

Water today, water tomorrow

Push, pull, nudge

How can we help customers save water, energy and money?



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It seems almost unthinkable that we should need to conserve water



This is one of a series of occasional focus reports about work we are doing on a particular policy area. It highlights the role that various measures could play in the water and sewerage sectors in England and Wales to help customers save water, energy and money. Our aim is to encourage wider debate and discussion.

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1. Water, water everywhere?

Talking about the weather has long been a national pastime. We comment on how warm it is, or how cold it is. We talk about the wind and the fog. But mostly we like to complain when it rains. In our temperate climate, rainfall occurs throughout the year. So it seems almost unthinkable that we should need to conserve water.

Yet from time to time droughts remind us that our water supplies are limited. For example, in 2006 south-east England had one of its worst droughts for nearly 100 years, directly affecting 15 million people. The water companies took additional action to reduce leakage and make the best use of available sources of water. But they also had to introduce restrictions on customers' use. United Utilities took similar action in 2010 after the north-west of England experienced the driest start to the year since 1929.

Climate change projections consistently show that there will be more of these extreme weather events in future. In fact, not only will there be more droughts, we can

expect more flooding as well. At the same time, population growth and lifestyle changes are likely to push up water demand in some parts of the country where the water environment is already under pressure.

Against this background, it seems obvious that we will need to capture more rainfall in times of surplus, storing it for when we and the

environment need it most. In some cases, that could be the best solution. But saving water brings wider benefits. Not only can it help to protect the water environment, it can also help customers to reduce their water bills. And, when they use less hot water, it can help to cut their energy bills and carbon emissions too. So, we need to think harder about how we use this precious resource.

Ensuring reliable water supplies

Most people in England and Wales receive their water from one of 22 private monopoly water companies. Only two of the companies plan to supply water for all uses, even during the worst droughts. Customers of the remaining companies do not want to pay for unlimited supplies with much higher bills. Instead, the companies must ensure essential supplies and manage the risk of having to restrict other uses during droughts. For example, Thames Water plans on the basis that its customers should not experience a hosepipe ban more than once in every 20 years.

As the economic regulator of the water and sewerage sectors in England and Wales, we expect each company to maintain reliable supplies in a way that delivers best value to its customers and the environment.



In 2006, south-east England had one of the worst droughts in the region for nearly 100 years

Minimising waste

In 'Waste not, want not – making the best use of our water', which we published in June 2010, we described how the companies and consumers could help to address these challenges by minimising wasted water.

For their part, the companies need to control leakage effectively. They also need to explore opportunities to transfer water from areas where there is a surplus to areas where there is not enough – sometimes across water company boundaries.

This document focuses on the contribution that household consumers can make, and the steps that Government, regulators and the companies can take to help them.

For many of us, the way we use water is deeply ingrained. We do

not tend to make conscious decisions about how much we use. And we are unlikely to change our habits without being prompted. There are different ways of prompting such change, and each has its own merits. We have set out the options (right).

In this document, we:

- discuss why using water wisely is important;
- describe in more detail the different ways of achieving sustainable water use; and
- seek feedback on the work we can do to encourage and bring about change.

We hope that this will contribute to the debate about how we value water, how we pay for it, and how we can use it more sustainably.

Push, pull and nudge

There are different ways to encourage consumers to use water more wisely. We have grouped them into three categories.

Push is about setting standards for water-using devices. This includes the regulations that apply to water fittings and new homes. The Department for Environment, Food and Rural Affairs (Defra), and the Department for Communities and Local Government (CLG) are responsible for these regulations, but the European Commission has an important influence too.

Pull is about rewarding customers for using water wisely. The most obvious way to do that is to charge customers for what they use, so that they pay less if they use less. About 60% of household customers in England and Wales do not have a water meter, which means that they do not pay according to how much they use. Defra and the Welsh Assembly Government set the policy and legislative framework for metering. For those customers who have a meter, the level and structure of their charges can have an important influence. The companies are responsible for setting charges, subject to our approval.

Nudge is about understanding consumer behaviour and using it to promote change. It draws on best practice in advertising and marketing to encourage consumers to change their water-using habits. It is something that Government, the regulators and those providing services to consumers can all use.

2. Why use less water?

In some parts of England and Wales, there are already pressures on the water environment (see opposite). Climate change could further limit water availability. At the same time, a growing population and changing lifestyles are likely to push up household water demand, although changes in the commercial sector could see a reduction in non-household demand.

Against this background, the companies have to take steps to maintain a balance between water supply and demand.

An appropriate response?

The overall impact of these changes will vary between regions and so will the most appropriate responses.

All of the companies must make sure that they control leakage effectively. In some cases, they might need to target further reductions in leakage. In others, it might be appropriate for them to develop new sources of water, storing it in times of surplus so that

it is available to satisfy consumer demand and replenish water habitats in times of need.

The companies should look at the potential to share resources. This could require more connections between water company networks. Adopting such an approach would help the companies to maintain supplies even when extreme events like floods take some sources out of service. We discuss this subject in more detail in [‘Resilient supplies – how do we ensure secure water and sewerage services?’](#), which we published in November 2010.

Developing new sources of water, and joining up the companies’ networks to make better use of existing sources, can provide clear benefits. But these options can also involve very high infrastructure and energy costs, which would push up bills. So, in many regions there will be a case for reducing the demand for water. It makes sense to find cost-effective ways to reduce wasteful water use in all regions, but the need to cut waste is even more pressing in those regions where water is already scarce.

Pressures on the water environment

Of the 22 water supply areas in England and Wales, the Environment Agency classifies 12 as ‘seriously water stressed’. It makes this assessment by comparing current and forecast rainfall per person with current and forecast household water demand per person.

The water stress classification is a very high-level measure to inform proposals for metering (see chapter 4). The Environment Agency’s assessment of water resource availability measures the pressures on water habitats more specifically. Using information from its Catchment Abstraction Management Strategies (CAMS), it indicates areas of risk to the water environment.

