



Planning Water Resources

in England and Wales

This Policy Position Statement (PPS) identifies the procedures that apply to the planning, protection, conservation and allocation of water resources in England and Wales. It has been produced with technical input by CIWEM's Water Resources Specialist Panel, which comprises experts from water companies, consultancies, academia, regulators and NGOs.

The way in which water resources are planned and managed in England and Wales has improved over recent years. We consider that the approach is generally mature and well developed. However, there are areas where planning could be further refined to deliver better outcomes both for water customers and the environment.

This PPS discusses key water resources planning issues and makes proposals for a more integrated and sustainable, open and transparent approach, which encourages public and community involvement and debate.

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector.

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Note: CIWEM Policy Position Statements (PPS) represent the Institution’s views on issues at a point in time. It is accepted that situations change as research provides new evidence. It should be understood, therefore, that CIWEM PPSs are under constant review and that previously held views may alter and lead to revised PPSs. PPSs are produced as a consensus report and do not represent the view of individual members of CIWEM.

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Ten actions to improve water resources planning in England and Wales

1. Better public awareness of the pressures on water resources

Government, regulators, water companies and other stakeholders must proactively raise public awareness of the intrinsic value of water resources, the nature of pressures upon them and practical (and ideally tailored) advice to encourage behaviour change and reduce water use.

2. A more integrated approach to planning for water management

Improved integration between the Periodic Review of Water Prices, River Basin Management Plans, Drainage and Wastewater Management Plans, Water Resources Management Plans and Drought Plans to enable a coordinated approach to water resources management that fully considers the needs of customers and the environment, as well as costs. In addition, there should be greater regional and national level planning which considers how water companies and other sectors can work collectively to deliver against strategically important water resources needs.

3. More coordinated use of drought data

Improved co-ordination of the application of the UK Climate Projectionsⁱ, Future Flows and Groundwater Levelsⁱⁱ data and stochastic drought forecasts to provide a clearer picture of the implications of drought for water resources planning.

4. More consistent forecasts of population growth, demographic composition and change

Harmonisation of population growth data sets from Local Authorities, the Office of National Statistics (ONS) and academia for long-term household demand forecasting. This will enable clearer understanding of the implications of demographic composition and change for more informed and precise water resources planning.

5. A strong, long-term commitment to providing a healthier, more climate resilient water environment

Improvements to the resilience of the environment which underpins water company operations. This should include effective delivery of the Abstraction Planⁱⁱⁱ and Water Strategy for Wales^{iv}, to prevent abstraction that has, or is likely to have, a significant damaging effect on the environment. As a nation we must improve our knowledge of environmental impact, wider use of natural capital accounting and ecosystems approaches and commit to taking remedial action as quickly as possible.

6. Adoption of a 'security through diversity' approach to managing water resources

CIWEM advocates a strong commitment to the twin-track approach, moving towards a more formalised 'security through diversity' approach. This should assess demand management and new resource options alongside water recycling, water transfers and trading. These options should be assessed on a long-term economic basis, taking full account of environmental and social cost and benefit.

7. Widespread water metering beyond water stressed areas

Compulsory household metering should be implemented in England where water resources are under stress, as soon as practicable. Away from water stressed areas, water companies should be allowed to take concerted measures to expand metering and associated dynamic charging to enhance efficiency and resilience. Metering should as far as possible be 'smart' and implemented alongside improved tariffs and measures to protect those customers on low incomes.

8. Water companies to work with other stakeholders with the long-term aim of delivering deep reductions in household water use

The aim over the next 50 years should be a national average per capita consumption of 75 litres per head per day (l/h/d) or less. In the short-term this objective can be progressed through specific actions including: reducing losses from customer supply pipes, tackling the problem of leaky loos and reducing or offsetting the additional demand from new development.

9. More consistent and transparent leakage data and reporting, to underpin improved performance on leakage reduction

Water companies should develop leakage reduction plans which fully achieve (and ideally exceed) Ofwat's target to water companies to achieve 15% leakage reduction by 2025 and to halve leakage by 2050 as advocated by the National Infrastructure Commission (NIC)^v. Companies should work to ensure improved consistency of leakage aspects of long-term demand forecasts, following the recent work by UKWIR and Water UK^{vi}.

