water regulations and water quality
- Public acceptance
- Ownership and maintenance models
- Land availability for installation of community scale rainwater and greywater reuse systems

Rainwater harvesting can be installed with multiple benefits for addressing water scarcity and stormwater flood attenuation. These wider benefits should be considered when assessing these systems.

- Undertake further research on the costs and benefits of rainwater harvesting and grey-water reuse
- Assess accreditation and training standards for installation of rainwater harvesting and grey-water reuse



Product Innovation

The products being supplied by water companies in retrofit programmes to households have changed little since the first mail-out of devices in response to Ofwat Water Efficiency Targets in 2011. The UK has a long history of innovation in manufacturing and includes several technology hubs that could be used to develop smart water products including point-of-use measurement and behaviour change feedback devices. With climate change leading to more extreme weather and drought internationally we can also export products.

A range of new products and technologies include:

- Smart point-of-use water measurement devices – such as on showers
- Smart rainwater butts that empty when needed for stormwater attenuation
- Airflush toilets
- Ultra low-flow products
- Improved customer engagement displays and devices

- Use the Waterwise water-efficient product awards to promote and stimulate research and innovation



Figure 12 Range of retrofit devices and innovations available for retrofit programmes



Fixing leaky loos

Toilet leakage has been identified as a major issue in the UK. Recent research on around 300 domestic toilets²⁴ concluded:

- That on average, approximately 4.1% of toilets were found to be leaking.
- Average leakage rates of 215 litres/toilet/day (based on the sample mean) and 72 litres/toilet/day (based on the sample median)
- Estimated total wastage from toilet leakage is 397 MI/day (based on the sample mean) and 133 MI / day (based on the sample median)
- The overall contribution of WC leakage to the average per capita consumption is between 1.65% and 4.63%.
- New properties (post-2000) are most likely to have leaks and 81% of these are associated with flush valves



- Work with water companies and other partners (government) to develop large-scale water efficiency retrofit schemes across the UK, including through establishing partnerships
- Raise awareness of the need for compliant products among retailers and suppliers, plumbers and customers. (Further customer and stakeholder education is also required regarding compliance. This could be achieved through the provision of advice and information.)
- Develop a training programme to support facilities managers in delivering water efficiency services
- Change fittings regulations (government) to require that all dual-flush and lo-flush WCs use syphon mechanisms

Actions Table: Products and labelling

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Undertake an independent review of the effectiveness of the Water Label	D1	Research the European Water Label and other labels in the UK (e.g. energy labels) to set out the business case for improving effectiveness	Water companies, Waterwise, Energy Saving Trust	Short term
Work with government to develop a mandatory labelling scheme for England and Wales	D2	Support the current voluntary labelling standards whilst moving towards mandatory labelling and water efficiency standards	Water companies, Waterwise, European Water Label, BMA	Medium term
Incentivise the use of water-efficient devices and fittings, through water company rebates similar to those used in the USA and linking eligibility to the European Water Label	D3	Undertake a water efficiency rebate trial linked to the water label	Scottish Water, Waterwise, European Water Label, BMA, SaveWater South East	Short term
Consult on mandatory water efficiency standards (Northern Ireland)	D4	Ensure action in the Northern Ireland Water Strategy is delivered	Waterwise, NI Government	Medium term
Provide guidance for local councils (government) on how they should interpret their water efficiency duties (Water Act 2003)	C12	Include a commitment to developing guidance for local authorities in the Defra 25 year Environment Plan	Defra, DCLG, Water UK	Long term
Link public sector water standards to the water label to encourage manufacturers to use the label and produce more efficient products	D5	Review water standards in public procurement and link to the water label	BEIS, Treasury, Defra	Medium term
Review BREEAM accreditation and link the water components to the Water Label to help support a wider market transformation	D6	Undertake a review of BREEAM water credits	Waterwise, BRE, European Water Label, water companies	Medium term
Retain zero VAT rating post Brexit for water-efficient devices listed in the HMT/Defra ECA Water Technology List	D7	Develop evidence for policy, including cost benefit analysis	HMRC, Waterwise, Defra	Long term
Undertake further research on the costs and benefits of rainwater harvesting and greywater reuse	D8	Review latest modelling for PR19 and recent case studies. Share outputs between water companies	Industry, Academia, water companies	Long term
Assess accreditation and training standards for installation of rainwater harvesting and greywater reuse	D9	Review and report against implementation of the BSi standards	BSi, Waterwise, Rainwater management association, WATEF network	Long term
Use the Waterwise Water-Efficiency Awards to promote and stimulate research and innovation	D11	Publish a water efficiency innovation compendium of awarded products Review; 2017 awards and hold again	Waterwise	Medium term
Raise awareness of the need for WRAS-compliant products among retailers and suppliers, plumbers and customers. (Further customer and stakeholder education is also required regarding compliance. This could be achieved through the provision of advice and information.)	D12	Deliver a coordinated programme of training and advice on product compliance (especially toilets). Deliver training online based on industry standards	Water companies, Waterwise, BMA, WaterSafe WRAS, Housebuilding bodies, plumbers, developers, SaveWater South East	Medium term
Regulate to prevent the sale and use of leaky loos in the UK	D13	Develop approaches to ban installation of leaky toilets	Water companies, Waterwise, BMA	Medium term
	D14	Review the water fittings and fixture regulations	Defra, Water UK, water companies, Waterwise, BMA, DWI, WRAS	Medium term