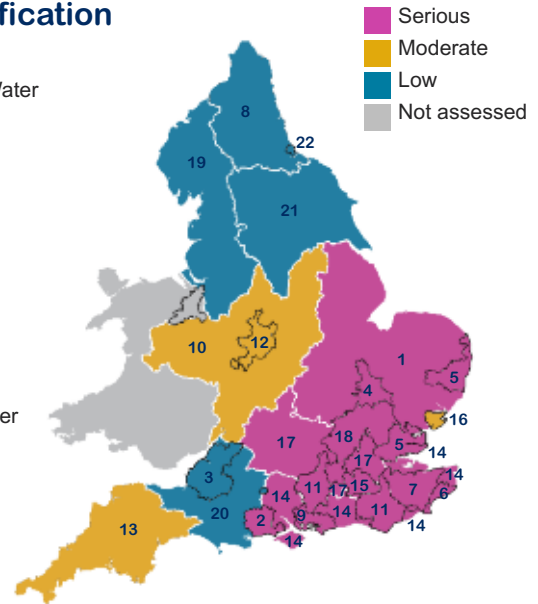
The Environment Agency assesses whether water is available for abstraction by comparing the amount of water

that the local ecology needs (the 'Ecological Flow Indicator' or EFI) with fully licensed and recent actual flows. The fully licensed flow assumes that all existing abstractors take their full permitted amounts. The recent actual flow is based on the amounts that existing abstractors currently use.

The Environment Agency uses six different CAMS resource availability colours to show whether water resources might be available for further abstraction. The grey and green colours indicate where abstraction is at a sustainable level, so more water may be available. Yellow and orange indicate that abstraction is potentially unsustainable but water might be available when flows are high. Red and purple indicate where abstraction is unsustainable and there may be little opportunity to abstract more water. The Environment Agency takes other factors into account when it makes detailed decisions about water availability, so this map is not a definitive summary.

Water stress classification

1. Anglian Water
2. Sembcorp Bournemouth Water
3. Bristol Water
4. Cambridge Water
5. Essex & Suffolk Water
6. Veolia Water Southeast
7. Mid Kent Water
8. Northumbrian Water
9. Portsmouth Water
10. Severn Trent Water
11. South East Water
12. South Staffs Water
13. South West Water
14. Southern Water
15. Sutton & East Surrey Water
16. Veolia Water East
17. Thames Water
18. Veolia Water Central
19. United Utilities
20. Wessex Water
21. Yorkshire Water
22. Hartlepool Water



CAMS resource availability colours at low flows

- Fully licensed flows would be >10% above normal
- Fully licensed would be flows > environmental flow indicators
- Fully licensed flows would be just > environmental flow indicators
- Fully licensed flows would be << environmental flow indicators
- Recent actual flows are < environmental flow indicators
- Recent actual flows are < environmental flow indicators – 25%



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Benefits of saving water

It is in all our interests to use water wisely.

Saving water benefits our pockets. A family of three could save £43 a year on its metered water and energy bills if each person spent just one minute fewer in the shower each day. Even if the same household did not have a water meter, it could still save £24 a year on fuel alone. And if saving water means that the companies avoid investing in expensive new assets, then that should help to keep metered and unmetered charges down in the long run.

Saving water also benefits the environment. By reducing pressure on the water environment, it helps to protect animal and plant life, and make local supplies sustainable. It benefits the wider environment as well – saving water saves energy and reduces carbon emissions. The companies use energy when they treat and distribute water. Also, on

average, 25% of the energy that people use in their homes is to heat water.

What scope is there to save water?

We can achieve these benefits without giving up the water that we value for our health and enjoyment. We just need to waste less.

In England and Wales, on average each person currently uses about 150 litres of water a day. That is more than in Germany, Austria and the Netherlands. Nor do we have to look overseas for examples of lower water use. Veolia Water East's customers in the east of England use fewer than 120 litres per person each day on average. Yet these comparisons only tell us something about the potential to use less. They do not tell us whether it is desirable to do so.

People waste water when the benefit they get from using it is less than the cost of supply, including wider social and environmental

costs. Using this definition, we can start to see some of the reasons why we might waste water even though it is in all our interests to use it wisely.

The most obvious is that the price we pay for water does not reflect the full cost of supply. So we are unable to compare costs and benefits properly when we decide how much water to use. Unmetered customers pay a fixed fee, but then pay nothing at all for each unit of water they use. Even metered customers pay less than the full cost of supply. Metered charges reflect only water company costs, which cover some but not all of the environmental costs of supplying water, and removing and treating wastewater.

In other sectors, consumers often take account of environmental and social impacts when they decide what to buy, whether or not the prices they pay reflect those impacts. For example, environmentally-conscious consumers limit their air travel even though prices are often very low.

**We do not have to give up
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But Defra's report on '[Public understanding of sustainable water use in the home](#)', published in March 2010, found that consumers are not very aware of water scarcity or the environmental impact of using water. Hosepipe bans and other restrictions sometimes raise awareness, but in general the effect is temporary.

We shall see in the following chapters that these are not the only reasons why people waste water. We consider how the companies and other parties can overcome these issues to encourage consumers to use water more wisely. Our focus is on the three broad categories of measures outlined on page 5 – push, pull and nudge. We highlight the key issues with each approach.



3. Push – requiring change

There is an argument for simply requiring water-using products to be more efficient. As long as efficient versions deliver the same experience, we will have no reason to change our behaviour – but we will use less water.

The impact of regulations

There are two main sets of regulations that influence water use.

- The Water Supply (Water Fittings) Regulations 1999 ('water fittings regulations') set minimum standards for the water efficiency of toilets.
- The Code for Sustainable Homes and Building Regulations require all new properties to meet minimum standards for typical water use.