10. Maintenance and regular review of our understanding of the long-term water supply/demand balance

The long-term (up to 50-year) water supply/ demand balance, as considered by the Water UK long-term planning framework, should be periodically reviewed and updated.

Definitions

'Water resources' are defined here as *all naturally occurring and artificially created water bodies for different uses according to purpose.*

'Water resources planning' is defined here as *the process by which existing water resources (supplies) are assessed and future water resource needs (demand) identified, managed and developed appropriately for whatever purpose (e.g. abstraction, transfers, in-river needs etc.).*



Context

Water companies have a statutory duty to provide household and non-household customers with a reliable supply of water for domestic and business purposes. They must also plan to ensure that they are able to meet the demands that are likely to arise in the future, whilst ensuring that there is enough water to provide for meeting environmental regulatory obligations. The Water Act 2003 introduced statutory provisions for water companies to prepare Water Resources Management Plans (WRMPs) every five years. There is a requirement for public consultation on the draft plans so that they are more transparent and give stakeholders the opportunity to contribute to their development.

There are major challenges ahead in England and Wales, including:

- ◆ Providing adequate water supplies for the projected large growth in population and housing;
- ◆ making water abstraction more sustainable and compliant with UK and EU legislation (despite Brexit, this is expected to remain enshrined in UK law and continue to be adopted for the foreseeable future), and
- ◆ adapting to and mitigating the effects of climate change which could be substantial.

In recent years there has been a step change towards risk-based planning for water resources and there is an increasing focus on wider water supply resilience for sectors outside of the core focus of water companies (domestic and business water consumption) which is welcome. This is necessary to develop increased awareness and planning for the needs of other water users, and how best to drive forward efficiency and optimise water use within these sectors (such as agriculture, power generation, industry and navigation).

To enable this more integrated approach, there is now more planning on a national and regional scale (for example via groups such as Water Resources East, Water Resources South East, Water Resources North and the West Country Water Resources Group). These consider future demands for water from different sectors, not just for public water supply. Over time, plans from such groups should evolve to become more focused and regionally integrated with water company WRMPs. Such changes in approach are being reflected in the direction being taken in advance of the next round of water resources management planning (WRMP24).

In 2018, the Government published its 25 Year Environment Plan^{vii} which sets out a commitment to *“work with the industry to set an ambitious personal consumption target and agree cost effective measures to meet it”* within England. The National Infrastructure Commission (NIC) also published its position on the direction Government should take to address England’s water supply challenges and enhance long-term climate change resilience^{viii}.

The Water Strategy for Wales^{ix} was published in 2015 and sets out the basis for managing water in the wider context of improved stewardship of natural resources.

Regulation of water resources planning in England and Wales

The **Environment Agency** (EA) administers the water abstraction and impoundment licensing system and has a general duty to secure the efficient and proper use of water resources in England.

Natural Resources Wales (NRW) is responsible for abstraction licensing in Wales. The EA and NRW also administer the discharge consent system and other controls on point and diffuse sources of pollution through which the quality of both surface water and groundwater resources is largely protected.

The **statutory water undertakers (water companies)** in England and Wales each have the duty to maintain and develop a reliable, efficient and economical system of water supply in their areas of appointment. They have a statutory duty to prepare WRMPs. Defra, Welsh Government, EA, NRW and Ofwat produce joint guiding principles^x on the information to be included in the plans and review their quality and robustness. Both Defra and Welsh Government^{xi} have produced guidelines setting out their expectations for the WRMPs. UK Water Industry Research (UKWIR) has undertaken work to define appropriate approaches and methodologies to both inform and support this guidance.

Ofwat has a duty to ensure that water companies provide domestic and business customers with a good quality service that represents value for money. Under the Water Act 2014, Ofwat was also given a new resilience duty to promote management of water resources in a sustainable way. Every five years Ofwat undertakes the price review for the water industry. It requests detailed business plans from water companies setting out their investment and operational requirements and determines the price limits that water companies may charge their customers.

Water company business plans include proposals to maintain the water supply-demand balance, derived from each water company's WRMP. The last price review took place in 2014 (with draft determinations being made in July, and final determinations in November), with the latter determining the investment schemes to be undertaken on water resources and demand management over the five years to 2019. The next round of business plans and pricing will be confirmed in December 2019 and will run between 2020 and 2025. Although these plans are prepared in five-year cycles, water companies take into consideration longer-term forecasts in their development.