E. Water company delivery and regulation

Regulatory framework for water companies

Governments and regulators across the UK have made it clear they want to see increased water efficiency in water company planning and investment. As set out elsewhere in this strategy, this ambition should be taken forward by water companies to improve the resilience of their services and to underpin a move to a more customer-led sector. But there are also challenges for government and regulators. For example, Ofwat should ensure that its analysis of English and Welsh company business plans for PR19 reflects this high ambition. Ofwat needs to build into its regulatory frameworks acceptance of innovation that fails - that's the nature of innovation. Partnerships delivering multiple benefits need to be squared with a regulatory tendency to draw a straight line between what water customers pay

for and the direct benefit it leads to. And the rewards and penalties which hold water companies to account for their customers should include quantified water efficiency at scale. It's important that Ofwat includes water efficiency expertise in its price review work - to enable it to establish whether plans really are ambitious and innovative. The same is true of the analysis of Water Resource Management Plans. And as set out above, governments should not be allowing homes and products to be built, fitted and sold if they aren't water-efficient.

- Ensure Ofwat reflects its high ambition on water efficiency in its operational work for PR19

Water neutrality

The Blueprint for Water coalition have called for a 'water neutral' PR19, where companies ensure there is no overall increase in the amount of water abstracted from rivers and groundwater despite increases in population and climate change. Water efficiency will play a major role in enabling this. Water neutrality has been assessed at a development scale in the UK²⁵ but the Alliance for Water Efficiency

in the US and partners are applying this concept at the water company scale.²⁶ Water neutrality could be linked to Outcome Delivery Incentives for water companies in England and Wales in PR19 to drive ambition.

²⁵ Environment Agency, 2007

²⁶ Alliance for Water Efficiency, 2017

²⁷ CCWater, 2015

Metering

The UK is one of the few countries in the developed world not to have either full water metering or a clear programme to implement universal metering. At present 50% of households in England and Wales are metered and this is projected to increase to 61% by 2020.²⁷ In England, water companies can compulsorily meter customers if they have been designated as being in an area of water stress (by the Secretary of State based on evidence from the Environment Agency). Otherwise, they can't. In Scotland there are some meter trials but the current level is close to zero, whilst in Wales the Welsh Government is looking at the benefits of smart meters.

Southern Water's Universal Metering Programme (UMP) has shown that domestic metering can save 16.5%.²⁸ If people do not pay for the amount of water they use, there is no financial incentive to use water efficiently - alongside social norms and other behavioural incentives, which do still exist. For unmetered customers, it is important to seek alternative ways to incentivise the efficient use of water. We are proposing a water meter in most

homes in England and Wales (some can't be metered) by 2030, supported by water efficiency and political commitment and tariffs to protect vulnerable customers and based on a wider cost-benefit analysis.