The water fittings regulations and the water by-laws that preceded them have had a significant impact on our water use. And, since April 2010, Building Regulations have

required property developers to achieve even higher water efficiency standards – consistent with levels 1 and 2 of the Code for Sustainable Homes. This means that new properties should achieve average water use of no more than 120 litres per person each day, excluding garden use. The Code also requires new homes built with public funds to achieve level 3,

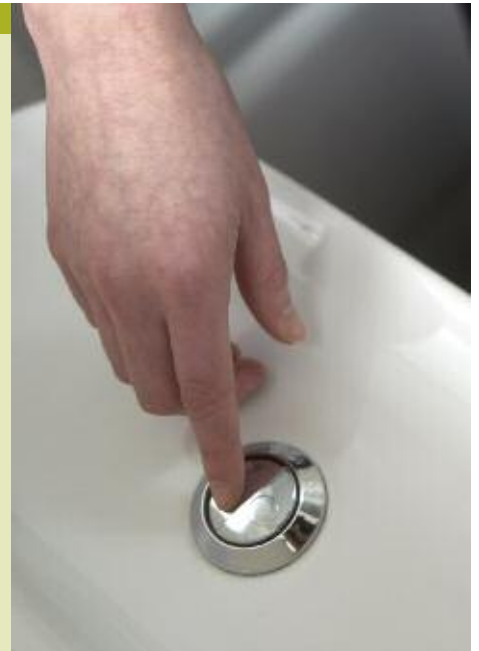
Flushed with success

In the 1940s, toilet cistern volumes were typically about 12 litres.

The Government started to impose limits in the 1960s. By the early 1990s, new toilets had a maximum flush of 7.5 litres.

The water fittings regulations now specify a maximum flush of 6 litres. Waterwise, a leading authority on water efficiency in the UK, estimates that each of us flushes the toilet about six times a day. So reducing the maximum flush from 7.5 to 6 litres a day could generate water savings of about 9 litres per person each day.

This is a significant amount when set against the daily average of 150 litres per person.



which sets a standard of 105 litres per person each day.

Do we need more regulations?

CLG, which is responsible for the Code, reports that it could cost developers £200 more to achieve level 3 than it costs them to achieve level 1. But it also notes that some developers, especially volume homebuilders, think that there would be no additional cost.

The UK Government does not currently wish to set higher standards for water efficiency in new build homes. It is conscious of the need to minimise the regulatory burden on homebuilders. Even so, it is committed to tightening the regulations for energy efficiency to achieve a zero carbon standard for new homes by 2016. Bearing in mind that water use – and particularly hot water use – has a significant carbon cost, we think that it is worth keeping standards for water efficiency under review.

Scope to extend the water fittings regulations is also limited. Any new

or amended water fittings regulations would be constrained by rules regarding barriers to trade with other European countries.

More generally, the UK and Welsh Assembly Governments prefer a more deregulatory approach to encouraging change. For example, energy efficiency labels for washing machines and dishwashers have to show how much water the product uses. This should help to raise consumer awareness and stimulate manufacturers to innovate to improve water efficiency. The UK and Welsh Assembly Governments have also encouraged manufacturers to provide water efficiency labels voluntarily for a broader range of products that use water (see chapter 5).

Other options

Regulations are not the only way of achieving more sustainable water use without relying on behaviour change. One option would be for the companies to incentivise

New properties should achieve average water use of no more than 120 litres per person each day

developers in their regions to build more water-efficient properties.

Or, property developers could offer homebuyers more choice. If they can choose the pattern on their bathroom tiles, buyers should also be able to select the type of shower their new home will have.

Measures to improve water efficiency in existing homes could generate even greater benefits. In 2009-10, about 124,000 new properties were completed in England, while the total housing stock exceeded 22.6 million properties.

The scope to improve water efficiency is particularly high in social housing, where products that use water tend to be less efficient. A recent survey for the Greater London Authority suggested that about 80% of social housing properties in Greater London had a bath and no shower. A typical bath will use three

Push, pull, nudge – how can we help customers save water, energy and money?

or four times as much water as spending five minutes in the shower.

Against this background, the decent homes programme has fitted 692,000 replacement bathrooms

and 931,000 replacement kitchens in social housing since 2001. This has brought clear benefits. For example, in 2001 only 7% of toilets in local authority housing had a maximum flush of six litres. By

2008, the proportion had increased to 32%.

A role for push?

There is undoubtedly a place for measures that conserve water without changing behaviour. Such measures are already having an impact. There is scope for them to achieve more, but they should seek to do so without reducing the benefits we enjoy from using water.

Mandating change across Europe

Two main developments at the European Commission could influence water use in England and Wales in the future.

A Water Efficiency of Buildings Directive is likely to follow from the Commission's review of water policy in its 'Blueprint for Water', due in 2012. Defra will seek to influence any standards that form part of the Directive.

The Ecodesign Directive, which is already in place, is likely to expand in 2012 to encompass hot water-related products such as taps and shower heads. The Directive aims to make sure that different national legislation on the environmental performance of energy-related products does not present an obstacle to trade within the European Union. Again, more information on this should emerge in the second half of 2011.



4. Pull – rewarding economy

More than half of all household customers in England and Wales do not have a water meter. Their water and sewerage bills depend on the rateable value of their property. So an unmetered household cannot reduce its bill by using less water. It could stop using water altogether and its bill would be unchanged.

Metered charges provide a clear financial incentive for customers to use less water. When metered customers use less, they pay less. Evidence from UKWIR, the research body for the water and sewerage sectors, shows that customers respond to this incentive, and reduce their water use by between 10% and 15%. Research also suggests that customers regard metered charges as the fairest way to pay for water, particularly if everyone has a meter.

Yet despite these clear benefits, only 37% of households had a water meter in 2009-10. We expect this figure to increase to about 50% by 2015 as more customers opt for a meter and some water companies meter their customers compulsorily.

The independent review of charging for household water and sewerage services, carried out by Anna Walker (the ‘Walker review’) concluded that future charging for water should generally be based on a metered system. There is broad support for this view across stakeholder groups. The question, then, is not whether to meter household customers, but how quickly to do so and what type of meter to install?

Household metering – how fast?

The UK and Welsh Assembly Governments’ view is that it is for government to set the policy and legislative framework for metering, and for Ofwat to assume proactive leadership in implementing this policy.

The UK Government will set out its policy on water metering in a Water White Paper, which it plans to publish in the summer. In Wales, the Assembly Government has set out its policy in an updated [‘Strategic policy position statement on water’](#). It considers that metered

Rateable values

Rateable values formed the basis of local taxation before the Government introduced the Community Charge in 1990. Local Authorities assessed the annual rental value of individual properties and taxed households accordingly. They made their last comprehensive assessment of rateable values in 1973, and only issued new valuations up until March 1990. These values date from before many of today’s water customers were even born. This seems increasingly anachronistic, and arguably unfair.

charges have a role to play in encouraging careful use of water, but it is concerned about the potential negative impact on some vulnerable groups. It will update its position in due course.