Water companies in England and Wales are required to prepare and maintain **drought plans** under the Water Industry Act 1991, as amended by the Water Act 2003. Following the Water Act 2014, these are produced every five years.

Drought plans set out how water companies will supply water to their customers during periods of low rainfall when water supply becomes depleted, whilst minimising any negative impacts of their actions during a drought. Plans should set out the short-term operational steps that companies will take before, during and after a drought. Both EA/Defra and NRW have produced separate guidance^{xii} on what should be included in water company drought plans. Welsh Government has produced guiding principles^{xiii} for companies wholly or mainly in Wales.

A **Water Efficiency Strategy Steering Group** and a **leadership group on water efficiency and customer participation** now exist through Water UK and Waterwise, with members across England and Wales. In addition, the **Long-Term Water Resources Planning Group** was set up in response to the extreme dry and wet hydrological events of 2012-2015. This group considers the resilience of the nation's infrastructure against such events.

Retail competition was introduced in England in April 2017. One of the aims of this was to increase water efficiency, however research by Waterwise suggests that progress on this has been lacking to date^{xiv}. **The Consumer Council for Water** has also recommended the need to promote other important means of achieving bill savings, such as water efficiency^{xv}. There have been issues in terms of a lack of communication around demand forecasting and few effective partnerships being developed between wholesalers and retailers on water efficiency options within WRMPs. A new **Retail Water Efficiency Leadership Group** co-chaired by Business Stream and Waterwise will provide a much-needed forum to discuss these issues.

Natural England and NRW are responsible for maintaining and enhancing Sites of Special Scientific Interest (SSSIs), European sites, landscape and delivery of wider biodiversity. The EA and NRW are responsible for implementation of the Water Framework Directive (WFD) and production of River Basin Management Plans (RBMPs). A range of other environmental organisations and stakeholders take an active interest in water resources planning as it affects their concerns. For example, the **Canal & River Trust** undertake water resources planning and drought planning to meet the demands of maintaining navigation across the 2000-mile waterway network it manages in England and Wales.

Local planning authorities and water undertakers need to work effectively together to ensure that investment in water related infrastructure and operations is timely and meets the needs of society and of the environment. Water companies are statutory consultees on Local Plans in England. NRW is preparing "Area Statements", to translate Ministers' Natural Resources Policy into local opportunities throughout Wales and Public Service Boards must produce Wellbeing Plans setting out how requirements of the Wellbeing of Future Generations Act 2015^{xvi} will be delivered.

Key Issues

We welcome and support the many improvements in water resources planning that have occurred in recent years. This includes increased customer and stakeholder consultation on the development of water resources management plans and public consultation on the plans' publication. There has been greater focus on demand management through customer metering and water efficiency and progress made by the Environment Agency and NRW in reviewing consents where abstractions are adversely affecting the environment.

Despite this progress, we consider the following challenges need greater attention:

Investment planning

Achieving an integrated and sustainable approach to water resource planning requires that the development of WRMPs, drought plans and business plans for price reviews is well-integrated, not separate. Water companies should also take note of river basin management plans (RBMPs) produced in accordance with the Water Framework Directive (WFD) and consider public health (drinking water quality as well as quantity) and the links to wider water supply resilience planning. We consider that the timetables for this wider planning should be better integrated and coordinated to enable consistent plans to be produced, as is now the case for WRMPs and business plans.

There is strong political emphasis on keeping the price of water and sewerage services for customers as low as possible, however this approach is unlikely to deliver the best long-term outcomes to society (which involve the most environmentally sustainable and resilient measures). Defra has directed Ofwat to secure long-term resilience for people, businesses and the environment by requiring water companies to *"meet the needs of current and future customers, in a way which offers best value for money over the long term"*^{xvii}, which we welcome.

Protecting the environment

There is a need to improve our knowledge and understanding of the environmental needs for water now and in to the future. Government, regulators, water companies and wider stakeholders should undertake proactive actions now, to ensure both the environment – and the water company and wider sector operations that depend on it – are more resilient.

There is also a need for updated, consistent, best practice approaches to evaluate the environmental impacts of water use and both the positive and negative impacts of supply and demand options. Natural capital accounting approaches are being developed and increasingly used to assess the environmental impacts of activities and the services provided by ecosystems. Planning and management of water resources should also adopt such approaches.