- Allow water companies to introduce full metering for benefits beyond areas of designated water stress status
- Fit water meters in almost all homes in England and Wales by 2030, supported by political commitment and tariffs to protect vulnerable customers and based on a wider cost-benefit analysis
- Increase the proportion of smart water meters at company level



Tariffs

Metering with appropriate tariff structures - such as the rising block tariff (where the unit charge rises for progressively higher volumes of water taken by customers), or a seasonally-varying or aridity-indexed tariff (where water costs more per unit when it is less plentiful) – has the potential to be a major incentive for water efficiency in the future. In their latest water resources plans, many water companies have announced substantial selective metering programmes that are predicted to generate considerable reductions in consumption. There should be political support for appropriate and smart metering to manage the demand for water; however, the social and economic implications of such an approach need to be properly factored into policy and practice, with appropriate provisions being made for the disadvantaged.

Some companies are also thinking outside the usual range of tariffs towards incentives. Gamification and discounts/ prizes linked to reduced consumption at a household or community scale are an example of this.



Improving delivery of large-scale domestic retrofit programmes

With universal metering programmes including some home visits for water efficiency there has been an increase in the total number of visits undertaken. In the current water company delivery period, there are hundreds of thousands of planned home visits. However, there is wide variation in the level of water saving achieved and the quality of delivery - and in the evaluation and planned use of resulting data. We can learn from the range of approaches and their level of uptake and water savings achieved. Drawing on this, water company retrofitting programmes need to be significantly scaled up - they currently represent a very small proportion of water company investment. Water companies also need to ensure that they are treating water efficiency as a strategic issue and not only one of supply and demand. Ofwat has made it clear that it should be on every Board table.

The evidence base for water efficiency, developed by Waterwise and the industry, has been used in business plans, water resources management plans and the Water UK long term water resources planning framework report. However, there is a need to update figures, drawing on more recent schemes. This will help understand variation between companies and programmes.

- Continue to raise capacity and skills in delivering water efficiency through training and accreditation programmes
- Provide a database of companies that have trained staff or used trained contractors to provide assurance to Ofwat and the general public about the efficiency and reliability of delivery in water efficiency programmes
- Update the water efficiency evidence base
- Business plans, price determinations and water resource plans should be water neutral, resulting in no net new abstraction or normalised increase in supply

Actions Table: Water company delivery and regulation

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Ensure Ofwat reflects its high ambition on water efficiency in its operational work for PR19	E1	Allow innovation to develop, allow no regret approaches with multiple benefits, require and include quantified water efficiency in incentives, ensure Ofwat undertakes an exercise to be able to judge the level of company ambition and innovation in water efficiency	Ofwat, Waterwise, water companies	Short term
Allow water companies to introduce full metering for benefits beyond water stress status (customer engagement)	E2	Explore opportunities for revising the water stress designation linked to metering and wider benefits such as customer engagement	Environment Agency, Defra, Water Companies, Waterwise, Ofwat, CCWater	Medium term
Fit water meters in the majority of homes in England and Wales by 2030, supported by tariffs to protect vulnerable customers. Increase the proportion of smart meters	E3	Research wider costs and benefits of customer participation and water efficiency linked to greater data availability from smart metering	Water companies, Waterwise, Ofwat, CCWater	Long term
Initiate a new round of incentive/ tariff (household or community) trials linked to smart metering	E4	Hold a workshop to collate evidence on incentives and share knowledge in sector	Waterwise, water companies, Ofwat, Waterwise, Anglian Water, Thames Water, Southern Water	Short term
	E5	Add information from recent incentive trials to the evidence base and disseminate results	Waterwise, water companies, Ofwat, Waterwise, Anglian Water, Thames Water, Southern Water	Short term
Continue to raise capacity and skills in delivering water efficiency through training and accreditation programmes	E6	Review skills and capacity for delivering aspirations on water efficiency across a range of sectors and scales	Waterwise, water companies	Medium term
Provide a database of companies that have trained staff or use trained contractors to provide assurance to Ofwat and the general public about the efficiency and reliability of delivery in water efficiency programmes	E7	Develop database of Waterwise-accredited professionals	Waterwise, Water Safe	Medium term
Update the water efficiency evidence base	E8	Update and review the evidence base to support WRMPs and PR business plans	Waterwise, water companies, CCWater	Medium term
Ensure that business plans, price determinations and water resource plans are water neutral, resulting in no net new abstraction or normalised increase in supply.	E9	Review WRMPs for water efficiency activities	Waterwise, Blueprint for Water	Short term