Under the current legal framework in England and Wales, the proportion of household customers with a water meter increases slowly each year. At the current rate of progress, we will achieve near-universal metering by 2050. A key issue is whether this gradual transition is in the best interests of

customers and the environment.

As a first step, we have started to assess the impact of metering over different timescales. The Walker review carried out a similar analysis. It

Our initial findings support the Walker review's conclusion that an accelerated metering programme could be significantly beneficial

found that an accelerated metering programme could be “significantly beneficial for customers and the environment” under certain conditions, including where it is expensive to supply water. Our initial findings support the review's conclusion.

We looked at the costs and benefits of metering over different time periods. For the purposes of this work, we did not consider how the companies might achieve faster rates of metering. The box (left) shows that it is possible to increase the rate of metering in some cases under the current legal framework. It is for the UK and Welsh Assembly Governments to decide whether it is appropriate to retain or revise that framework.

Metering – what type of meter?

Our metering analysis assumes that the companies will install standard

When can the water companies meter their customers?

The existing legal framework allows each water company to charge individual customers according to the volume of water they use:

- when the property is new;
- on change of occupier;
- when a customer opts to have a meter; and
- under specific circumstances where the customer has high discretionary use, for example if they have a swimming pool.

Also, the companies can charge all household customers by volume if the Secretary of State (or Welsh Ministers for companies operating wholly or mainly in Wales):

- grants a company ‘water scarce area’ status; or
- designates all or part of a company's region as ‘seriously water stressed’, and the company has a programme of compulsory metering in its published water resources management plan.



meters, like most of those already in place. These meters have no facility to store information, and the companies have to read them manually.

From a customer perspective, having a standard meter helps to raise awareness of water use because it enables charging by volume. But the meter itself provides little prompt for customers to alter their behaviour. In most cases, it is installed in the ground beyond the property boundary and is often difficult to read. More sophisticated, 'smart' meters can help to engage customers more effectively. They can collect more detailed information about how much water customers use. The companies can communicate this information to customers through different media. For example, they can relay information:

- using a display in the home;
- as part of a customer's online account information; or
- with printed bills.

Household customers could clearly benefit from this enhanced information. For non-household

Why is there a steady flow of meter optants?

Customers usually opt for a meter because their bills would be lower if they paid for how much water they use.

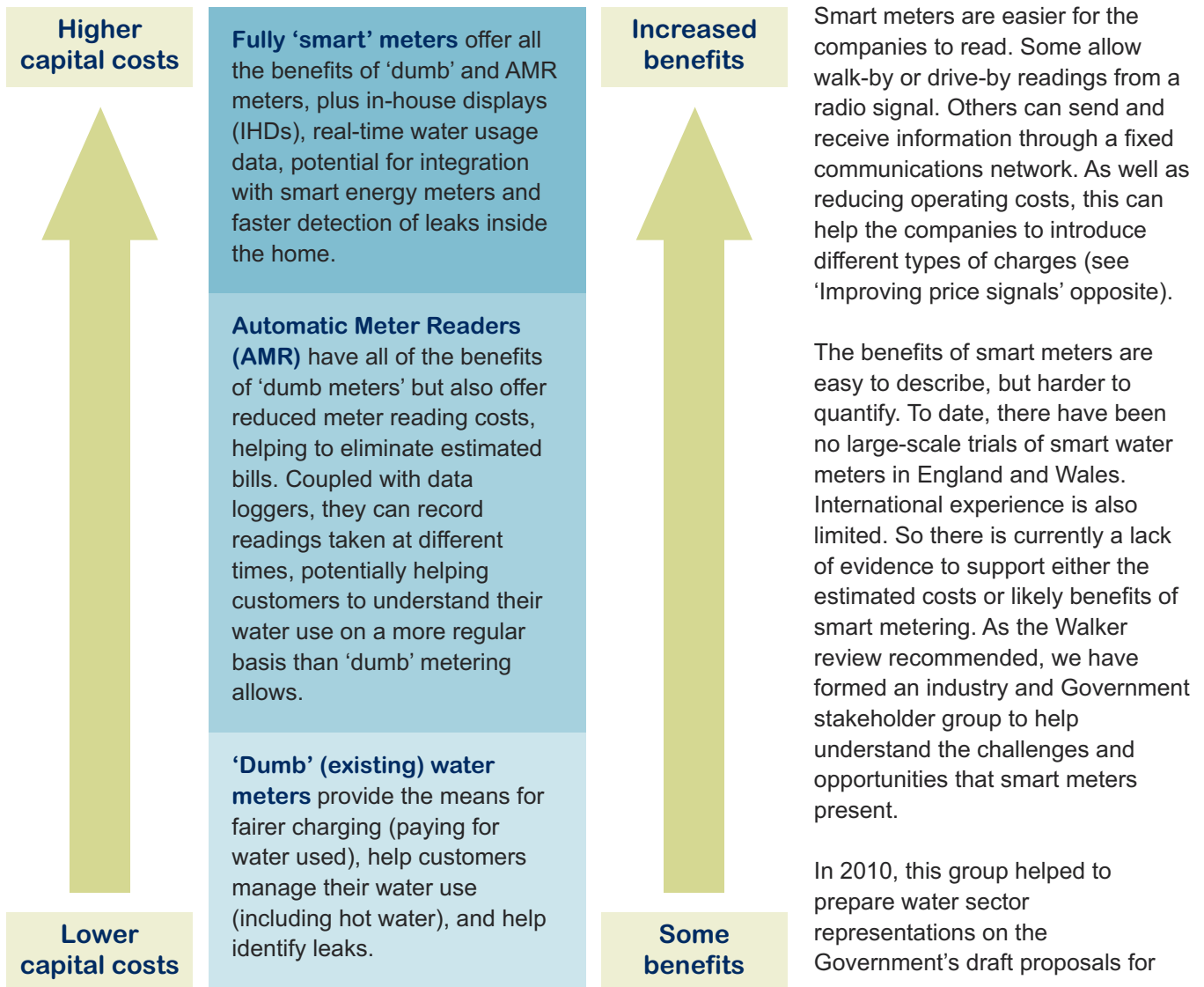
When customers opt for this reason, charges increase for the remaining customers who do not have meters. This happens because we make sure that each company's charges for unmetered customers as a whole reflect the amount of water that those customers use. Customers who opt for metered charges tend to use less water – even before they opt – than do customers who remain unmetered. So, average unmetered water use normally increases when customers opt, and unmetered charges increase correspondingly.