Further action may be needed where water use from existing resources has, or in the future is likely to have, a detrimental impact on the water environment because of unsustainable abstraction. To date, most attention of this kind has been on restoring sustainable abstraction at sites that are already impacted, rather than building resilience in sites that will be impacted in future (for example improving river habitats near abstraction points so that they persist and recover from an increasing frequency and severity of low flow periods and droughts

more quickly). The Water Abstraction Plan^{xviii} sets out how the government will reform water abstraction management in England and will introduce more of a catchment focus for sharing resources, enabled by a digital abstraction service.

The WFD focuses on the ecological health of the aquatic environment. Its primary objectives are to prevent deterioration and, where necessary, restore *good ecological status or good ecological potential* for surface water or good status for groundwater. Resolving the abstraction and flow issues in England and Wales will be a key part of achieving commitments to the environment. We support the aims of the WFD and consider that these should not be diminished following the exit from the European Union.

Changes to existing licences to reduce the effect of abstraction on the environment is an important mechanism to achieve long term goals for sustainability and biodiversity. However, the cost-benefit and funding for these changes needs to be clear as this will be a significant driver of planning for some water companies with available resource potentially reducing as a result by between 5 and 50%^{xix}.



Climate change

Climate change introduces a source of considerable risk and uncertainty into water resources planning. It bears upon all aspects of the supply-demand balance, requires careful analysis of the risks involved and the means of dealing with them, alongside those from other sources. It also demands consideration of the levels of service to which security of supply can be maintained, if unacceptable environmental impacts are to be avoided.

The work of the UK Climate Projections initiative (UKCP) suggests that future summers have the potential to become hotter and drier, while winters are likely to become warmer and wetter, particularly in the south and east of England. It is possible that climate change will have severe effects on surface water flows and groundwater levels, on aquatic ecology and upon the demand for water by people and the environment. However, there is large variability within the forecasts of the extent of such impacts.

Research to support effective drought and water resources planning under climate change is vital to ensure that our natural environment and water use is resilient. Recent work under the MaRIUS (Managing the Risks, Impacts and Uncertainties of drought and water Scarcity)^{xx} project, particularly its derivation of synthetic 'drought event libraries', could form the basis for consistent analysis of drought events and approaches to modelling droughts beyond the historic record (which runs back to the 16th Century). The results of this work need to be applied in a transparent and consistent way across all water companies in the context of the risk-based planning approach, something which the ongoing ENDOWS^{xxi} project is looking to improve.

The latest guidance to water companies on planning for climate change is contained in the Water Resources Planning Guideline 2017^{xxii}. WRMPs must incorporate climate change impacts (both dry and wet). Water companies are required to address drought scenarios in these plans that are worse than historic droughts (as appropriate to their risks). All water companies have been asked to report their resilience to 1 in 200-year droughts, although only those wholly and mainly in England were required to include a scenario for 1:200-year droughts within their WRMP (unless those in Wales consider that they are at risk of such an event).

The water industry is a significant energy user and carbon emitter. In Wales the emissions of greenhouse gases which are likely to occur due to each measure in the WRMP need to be identified^{xxiii}.

Demographic change

The populations of England and Wales are projected to increase to 62 million and 3.3 million respectively by 2041^{xxiv}. The number of households in England is projected to increase from 22.7 million in 2014 to 28.0 million in 2039^{xxv}. In Wales, the number of households is projected to increase to around 1.5 million by 2036 with the south east seeing the largest increases.

As planning for water resources looks increasingly far into the future, there is a need for improved projections relating to population growth as an important consideration in forecasting demand. Harmonisation of data sets from local authorities, the Office of National Statistics and academia would improve the data available to water resources planners.

Likewise, closer liaison between water companies and local authorities could provide a clearer picture of where additional populations are likely to live, and what kinds of properties they are most likely to live in – both important factors in the ability to plan for and manage future demand.

It is expected that measures to reduce the demand for water will result in lower rates of per capita consumption (PCC), however this is likely to be offset (to some degree at least) by increase in population. Demand in areas where resources are already constrained, such as London, the east and south-east regions, is projected to grow at a faster rate than many other parts of England and Wales. Water companies in Wales use Welsh Government property projections. In England water companies plan for population growth in WRMPs using property and population forecasting methods developed by UKWIR.