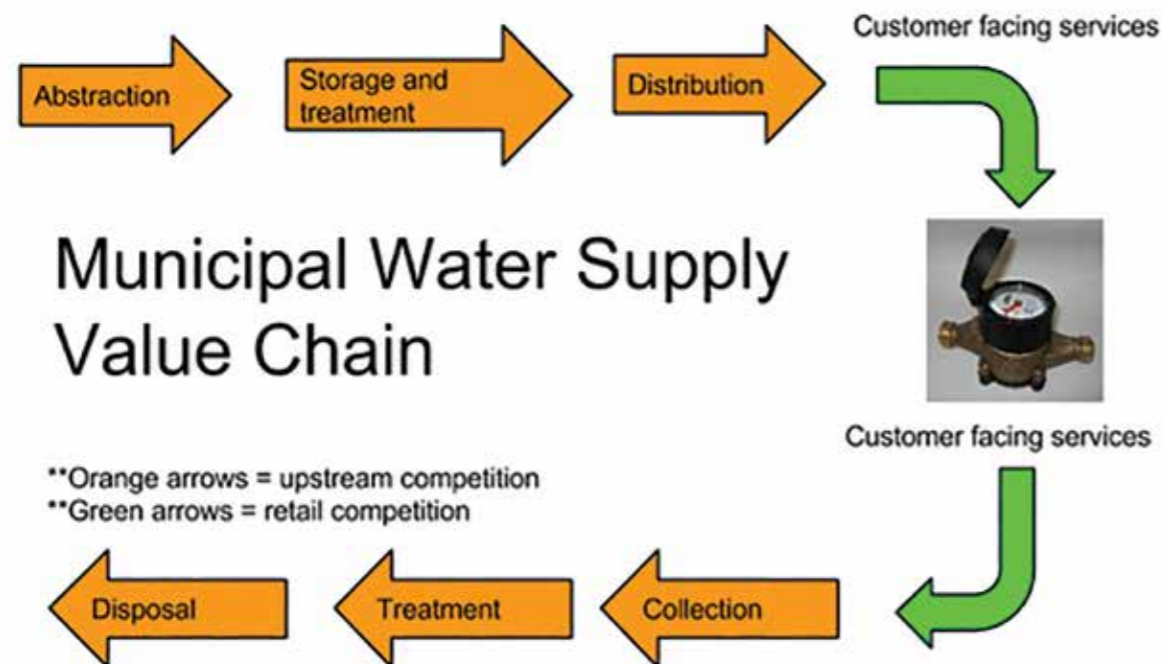


F. Water efficiency in retail competition

Through retail competition for water, non-household customers are free to change from their existing monopoly water company to another water supplier – now the case in Scotland and England. This is really about the “customer-facing” services including billing customers, handling payments, reading meters, and taking calls from customers about network related issues. It does not include water resources management, water and sewerage treatment, or management of water or sewerage networks. These are referred to as upstream or wholesale services (Figure 7).

Traditionally water companies have had a less rich relationship with their customers than other sectors such as groceries, aviation, and telecommunications. The focus has been on billing or repairs when something goes wrong. Several companies have delivered targeted programmes to businesses, but in general it has been limited to water efficiency services supplied in terms of online audit checklists or audits for large/ key customer groups only.

Figure 13 Retail competition elements of the water value chain highlighted in green



Non-domestic retail competition

From April 2017 1.2 million businesses and other non-household customers in England are able to choose their water retailer. This has been possible in Scotland since 2008. In Wales only businesses using more than 50MI/ year can choose their supplier. This has been possible in Scotland since 2008.

In 2014 Business Stream reported saving customers £43m through water efficiency, 20 billion litres of water and 34,000 tonnes of carbon dioxide emissions since 2008 in Scotland¹². The public sector in particular in Scotland is projected to save £36m over four years.