That might seem unfair to the remaining unmetered customers, whose water use might not have changed at all. But it reflects the fact that, on average, those customers paid too little in the past. These increases in unmetered charges prompt more customers to opt, and the cycle continues.

We recognise that some customers do not opt for a meter even when it might benefit them. So, some unmetered customers are paying bills that are high relative to their own water use. We are considering what the companies can do to help customers understand their options. This will be particularly important for customers from vulnerable groups, including those on low incomes.

customers, the advantages could be even greater. About 90% of commercial customers already have a meter. For them, the key issue is the quality of the information that

their meter gives them. While some commercial customers already have more sophisticated meters, most do not.



smart energy metering. The main objective of these representations was to keep open the option for water to share the energy sector's new communications infrastructure.

Improving price signals

Pull is about improving price signals to reward economical water use. The transition from unmetered charges to charging by volume is the most obvious example of this. But there are others.

For example, metered charges could differ in 'peak' and 'off-peak' periods if the costs of supply depend upon peak period demand. On the same basis, temporary higher pricing could encourage water conservation during drought periods. This could reduce the need to impose hosepipe bans and other restrictions on use, although it would need to come with safeguards to protect customers.

Seasonal charges are difficult to apply with standard meters because they require meter readings at particular points in time. It would be

Smart energy metering

Between now and 2020, the energy sector will roll out smart meters to all households in England and Wales. This could provide an opportunity for the water companies to use the communications infrastructure that will support these new smart meters. In particular, they could:

- reduce their data collection costs by transmitting meter readings through the energy communications infrastructure; and
- present water usage information to consumers using the same in-home displays that the energy sector will use.

When they install smart meters, energy suppliers will provide households with information about energy efficiency. We think that this presents an excellent opportunity to deliver water efficiency information at the same time. Providing advice jointly would reduce costs and reinforce the efficiency message. Water and energy efficiency are closely linked – consumers save both water and energy when they use less hot water.

prohibitively expensive for a water company to read all its customers' meters manually at the same time. Automated meter reading makes this task easier and cheaper.

It is not only price signals to water and sewerage customers that matter for sustainable water use.

Abstraction charges should help to signal the different values of water in different locations, encouraging abstractors to use water resources more sustainably. We continue to work with Defra and the Environment Agency to explore possible abstraction licensing reforms.

Southern Water's universal metering programme

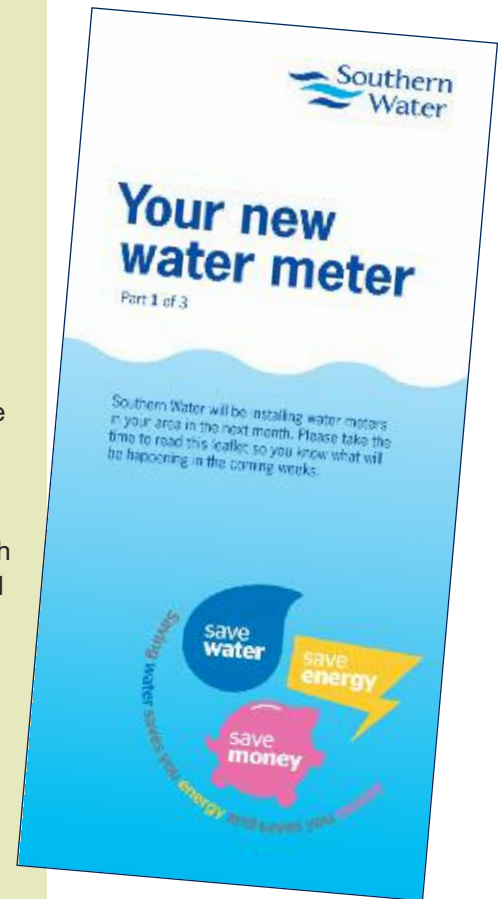
Southern Water is in the process of managing an accelerated transition to widespread metering. The Secretary of State has designated its operating area as seriously water stressed, and the company needs to take steps to maintain an appropriate balance between water supply and demand. As part of its published water resource management plan, Southern Water is launching a comprehensive programme to meter nearly all of its household customers.

At present, 40% of the company's household customers already have a water meter. Between now and 2015, it will install nearly 500,000 new meters to take this proportion to about 92%.

As part of its installation programme, Southern Water has worked with various experts to make sure it engages effectively with its household customers on the key issues of saving water, energy and money.

The company is introducing transitional charging arrangements to ease the impact on those customers whose bills will increase. It will also offer free water and energy audits and water-efficient devices to low-income customers who will face significantly higher bills. And it plans to introduce further measures to protect customers on low incomes in light of forthcoming guidance on social tariffs from the Secretary of State.

The company's experience will help provide valuable information on the costs and benefits of metering. It will help other companies to identify the steps they need to take to deliver large-scale metering programmes successfully.



5. Nudge – encouraging behaviour change

Metered charges provide an incentive for customers to use water wisely. But we cannot rely on metering and charging alone to achieve sustainable water use. There will continue to be significant numbers of unmetered customers for some time. And even when customers have meters, the price they pay per unit of water is unlikely to reflect the full social, economic and environmental cost of supplying and taking away that water. In any case, we know that people do not always respond to price signals in the way that economics text books suppose.

The traditional text book approach assumes that consumers spend and save optimally. They maximise the value they get from a vast range of consumption and investment opportunities, drawing on a wealth of information to perform complicated trade-offs. So the amount that they choose to spend on a home, a car, or their children's education, is precisely calibrated with the amount they spend on shoes, tins of beans and tap water.

In practice, economists recognise that this is a convenient

simplification. Relatively recently, they have drawn on insights from psychology and other social sciences to gain a better understanding of consumer behaviour. This 'behavioural economics' reveals that the way options are presented can have a significant impact on the choices people make. Advertising and marketing executives have known this for a long time, but behavioural economics has revealed more about why it happens and hence how policy makers and others can influence – or 'nudge' – behaviour.