We consider it important that water resources management professionals move away from a technocratic view of water resource provision, to better understand and therefore influence consumer water use. Demand for water is driven by a wide range of consumer choices, which in turn are influenced by social, cultural and technological interactions within homes and communities. Demand cannot be understood in isolation from what people do, and the social and cultural drivers of these practices. In particular, there are interdependencies between behaviour and technology, best exemplified by the emergence of showering in preference to bathing. Water resource planning needs to involve social scientists and behavioural economists to better understand these drivers and how to influence consumer choice.

There is also a need to move away from the analysis and use of average consumption as an indicator and measure of water use. The typical distribution of consumption rates within a population are negatively skewed, with most people using less than the average (i.e. mean) consumption rate, which is affected (i.e. inflated) by a long right-hand tail which is likely to include leakage (within the home or on customer supply pipes), large households and profligate use.

Demand management

There is a need for all parts of the water industry to promote awareness of the value of water and the environmental and social consequences of high consumption. CIWEM supports a 'security through diversity'^{xxvi} approach (as shown in Figure 1, overleaf) to water resource planning (water efficiency together with new resources and transfers). Whilst there has been significant reduction in the consumption of water in commercial and industrial properties, largely through the decline of heavy industry and manufacturing sectors of the economy, considerable further potential for reducing non-household consumption remains, particularly amongst small and medium-sized businesses.

The roles, responsibilities and lack of coordination between the regulators need to be resolved regarding the funding and promotion of demand management measures. Whilst demand management measures can contribute to the long-term sustainable use of water resources, in present economic terms they are often less cost-effective than the alternative of developing new water resources. Demand management would be demonstrably more economically viable if all costs associated with water use were accounted for and in this context would be less costly if the market for efficient water using products was stimulated.

NIC^{xxvii} note that water efficiency initiatives, including metering, are often considered less economic as water companies are planning to implement emergency restrictions such as tankering, severe reductions in pressure or rota cuts during a more serious and prolonged drought. They suggest that these more severe measures would be unlikely to happen as Government and water companies would likely take emergency measures with high financial and environmental costs to ensure household water supplies. When these costs are considered, greater water efficiency and metering become much more cost effective.

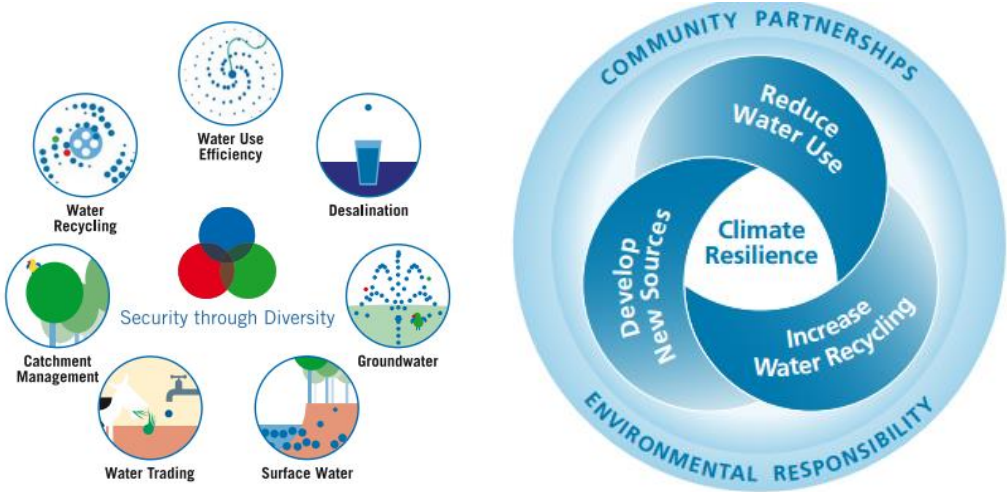


Figure 1. Options for ensuring water security (Government of Western Australia)

Household metering

Evidence indicates that households who are charged for their water services based on metered consumption use less water than those who pay based on rateable value^{xxviii}. Metered households tend to have fewer losses and include fewer properties with very high consumption rates. There are various ways that homes become metered: all homes built since 1990 are metered, unmetered customers can choose to become metered, and water companies can meter existing properties if they are in a region of water stress and metering helps balance supply and demand.

Households that have chosen to have a meter tend to opt to save money on their water bill, largely because they have lower than average occupancies and/or consumption. Recently Southern, South East, Thames and Affinity Water have implemented compulsory or progressive meter programmes. A recent publication^{xxix} on the impact of Southern Water’s programme to meter the majority of homes in their area indicates a 16.5% reduction in household consumption in metered homes.