As retail competition is introduced for non-households there are several challenges for water efficiency. These include:

- Capacity of new retailers to deliver water efficiency services
- Customer awareness of competition and water efficiency services
- Some water companies have outcome delivery incentives from Ofwat linked to non-domestic water efficiency that need to be delivered in this price review period (before 2020). How can this be achieved within the constraints of competition law?
- Water resources planning and access to data to support forecasting (sharing with the wholesale water company)
- Bundling water as the cheapest service along with others such as telecoms and energy with higher margins – this would reduce any price signals towards water conservation.

Retail competition has the potential to improve water efficiency through:

- Billing and metering
- Water audits and water efficiency measures
- Alternative water sources

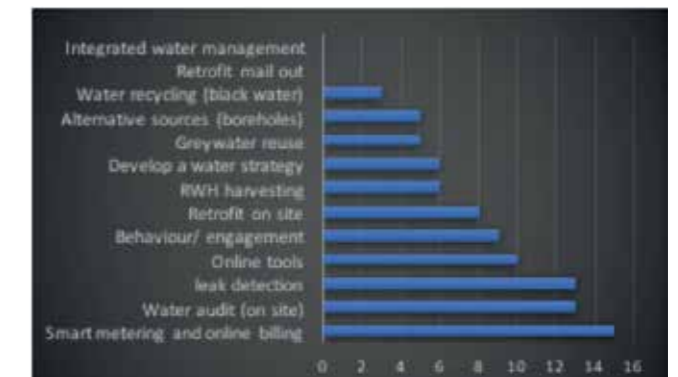


Figure 14 Comparison of services offered by retail water companies (Waterwise review of websites, April 2017)

A survey of 20 water retailer websites in April 2017 identified smart metering and online billing followed by on-site water audits and leak detection as the most popular service offerings to date - though water efficiency services were less than universal across retailers.

The current market codes doesn't require retailers to implement water efficiency or to report activities and water savings to wholesalers.

This poses issues from a water resources planning perspective, as non-domestic water efficiency can make a significant contribution to addressing a deficit. Retailers may not be able to deliver the focussed large-scale water efficiency actions for non-domestic properties required to meet water resources planning needs.

Domestic retail competition

Ofwat has begun to analyse the costs and benefits of domestic competition. Many of the challenges are similar to non-domestic competition and water efficiency delivery is at the heart of this.

Ofwat's findings on the costs and benefits of residential competition suggest that water efficiency could have a net benefit of between £98m and £398m - based on a series of assumptions. Further research is required to build upon this business case. And there are risks to resilience.



Potential concerns outlined by Ofwat and in discussion with stakeholders for this strategy include:

- Customers who don't have access to technology (e.g. internet) can be significantly disadvantaged and are less likely to switch supplier
- Water Resources Planning – reduced access to customer data due to communication restrictions on wholesalers
- Significantly reduced benefits if water efficiency measures are not implemented
- During drought without clear and consistent communication between retailers and manufacturers there will be much less effective implementation of temporary use bans (watering restrictions) and behaviour change to reduce consumption
- A race to the bottom based on prices – the latest research from CCWater suggests found that 44% of households would need to save over £40 a year before switching retailer, which is unlikely given the margins possible



Monitoring non-household retail competition

We believe Ofwat's monitoring of the retail market provides a seminal opportunity to audit the water efficiency services being delivered and the impact on water consumption across a range of sectors. Defra could provide guidance to Ofwat in relation to this. Waterwise is well placed to undertake this with partners including CCWater, and included this in our response to the Ofwat monitoring consultation.

- Work with non-hh retailers in delivering water efficiency, identify capacity gaps and provide an independent assessment against the framework to inform consumer choices
- Clarify market codes and operations in relation to water efficiency and water resources planning
- Ensure that as the sector fragments all parties in the water sector deliver water efficiency, including non-regulated elements of the sector (e.g. TPIs)

Actions Table: Water efficiency in retail competition

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Work with non-hh retailers in delivering water efficiency, identify capacity gaps and provide an independent assessment against the framework to inform consumer choices	F1	Monitor water efficiency services and progress in non-household retail water companies. Develop the evidence base to support any decision on household retail water competition	Waterwise, retailers	Short term
	F2	Develop communications/water efficiency messages targeted at micro-businesses and SMEs	Waterwise, CCWater, retailers	Medium term
Clarify market codes and operations in relation to water efficiency and water resources planning	F4	Work with wholesalers, regulators and retailers to clarify positions on delivering large scale non-domestic water efficiency programmes for water resources planning	Waterwise, water companies, Ofwat	Short term
Ensure that as the sector fragments all parties in the water sector deliver water efficiency including non-regulated elements of the sector (e.g. TPIs)	F5	Develop a scoring for water efficiency services offered by retailers	Waterwise, CCWater, WWF, retailers	Long term





G. Integrated water management and resilient infrastructure and services

The Ofwat resilience task and finish group defined resilience:

Resilience is the ability to cope with, and recover from, disruption, and anticipate trends and variability in order to maintain services for people and protect the natural environment now and in the future.