At first glance, nudging water use, or any other behaviour, sounds both manipulative and controlling. But it is not about restricting or interfering with consumers' freedom to choose. They can always give nudges the cold shoulder.

Nor is nudge necessarily manipulative. It simply recognises that consumers will be affected by the way in which options are presented to them. They will be affected regardless of whether the presentation is deliberately designed to have such an influence. On that basis, it has to be better to

influence behaviour by design than to influence it by accident.

The case for nudging water use

Thaler and Sunstein's 2008 book, 'Nudge – improving decisions about health, wealth and happiness', helped to bring behavioural economics to popular attention. It describes a range of circumstances under which people are most likely to make mistakes in their decisions, and hence where they could benefit most from a nudge. The

table on page 20

summarises

these

circumstances

and notes

which ones

might apply to

water. It looks

separately at

decisions about

daily water use and

purchases of products

that use water (such as washing machines and dishwashers).

The overall conclusion is that water use is a suitable candidate for nudges.



It has to be better to influence behaviour by design than to influence it by accident

Is water use suitable for nudging?

Consumers experience the benefits of water use straight away. But households with a water meter do not incur any costs until their next bill arrives. Unmetered households' decisions about water use do not incur any costs at all because their bills do not relate to how much water they use. For all consumers, the environmental costs of their choices are remote – either because they occur later, or because they are just not apparent to the consumer when they do occur.

For similar reasons, making the right decisions about water use is not easy because it is difficult to assess the full costs.

Consumers only rarely buy products that use water, so they have little

Consumers might benefit from nudging when their decisions:	Daily use	Water-using products
involve benefits now, incurring costs later	✓	✗
are difficult	✓	✓
are rare, so that there is no opportunity to practise	✗	✓
do not give rise to feedback, from which they can learn	✓	✓
have to be made without properly understanding their own preferences	✗	✗

opportunity to practise. They make decisions all the time about using water, but they typically receive very little feedback on their use. At best, most metered customers receive a bill that explains how much water they have used in total over a period of time. It is not surprising,

then, that research carried out for us and the Consumer Council for Water found that metered customers did not know how many units they typically used, or what they paid for each unit.

How nudge might work

Lessons from behavioural economics can help drive more sustainable water use in at least three ways, including:

- as a means to encourage customers to opt for a water meter;
- to promote behaviour change among metered customers; and

- to incentivise all customers to save water.

We consider each of these in more detail on the following pages.

Increasing meter uptake

Resistance to change is a common feature of consumers' behaviour. It is also why people do not always

act in their own best interests. Many unmetered customers would benefit from lower bills if they were to choose to have a meter, yet they do not do so.

One way of challenging this resistance is to make use of our natural tendency to behave according to socially acceptable conventions or standards ('social norms'). The water companies have



Nudge and traditional water efficiency measures

The water companies have a legal duty to promote efficient water use. We set them targets for the work they must do to meet this duty. They can carry out various activities to achieve these targets, including providing information and distributing water-saving devices.

These traditional measures have a strong nudge component. They recognise that people do not always make decisions that are in either their own or society's best interests. So they encourage behaviour change essentially by raising awareness and making it easier for people to act. The success of doorstep recycling collections illustrates the potential impact of this approach. Recycling rates in the United Kingdom doubled between 2003 and 2008. More widespread doorstep collections were a key factor, saving people the hassle of visiting their local recycling points.

observed that requests for meters sometimes increase significantly in particular locations through word-of-mouth by customers. So, if they were to promote metering more actively, one option would be to target promotion at a community level, highlighting the proportion of customers locally or more widely who already have a meter.

A more powerful nudge would be to change the current system of opting-in for a meter to one in which customers had to opt out. In their 2003 article ‘Do defaults save lives?’, Johnson and Goldstein illustrated the effectiveness of this particular approach to organ donation consents.

But there is a risk that an opt-out system could be seen as manipulative, even if – technically – it allows freedom of choice. Some customers might feel that they were tricked into having a meter.

On the other hand, safeguards could make this approach more acceptable. Under the current

system, customers can go back to unmetered charges up to 12 months after their meter is installed. An opt-out system could extend this period to two years. The companies could continue to charge on an unmetered basis in the first year, while providing comparative metered and unmetered bills. Customers could then have a second opportunity to opt out before paying metered charges in the second year. And they would have a third opportunity to opt out at the end of the second year.

We are not advocating an opt-out system, and the UK and Welsh Assembly Governments have no plans to allow the companies to meter on this basis. But it might be more acceptable to customers than having their

water company meter them compulsorily.

Promoting behaviour change by metered customers

While metered customers enjoy the benefits of water use straight away, they do not incur costs at the same time. Nor do they typically receive much information about those costs, either when they receive their bills or at any other time. We know



that having a meter generally reduces water use. But it probably does so mainly by increasing general awareness that there is a cost consequence of using water. Customers are often unaware of how much any particular volume of water costs them, or of the pattern of their water use over time.

Most metered water bills contain only very high-level information. They report total water use in the billing period and the charges arising from that use. More helpful bills provide comparative information. For example, they show how a customer's use has changed compared with previous billing periods, and how it compares with typical use for particular household groups. But even this information might have relatively little value if customers do not bother to read their bills in any detail.

It would not necessarily incentivise desired behaviour either. In 2007, a study in the United States found that consumers used less energy when they were told that they

previously used more than the average for their neighbourhood. But their usage increased when they were told that they used less than average. In this case, relying on social norms was positively unhelpful.

In the same study, a more effective nudge was to include a picture of one of two facial expressions ('emoticons') in each bill.

Above-average users received an unhappy emoticon, while below-average users received a happy emoticon. High users reduced their consumption by even more than they did when simply presented with the facts. Significantly, and even more helpfully, low users did not increase their consumption.

By contrast, [a study by the Energy Saving Trust](#) found that people did not want to conform to social norms. They found it more helpful to see

changes in their own usage so that they could identify the causes of high use and find ways to reduce it. Perhaps the most useful conclusion to draw from this is that it

would be wrong to rely on the results of any given study, and better to adapt strategies in light of experience.