There is continuing innovation in meter design with “smart” water meters able to provide increasing amounts of information about water usage during each day and throughout the year. These advances provide the opportunity to record greater detail of water consumption patterns and the ability to set new charging tariffs, further incentivising customers not to use excessive volumes of water that might be charged at a higher tariff.

The majority of meters are installed outside of properties for ease of access and this captures not only water usage but supply pipe leakage and water wastage within the home through leaky cisterns and overflows. Smart meters can inform customers where these problems may exist so that water wastage can be minimised.

Artesia Consulting's report for Ofwat on the long-term potential for deep reductions in household water demand^{xxx} indicates that regardless of all the other influencing factors, increasing the proportion of households on a meter will reduce the mean consumption in an area through a range of factors, including:

- Customers changing their behaviour to use less water or install water efficient devices.
- Consumption is being measured in most households rather than being estimated.
- Losses being identified and repaired.

Extensive water metering can also help water companies assess the difference between the volumes of water entering the distribution network and that being delivered to customers leading to more accurate estimates of network leakage. This in turn can help target leakage reduction and make leakage repair more efficient.

Water companies in designated 'Water Stressed Areas' have powers to introduce compulsory metering programmes and charge on this basis. Most utilise these powers but outside such areas meter penetration is lower, with the average at around 53%^{xxxi}. Most water companies have plans to increase meter penetration over time, but this could be undertaken more quickly if legislation allowed for charging of all customers on a measured basis.

Current legislation does not allow for the compulsory charging for all customers on a measured basis, however, there remains benefits in the installation of meters whether bills are based on metered volumes or not.

The cost, benefit case for water metering is not fully understood in all situations. For example, flats in urban areas can often have shared services which are expensive to split and meter separately. Further research into the most effective approaches to metering in different situations, tariffs and customer behaviour would help to progress extensive water meter uptake.

Overall, increased household metering and smart metering can achieve greater customer engagement in understanding water use and help to reduce water consumption. This could be enhanced by using innovative tariffs where smart metering is implemented. The increased knowledge gained through metering will support the reduction in both customer and distribution network leakage.

A key recommendation by NIC is for Defra to *"enable water companies to implement compulsory metering by the 2030s beyond water stressed areas, by amending regulations before the end of 2019 and requiring all companies to consider systematic roll-out of smart meters in a first step in a concentrated campaign to improve water efficiency"*. NIC calculated that bringing forward metering could achieve a 400Ml/d reduction in demand before 2050. The Southern Water Universal Metering Campaign was an important intervention carried out across its region. With 88% of its customer base now on metered charges, the resulting 16% reduction in water use has been a dramatic impact. Southern Water now wants to go much

further and provide an ongoing bespoke programme of products, advice, services and incentives to help every customer connect with their campaign.

We are supportive of progress towards metering innovation and comprehensive metering coverage in all water company areas (not just those in water stressed areas) to improve the accounting for water use. Improving water efficiency through metering should be a clear aim for all water companies and this should be provided for in the forthcoming Environment Bill as a means to achieve the Government's 25 Year Environment Plan aims.

Water efficiency

We believe that water companies should promote water efficiency more imaginatively via the principal activities outlined in our water efficiency report^{xxxii} and by engaging with a wider range of stakeholders as advocated by the Waterwise Water Efficiency Strategy for the UK^{xxxiii}. Parties to such activities should range from manufacturers and retailers to local government, community groups and third-sector organisations or well-known brand owners who have good exposure and market-moving ability.

Alongside metering and tariffs, establishing widespread appliance labelling and water efficiency training for plumbers and others who choose the appliances that are fitted in the home is critical to progress. Links with building regulation and planning controls will also be crucial to promote effective water management and water efficiency.

This potential is reflected in growing emphasis on the need to reduce average PCC. Government has committed within its 25 Year Environment Plan to working with the industry to define an 'ambitious' target for household consumption but shied away from setting a figure for England. We believe that England should be aiming for an average of less than 100 litres per person per day (l/p/d) in the next 20 years and less than 75 l/p/d in the next 50 years.