Although water efficiency was not included as a direct recommendation of the Group, it is implicitly part of recommendations. These include increasing public engagement and education; ensuring clear routes for funding legitimate resilience investment; ensuring coherent planning at both a regional and national level; improving the understanding of risk and failure; ensuring water services are resilient under different water sector structures; developing benchmarking, standards and metrics; and ensuring existing plans are stress tested. Research shows that resilient services are extremely important to customers - and water efficiency has a vital role to play in ensuring that water continues to come out of the tap. (Customers also care about the environment - and water efficiency helps improve the environment and ensure more water is left in catchments.)

Integrated water management

There are many different names and definitions for integrated water management. In this strategy, we are referring to a holistic water cycle approach to managing water resources, water quality, and flood risk management. Water efficiency is often seen as one part of a silo (water resources) and there is a need to join up retrofit and behaviour change projects with water company programmes on sustainable drainage and catchment management -

as well as customer service and customer participation. The example below demonstrates a more integrated approach to water management implemented in Sydney, which could also be applied under the competition and regulatory regime in England and Wales. Through multiple instances of semi-autonomous systems such as Central Park nested in a city we can balance decentralised and centralised infrastructure.



Upstream competition case study: Central Park Sydney

This innovative new development is served by Central Park Water, servicing 4,000 residents and 15,000 workers and visitors daily. The world's largest membrane bioreactor system, with ultraviolet and reverse osmosis treatment in the basement of the building, provides water to 50-70% of non-potable uses including toilet flushing, washing machine use and garden/green wall irrigation.

Water sources include:

- Rainwater from roofs
- Storm water from impermeable surfaces and planter box drainage
- Groundwater from basement drainage systems
- Sewage from an adjacent public sewer
- Sewage from all buildings within the Central Park community
- Drinking water from the public water main

Wider benefits stated by Central Park Water include lower infrastructure charges for developers, quicker land release speeds for development and lower bills for customers. Central Park Water also supply recycled



A range of similar schemes are developing in New South Wales, including an additional eight communities and more than 25,000 dwellings. The economic regulator IPART reported that as of April 2015, 28 current licences under the Water Industry Competition Act 2006 are supporting these developments.

By joining up sustainable drainage programmes with water efficiency programmes, behaviour change and retrofits of homes can be more effective. A major supply deficit is projected for London by Thames Water, and we are also facing sewer capacity issues due to surface water inflow. There is the potential to consider the city as a water supply catchment through water capture and reuse. A similar situation exists in our other large cities.

Ofwat has consulted on provision of market information on water resources to support third party demand management options³⁰ These are defined as: a water efficiency scheme provided by a third party, a leakage reduction scheme provided by a third party or provision by a third party of reclaimed water. A wider range of support and public dialogue around providing third party demand management solutions is needed. Additionally, incumbent companies who are further ahead in delivering large-scale water efficiency programmes should be incentivised to offer these services to other water companies, similar to incentives for water transfers and supply side solutions.