Smart meters can provide useful information to customers. Rather than simply recording water use,

they can show the cost of use over much shorter periods of time. Yet here again, the effects could be perverse. If water prices understate the full economic cost of supply, including the environmental and social costs, then there is a risk that consumers will use too much.

There is also a risk that they would greet more detailed information about water use and its bill impacts with indifference. Energy supplier Southern California Edison found



that using email and texts to update its customers on the energy they consumed was ineffective. Customers responded much more positively when they were given an Ambient Orb, which glowed red when they used a lot of energy and green when they used little. The

idea has much in common with the emoticons described on the previous page, but it provides more timely feedback.

A report for the Energy Saving Trust by the Centre for Sustainable Energy published in 2010 – ‘[The smart way to display](#)’ – also found

that consumers were more likely to respond to simple displays. Using evidence from focus groups, it suggested that the most effective display would show energy use rather like a speedometer, but with supporting information about the bill impacts.

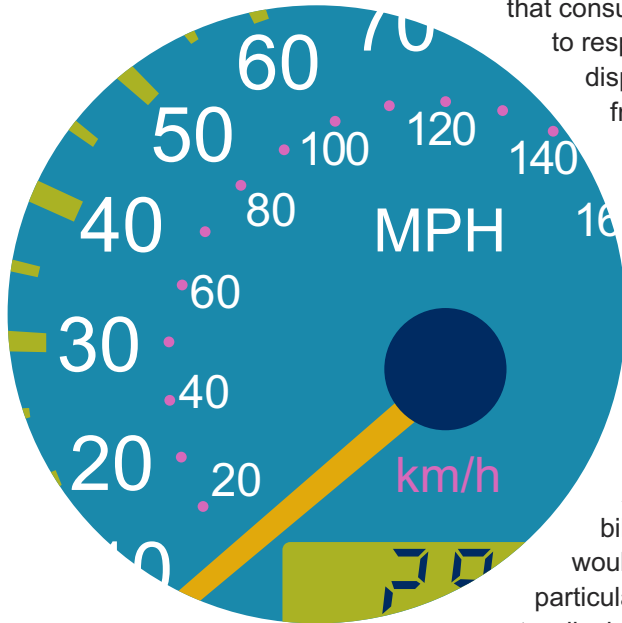
As in the case of billing information, we would not advocate any particular approach to smart meter displays. Our point is simply that the design of these displays will be critical to how effective they are at influencing behaviour.

Incentivising all customers

Some of our water use depends less on our day-to-day behaviour and more on the technology we have in our homes. We have occasional opportunities to change that technology – for example, when we buy a new washing machine or fit a new bathroom. These purchasing decisions provide a significant opportunity to nudge consumers towards water-efficient products.

The most obvious nudge in these circumstances is an appropriate form of product labelling. The point of such schemes is to highlight a key characteristic – water efficiency in this case – that might not otherwise have registered on the purchaser’s radar. The Bathroom Manufacturers Association (BMA) has developed its own water efficiency labelling scheme, and we support its efforts.

It will be important to monitor the effectiveness of the BMA’s scheme,



and to identify ways to improve it. For example, a report for Defra on ‘Behavioural economics and energy using products’, which was published in 2010, noted that people tend to under-value future costs, focusing instead on purchase price. The report suggested that appropriate framing of information on future running costs could help to address this problem. In the BMA’s scheme, information about running costs is not explicit – it is only implied by a water use rating. This might be appropriate, but it depends what other information consumers receive.

The problem is that consumers might think that more water-efficient versions provide less effective performance. No one wants to shower under a trickle of water. In fact, technology has improved so that the experience from water-efficient products is often effectively the same as the experience from products that use more water. But as long as consumers perceive otherwise, there is a risk that labelling could have a perverse

effect on purchase decisions.

In other markets, manufacturers and retailers reassure consumers with additional information. For example, car buyers can compare performance statistics and test prospective purchases before they buy, so they need not automatically equate fuel efficiency with inadequate performance. A wider package of point-of-sale information can

also help with water-using products. But there might be less of a risk if the efficiency label provided a rating without stating the volumes of water explicitly. As an example, energy efficiency labels use an A-G scale.

Product labelling schemes tend to emphasise the savings that consumers can make from buying a particular product. Yet research

suggests that consumers are swayed much more by a desire to avoid losses. So, a scheme could be more effective if it emphasised that buyers would lose money if they bought less efficient products.



Green Deal

Research suggests that consumers place too low a value on future costs – and future cost savings. So they are less likely to buy expensive products like loft insulation, which save money on future energy bills. The Government developed its 'Green Deal' initiative to help overcome this problem.

Under the Energy Bill, the Government plans to introduce the Green Deal to allow people to finance energy efficiency improvements at no up-front cost. Instead, they will repay the cost through a charge on their future energy bills.

Hot water provides a strong link between water and energy – it accounts for about 25% of carbon emissions from the home. So, the Green Deal can include measures to improve hot water efficiency, as long as the expected financial savings are equal to or greater than the costs.

Customers who are interested in the Green Deal will receive accredited, objective advice as part of an initial assessment visit. In ['The Green Deal – a summary of the Government's proposals'](#), the Department of Energy and Climate Change said "...we are looking at how best to use [this advice] to give consumers a wider range of information about steps they can take to improve the sustainability of their homes, including water efficiency."



Who should take responsibility for nudging?

Nudges are a potentially effective way to encourage more sustainable water use. But who should be doing the nudging?

The water companies are obvious candidates. As retailers, they have a direct relationship with consumers, so they have the best opportunity to nudge. They also have a clear motivation because they have a duty to promote efficient water use. Yet some nudges will only succeed if consumers trust the organisation doing the nudging. Since consumers do not always trust their water company, other organisations might be more successful at delivering certain nudges.

In this document, we have already suggested that other stakeholders could play a part. So, property developers could encourage more efficient water use by offering homebuyers more say in the water-

using technologies they install in new homes. Manufacturers of these products are already contributing with labelling schemes. And trusted retailers could play an important role through their involvement in the Green Deal.

Our role

As the economic regulator, we can help in a number of ways.