Delivering such targets will be challenging but has been shown to be possible^{xxxiv} by Artesia / Ofwat. They identified nine 'first steps' that could be implemented in the short term to enable such levels of consumption to be achieved, including:

- ◆ leadership and concerted action on demand management;
- ◆ wider implementation of metering;
- ◆ smart metering and effective tariffs;
- ◆ mandatory labelling of water using products;
- ◆ tackling leakage from customer supply pipes and 'leaky loos';
- ◆ tighter planning controls for water efficiency in new development, and
- ◆ open data for innovation.

Many of these recommendations are being taken forward by the Water Efficiency Strategy for the UK Steering Group and Water Efficiency and Customer Participation Leadership Group.

Stakeholder engagement

Since PR14, water companies are required by Government to engage with their customers and wider stakeholder base to inform investment priorities which they set out in their Business Plans. This engagement is increasingly relating to complex issues such as risk or drought return period. As the sophistication of analysis increases, the communication challenge is likely to increase, and plans will only be as good as water companies’ ability to engage and communicate with their customers.

One solution to this challenge would be to provide more open access to the analyses and results of WRMPs. Such open access would enable third parties to further analyse and summarise WRMPs and challenge water companies to make the data and related information clearer and more understandable.

There is a disconnect between water efficiency options for water resources planning and business planning perspectives. Water companies have traditionally only engaged with customers for billing or when a problem arises. Ofwat’s Tapped-in report^{xxxv} outlined a customer participation continuum from listening to active participation (see Figure 2). Water efficiency represents an opportunity for customers to participate in water resilience and should be implemented for the wider benefits that arise, such as better response to resilience events like the freeze/thaw incident in early 2018 or during drought, and improved customers satisfaction levels. Although these wider benefits are supported by business planning, they haven’t been integrated into the latest round of water resources planning.

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 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 2. Customer participation continuum (source: Ofwat)

Water resources planning shouldn't be the only time when customers are engaged about the water resources situation and the options to address it. The 2012 drought saw some positive steps taken on joining up communications between companies, however there are many lessons on customer engagement that haven't been implemented and led to similar issues in other resilience events. Recommendations from reports by UKWIR, Waterwise and WWF include:

- ◆ There urgently needs to be a well-resourced and constantly updated industry source of information on water resources¹;
- ◆ There is a need for much earlier and better stakeholder engagement by the water industry on water resilience issues, and
- ◆ There is a need for an ongoing national campaign to promote water issues and water efficiency, so that there is a background of understanding in advance of the next drought.

Experience from Australia shows that clear, credible communication about drought situations and response is paramount to public participation and support. Experience from California also suggests the need to maintain communications in order to maintain savings over time. Save Water South East represented a useful regional communications-based approach and the National Drought Group, which was meeting due to dry weather in summer 2018, has also proposed and supports a national communications platform.

Leakage

Water companies have been challenged by Ofwat, the Secretary of State for Environment, Food and Rural Affairs, Welsh Ministers, and the NIC to make significant reductions in leakage. Progress in reducing leakage over recent years has been limited and leakage can be an obstacle to companies effectively engaging their customer base on issues such as water efficiency because it is perceived by customers as being wasteful.

The 25 Year Environment Plan sets out an expectation for companies to achieve an average reduction of at least 15% in England by 2025 and the NIC has proposed reductions of 50% by 2050^{xxxvi}. Consistency of reporting leakage data is important in enabling robust demand estimation and forecasting. There have been significant improvements in leakage reporting in recent years and this is to be welcomed. CIWEM's detailed position on leakage is set out in our position statement "Water distribution network leakage in the UK" ^{xxxvii}.

¹ [Discoverwater.co.uk](https://www.discoverwater.co.uk) is a positive and welcome step in this direction but this could be developed further e.g. by considering how companies could use such a portal to present live data on reservoir storage, demand etc, and provide access to open data for use by scientists and modellers.

Supply-side options

There is an increasing emphasis on the need for wider collaboration between water companies and third parties in meeting water resources needs. We agree that water companies should further investigate sharing water resources and developing new resources in partnership with others, taking account of all costs and benefits, including those to customers and the environment.

A more formalised expansion of the 'twin-track' approach to a security through diversity' approach, which places similar emphasis on water recycling, water transfers and trading to that placed on water efficiency and new resources would help to progress innovation in this area. There is also a need for closer integration of WRMPs with wider users such as agriculture and energy, utilising catchment scale management to effectively allocate and manage water resources at a more local level (such an approach is being driven through the Water Abstraction Plan).