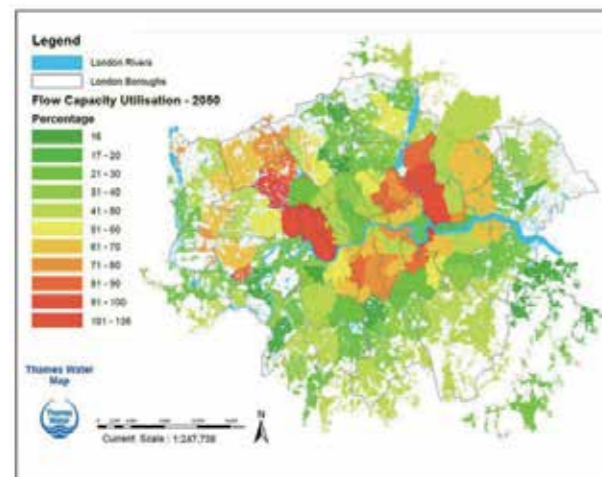


Figure 14 Sewer flow capacity in London ²⁹

Competition isn't the only option. An alternative community model is taking shape in the South West of England. This is called RainShare and involves connecting those with excess water, including roof runoff, with those who need water. The first example of this will be between householders and an adjacent allotment for growing vegetables. In the UK, innovative approaches on water reuse have been implemented by water companies in the North West Cambridge development and at the Olympic Park in London. These schemes required innovative thinking from water companies and clear partnerships with the developer, the University for Cambridge and the London Legacy Development Authority in London respectively.

- Include water efficiency in retrofit sustainable drainage (SuDS) and Water Sensitive Urban Design (WSUD) projects
- Identify opportunities for water efficiency within distributed infrastructure systems to provide nested semi-autonomous areas within cities and improve resilience



Image from SuSDRAIN

'Smarter' water infrastructure

There is increasing recognition of the need to better utilise "Big Data" such as smart metering information and the Internet of Things (IoT) to better manage water. These technology trends can potentially revolutionise the water sector, by providing highly detailed data and actionable insights throughout the water lifecycle; from production and distribution, through to consumer engagement. Low-cost IoT-based sensing devices (e.g. of flow, pressure, quality) monitoring, analysing and transmitting data throughout the water network (from a well to a household) can have a significant effect on the entire water value chain. The technology-driven pollination of water data with other data sources (eg weather, energy) and systems (eg smart home, Cleanweb, open data) can further increase opportunities for extracting value from the data. Such benefits are apparent in the energy sector, a perfect example of the application of Big Data technologies. Energy utilities enjoy state-of-the-art Big Data systems to monitor, analyse, and automate energy production, management, and demand. At the same time, they have joined a growing ecosystem of customer-centric products and services for energy monitoring and automation that provides them with further data, capabilities, and insights.

[DAIAD, 2014](#)

- Support innovation and wide-scale adoption of big data analysis and the internet of things to support greater understanding of demand and behaviour change in water efficiency programmes
- Review the data needs of the sector, assessing what data is needed and how it should be collected and used
- Increase availability of Open Water Data, including anonymised information on water demand and outputs from water efficiency pilot projects

There is a need for a debate within the water sector about the amount of open data, and of data use in general. More open data would enable greater public engagement with water and the development of more ICT solutions, which could aid water efficiency. However, there is also a need to protect privacy and consider the ethics of data collection and use.

The level of metering in the sector has grown dramatically in the past ten years and companies are now starting to install smart meters - although the proportion of these needs to increase. Smart meters should provide information that will aid network optimisation and customer-facing information to drive water efficiency. But there needs to be more work on the use of smart rather than Big Data. Water companies need to focus on what data is needed and how this should be gathered. Metering of individual homes is not the only option - neighbourhood meters for network optimisation combined with in-home sensors that can provide data directly to customer's smart phones are one alternative approach.

Actions Table: Integrated water management and resilient infrastructure and services

Recommendation	Action Number	Action	Organisations recommended to be involved	Timing
Include water efficiency in retrofit sustainable drainage (SuDS) and Water Sensitive Urban Design (WSUD) projects	G1	Develop advice on joint programme delivery. Review costs and benefits of Thames Water/Groundwork approaches, Severn Trent Water's urban demonstrator, and Dwr Cymru Welsh Water's Greener Grangetown	Water companies, local authorities, Defra, Environment Agency, Welsh Government, Natural Resources Wales, Scottish Water, SEPA	Medium term
Identify opportunities for water efficiency within distributed infrastructure systems to provide nested semi-autonomous areas within cities and improve resilience	G2	Review opportunities and barriers for third pipe schemes on water reuse and rainwater harvesting linked to developer incentives	Water UK, water companies, Waterwise, Anglian Water	Medium term
	G3	Support the dialogue around provision of market information for third party demand management solutions in PR19	Waterwise, Ofwat	Short term
Support innovation and widescale adoption of big data analysis and the internet of things to support greater understanding of demand and behaviour change in water efficiency programmes	G4	Work with Innovate UK to develop a water programme within wider smart cities work	Innovate UK, Waterwise, Future Cities Catapult	Medium term
		Review security and cyber terrorism related issues in terms of water efficiency and the 'internet of things'	Waterwise, Defra, Ofwat, Water UK	Long term
Review the data needs of the sector, assessing what data is needed and how it should be collected and used	G5	Build on the DAIAD project, other ICT4Water projects, and existing work in government and water companies	Defra (Open Data), Water UK, Ofwat, Waterwise	Medium term
Increase availability of Open Water Data, including anonymised information on water demand and outputs from water efficiency pilot projects	G6	Review open data opportunities from the Discover Water Portal	Water UK, CCWater, Ofwat, Waterwise, water companies	Long term