- We can incentivise the companies to use nudges to achieve socially beneficial outcomes. For example, we allow them to count against their water efficiency targets the estimated savings they achieve from providing information, education and other nudge measures. To date, we have set a 30% limit on the contribution that these 'soft' measures can make. We plan to remove that limit as part of a package of changes that would incentivise the companies to provide better information on the actual impact of water efficiency measures. In turn, this should help the companies to make better decisions in future about which measures to use.
- Our service incentive mechanism (SIM) is designed to encourage the companies to innovate to deliver service improvements that consumers would value. Nudge measures can improve the consumer experience by helping customers to help themselves. So, effective nudges should improve the companies' performance under the SIM, and we will reward them accordingly.
- As part of our work to help improve the evidence about smart metering, we will take account of the potential for smart meters to help the companies nudge consumers towards more sustainable water use.
- We are reviewing the way in which we regulate. As we explained in '[Beyond limits – how should prices for monopoly water and sewerage services be controlled?](#)', which we published in July 2010, we want to focus more on incentivising outcomes, rather than outputs or inputs. In order to do this, we need to understand why the companies react to our incentives in the way that they do. We should then be able to give the companies greater flexibility to identify whatever combination of measures will balance water supply and demand in the best interests of consumers and the environment.
- We can help the companies to find the most effective ways to engage with consumers.
- Customers want to have lower bills, but often they do not have the time or the knowledge to find ways of reducing the amount of water they use in order to reduce their bills. They need help. Water suppliers help as part of their customer service. But we think that there is scope for them to improve. We want suppliers to deliver the kind of service that customers would enjoy in a competitive market. Experience in other sectors reveals that companies provide better service when they have an incentive to focus on the different parts of their business, including retail. We think that it is possible to create that incentive by reforming the retail licence framework.



6. Conclusions and next steps

It is in all our interests to use water wisely, but we do not always act accordingly. In this document, we have explored some of the different ways to achieve more sustainable water use.

There is an obvious advantage to measures that achieve more sustainable water use without relying on behaviour change. Regulations that require water-using products to be more efficient already make a valuable contribution. The potential to do more is constrained by rules around barriers to trade, and concerns about imposing burdens on business and limiting freedom of choice. But there are other ways of achieving similar outcomes, and it makes sense to continue exploring all of the options.

Volume-related water charges have a vital role to play in encouraging behaviour change, and they are the fairest way to pay. So we think that there is a strong case in principle for a faster transition to more widespread metering. Whatever the speed of the transition, the companies must make it acceptable to their customers. This should

include safeguards to protect those vulnerable and low-income households whose bills would increase.

Metering is the most obvious way to give volume-related charges a greater role in encouraging behaviour change. There is also scope to use different tariff structures to send better price signals.

But we should not rely on price signals alone. Consumers can be nudged towards more sustainable water use. With better information and more helpful feedback, consumers should make better decisions.

Further work

- Defra's Water White Paper will include the Government's policy on water metering and water efficiency. Defra expects to publish this in the summer.
- We have started to assess the impact of different rates of progress towards more widespread metering. Our initial

results are only indicative, and we plan to make our detailed findings available soon. We are aware that there are a number of areas where we need to develop the analysis. In particular, we have excluded some costs and benefits because they are difficult to quantify, but we need at least to consider how to take account of them.

- With help from our Smart Metering Advisory Group, we will expand our metering analysis to cover options for different types of meter. We will draw upon emerging findings about the costs and benefits of various meter types in the energy sector. Since 2007, Ofgem has run a series of large-scale metering trials under the Energy Demand Research Project (EDRP). When the EDRP concludes in 2011, it should offer some practical insights into the costs and benefits of smart water meters. Defra's Water White Paper will take account of the Group's work.
- We also expect the Water White Paper to set out the Government's

position on retail separation. We then plan to consult on the next steps for our work on market reform.

- Together with the companies, we will continue to work with Ofgem to keep open the option for water to share the communications infrastructure that will support the roll-out of smart energy metering.
- We will assist the UK Government as it develops detailed proposals for the Green Deal.
- We have set the companies mandatory water efficiency targets for each year between 2010 and 2015. We will monitor their progress, and consider how to use regulatory incentives beyond 2015.
- We will explore how behavioural economics can help the water and sewerage sectors deliver more sustainable outcomes. We think its role could go beyond water use. For example, it could include improving our understanding of what motivates customers who choose not to pay their bills (as

You can help

We welcome views on the issues we have raised in this document. We would be particularly interested in your views on:

- actions we can take to improve incentives for the water companies to promote more sustainable water use;
- the impact of metering over different timescales; and
- the potential for nudging consumers towards more sustainable water use.

Please send any comments to waste.not@ofwat.gsi.gov.uk by 14 April 2011.

distinct from those who are unable to pay their bills). This could generate new options for dealing with debt.

Push, pull, nudge – how can we help customers save water, energy and money?

7. Further information

Ofwat publications

[‘Waste not, want not – making the best use of our water’](#), Ofwat, June 2010.

[‘Beyond limits – how should prices for monopoly water and sewerage services be controlled?’](#), Ofwat, July 2010.

Service and delivery report supporting information: [‘Security of supply’](#), Ofwat, October 2010.

[‘Resilient supplies – how do we ensure secure water and sewerage services?’](#), Ofwat, November 2010.

[‘Water meters – your questions answered: Information for household consumers’](#), Ofwat, November 2010.

Related information

[‘Do defaults save lives?’](#), Johnson and Goldstein, Science, 2003.

[‘The impact of household metering on consumption – further analysis’](#), UKWIR, 2004.

[‘Nudge – improving decisions about health, wealth and happiness’](#), Thaler and Sunstein, 2008.

[‘Deliberative research concerning consumers’ priorities for PR09’](#), water industry stakeholder steering group, 2008.

[‘Public understanding of sustainable water use in the home’](#), Defra, March 2010.

[‘Code for sustainable homes: a cost review’](#), Department for Communities and Local Government, 2010.

[‘The Green Deal – a summary of the Government’s proposals’](#), Department of Energy and Climate Change, 2010.

[‘Behavioural economics and energy using products’](#), Defra, 2010.

[‘The smart way to display’](#), Energy Saving Trust, 2010.



Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We are responsible for making sure that the water and sewerage sectors in England and Wales provide consumers with a good quality and efficient service at a fair price.



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