We consider that all options for developing new supply-side solutions should be considered equitably to promote innovation within the industry. A National Policy Statement for Water Resources^{xxxviii} is being developed in 2018 which will streamline the approvals process for supply-side schemes which exceed a defined threshold.

New supply schemes should be justified at the right scales, consider the benefits for other sectors and deliver net gain to biodiversity and the environment. Where these can be demonstrated, raising dams to store more winter rainfall can be advantageous as the infrastructure is already in place, and significant extra storage can often be gained cheaply and with limited environmental impact. This has been done at Ladybower Reservoir in Derbyshire and Marchlyn Reservoir in Snowdonia and is proposed for Bewl Water in Kent and East Sussex.

Water recycling can play a greater role in water resources management through more integrated consideration of these cycles. Treated effluent can be returned further up the river to augment resources. Much treated effluent is now discharged to sea and lost, whereas it could be treated further and returned to inland water courses. This can be particularly helpful when it supports the minimum flow of the watercourse, thus allowing extra abstraction further upstream, as Anglian Water have proposed for the Rutland Water scheme. Alternatively, it can be diluted and pumped to a reservoir, as has been done at the Langford scheme in Essex. We contend that there should be greater consideration and recognition of the benefits of water recycling, alongside schemes such as transfers. The future development of drainage and wastewater management plans should help improve the integration of supply, demand, runoff and wastewater management.

Canals can be used to transfer water between catchments. There are already several canal water transfer schemes in operation for public water supply, the largest of which supplies up to 245 Ml/d to Bristol Water, via the Gloucester & Sharpness Canal. Such schemes can use back-pumping where necessary to deal with 'uphill' locks, as has been studied for the Oxford Canal to transfer water to the Thames catchment. These options are likely to be cost-effective compared to other supply-side schemes but the maximum flow rate may be limited by hydraulic capacity of the channel and water velocities, potentially limiting transfer capacity. Inter-catchment water quality issues and the potential transfer of non-native species are also a consideration for such schemes.

New reservoirs, whilst storing winter runoff, do have large embedded carbon costs associated with scheme construction. Other options such as desalination and effluent reuse where reverse osmosis is required, both require large amounts of power to operate therefore the extra emissions associated with conventional energy sources should be carefully considered before proposing them.

Competition

Most public water supply provision is inherently a 'natural monopoly' and therefore is subject to significant economic regulation. Following privatisation of the public water authorities in England and Wales in 1989, the nature of economic regulation differs across the UK. The economic regulators are responsible for setting limits on pricing (for water bills) and protecting customer interests, encouraging competition and investment within the industry^{xxxix}.

Since April 2008, business water charges in Scotland have been competitive, with non-household customers being able to choose their supplier akin to the retail gas and electricity market in the UK. From April 2017, non-household customers of water and wastewater services in England have also been able to choose their retail supplier. It is important that water resources planners continue to monitor the impact of non-household retail competition, and that due focus is given by retailers to support water resources planning processes.

Ofwat has recognised that there are potentially significant savings for customers resulting from effective consideration of water trading or third-party options (other than an incumbent's own in-house solutions) to meet future water resources needs and challenges. It has introduced the Water 2020 framework^{xl} into the Price Review or business planning process for companies in England and Wales. Within this are a number of aspects relevant to water resources.

A number of water companies have already used processes to engage with third-parties as part of water resources planning. However, to promote competition, as part of the 2019 round of Business Plans Ofwat requires companies to publish a bid assessment framework. The purpose is to support a future bidding market for water resources, demand management, and leakage services for companies to consider robustly alongside their own in-house provision. As part of the 2019 water resources planning round, companies were also required to publish market information data to give consistent and transparent data to support the development and operation of this future market.

We are supportive of the ongoing exploration of appropriate and balanced competition in the sector, to ensure that bills represent best-value and to ensure service provision is as good as it can be. However, there is a need for significant care through ongoing consultation and dialogue across the industry, in particular to ensure that any future disaggregation or restructuring of the sector does not impact upon the stated CIWEM aims of integrated, holistic planning that is so critical for resilient water resources. It is critical that, given the socio-economic importance of water supply provision, the responsibility for security of supply is clearly defined within future regulatory models throughout the UK in order to ensure effective planning, management and response.

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