Conclusion and next steps

Climate change and population growth are placing increasing pressure on water resources in the UK. Growing demand and the need to protect the environment mean water companies are already delivering greater levels of water efficiency. But we can all do much more.

There is a need for a coordinated approach to delivering water efficiency in the UK and our initial review of stakeholders has identified key brokers in this. Country-specific and region-specific approaches are also required in delivery to engage with water customers and influence behaviours.

Waterwise's Water Efficiency Strategy for the UK aims to provide the evidence to support government action in this area and for water companies and other stakeholders to draw on as they develop their next round of plans. It will help us all aim higher on water efficiency - working together to develop evidence and approaches to realise this, for the sake of people, the economy and the environment.

The Water UK-supported Water Efficiency Strategy Steering Group will meet regularly to ensure delivery and progress, and Waterwise will report against the actions from the strategy in 12 months' time.

Appendix A – Water efficiency strategies and plans across the UK

A number of strategies and plans already exist or are in preparation that can help deliver water efficiency. Some of these are outlined below:

- Final Water Resources Planning Guideline – The 2016 guideline re-quires water company plans to be; “Demonstrating how you will fulfil your obligation to promote water efficiency and your plans for increased customer metering, thereby reducing abstraction and its impact on flows and groundwater levels.”
- Draft Defra Strategic Policy Statement - Defra asks Ofwat to “promote ambitious action to reduce leakage and per capita consumption, where this represents best value for money over the long term”. This could be facilitated by the Water UK-sponsored Water Efficiency Strategy Steering Group, which includes Defra
- Defra 25 Year Plan – In response to the National Capital Committee’s third State of Natural Capital report, Defra committed to producing a 25 year plan for a healthy natural economy in England
- National Infrastructure Assessment – The National Infrastructure Commission announced in May 2016 that it will be developing an assessment with a 30 year timeline and this will include water, sewerage and flood defences
- Water Strategy for Wales (2015) – This will assess and consult on options for encouraging reduction in water consumption: It will include working with the water companies and other interested parties to encourage and incentivise engagement and action on water usage; to challenge perceptions; to promote the benefits of water efficiency; and carry to out further investigation into the costs and benefits of metering
- Scottish Water – Water Efficiency Plan 2011-2015 – The strategy sets out three key areas around engaging with customers, improving assets, and working with stakeholders
- Sustainable Water - A Long-Term Water Strategy for Northern Ireland (2015-2040) – This commits to progress delivery of difficult crosscutting policies such as water efficiency, surface water management and water and sewerage funding and regulation; managing water consumption by improving water efficiency in homes and businesses; a long-term target to reduce average water consumption from 146 l/h/day to 130 l/h/day. It also commits to continuing to invest in education and public awareness campaigns to promote water efficiency and the value of water; developing and implementing a public awareness campaign highlighting the benefits of water efficiency and how it can lower energy bills; considering regulatory options in which all future residential development is water-efficient and aims to achieve a maximum consumption figure of 130 l/h/day; carrying out pilot projects to test and compare the cost-effectiveness of different water efficiency / reuse technologies (for both retro-fitting and new build); considering amending the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 to include a performance rating for water fittings; and developing and implementing policies in respect of retrofitting water efficiency/ recycling measures in homes and businesses.

³¹ Environment Agency and Natural Resources Wales, 2016



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