# Appendix 3

# PARTIAL REGULATORY IMPACT ASSESSMENT

## PROPOSAL TO AMEND THE BUILDING REGULATIONS 2000 OR THE WATER SUPPLY (WATER FITTINGS) REGULATIONS 1999 TO REDUCE THE CONSUMPTION OF WATER FOR DOMESTIC USE IN NEW HOMES AND COMMERCIAL BUILDINGS

### 1. Title of proposal

Water saving measures in new homes (minimum standards for water efficiency) and "water for domestic purposes" in new commercial buildings.

This Regulatory Impact Assessment (RIA) considers the potential impacts of proposals to reduce water consumption by households and the water used for "domestic purposes" in other buildings through changes to either the Building Regulations 2000 or the Water Supply (Water Fittings) Regulations 1999.

### 2. Purpose and intended effect

#### *Objective*

The objective of the proposal is to reduce consumption of water in new domestic and commercial buildings. The proposals are designed to provide a regulatory minimum standard for dwellings to underpin the aspirational standards set out in the Code for Sustainable Homes and to ensure that all new commercial buildings meet the minimum standard set by the BREEAM standards devised by the Building Research Establishment.

The consultation document is due to be issued in December 2006 with a three month consultation period. Regulations will be made in 2007, to come into force as soon as possible after that.

#### *Background*

The UK, uniquely in the developed world, has potable water pricing that is not directly related to the volume consumed because the majority (74%) of households are not currently metered. This arose because the UK was the earliest industrialised and urbanised nation. Metering all customers retrospectively would be very costly and will have only a marginal impact on water demand unless allied to tariff structures with consequent social and political costs and risks.

Assuring a safe balance between water supply and demand remains however a vital requirement and needs to be addressed by both resource development *and* demand management.

Demand can be managed by modifying the building regulations to require the installation of more water efficient devices. Such water savings would be achieved without the need for customers to modify their behaviour and use of water. There will be no cost impact on and no detrimental lifestyle changes to the customer.

These modifications to regulations are focussed initially on new buildings because (i) new build is likely to be the focus of water demand growth in the water scarce south east, (ii) because it is a relatively simpler case on which to base the changes to existing properties and (iii) any changes proposed are more easily accommodated in the context of change to a new home.

Increasing demands on water supplies from growing domestic consumption, new home build and redevelopments exert growing pressure on a finite water resource the ability of which to satisfy water demand has been diminished by the reduced rainfall experienced in recent years. Growth in water demand has exceeded growth in supply capacity, particularly in the south–east of England. This has introduced more vulnerability into the supply demand balance and made the system less able to cope with fluctuations: thus two dry years in succession have led to drought conditions and hosepipe bans in the south east.[1]

Demand for housing continues to grow and published projections of household growth to 2021 indicate an additional 209,000 households[2] on average each year. The average occupancy for homes is projected to decrease from 2.4 to 2.1 by 2026. Decreasing average occupancy leads to an increasing use of water per occupant as a result of water-using activities that are largely unrelated to the number of occupants (e.g. garden watering), These drivers will continue to increase demand for water and current predictions are that all of these factors will continue to increase stress on the water supply system.

It is likely that over the short to medium term, growth in demand will continue to outstrip growth in supply unless further water resource development is permitted and restrictions on use apply, particularly in periods of prolonged high demand with insufficient resource replenishment. Typically, a new reservoir will take 20 years to develop due to long lead time for planning, design, procurement and construction. Alternative resources such as desalination plants are controversial; require considerable amounts of investment and are energy intensive.

An expanded compulsory metering programme will have some effect on demand, although the scale of the effect will depend on the extent to which metering secures substantial, long-term, behavioural changes by water consumers and this will require significant changes to tariffs. However, even if metering allied to tariff changes was accelerated, it would take several years for most companies to secure a high enough level of meter penetration (80-90%) to make much difference to patterns of water demand overall. Substantial changes to tariffs may have political and public health costs. All new homes and the majority of commercial properties (95%+) are metered on completion.

1 For a list of current restrictions see Ofwat website http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/Content/WaterResRestrictions

2 Source: Communities and Local Government, CLG.

## *Current legislative background*

The majority of building works in England and Wales are required to comply with the ***Building Regulations 2000*** (as amended). They exist to ensure the health and safety of people in and around all types of buildings, i.e. domestic commercial and industrial. They define the type of buildings and type of works which are included and set out the requirements with which individual aspects of the building design and construction must comply. The Building Regulations have no provisions to provide for water savings. The existing regulations exercise some control over the installation of fittings such as a WC, particularly where this requires additional drainage, or a hot water storage tank (to ensure the safety of the appliance).

There is some overlap between Part G3 of the Building Regulations and the ***Water Supply (Water Fittings) Regulations 1999*** (SI 1999/1148) which principally specify requirements for fittings connected to the public water supply in order to prevent contamination of water supplied for consumption, loss of water through leakage, undue consumption, misuse, and erroneous measurement of water and to ensure the safety of fittings. Some water savings could be made by strict enforcement of these Regulations by ensuring leak-tightness tests are conducted on installation of water fittings in all buildings (including supply pipes and internal pipework). However, these measures do not actively encourage manufacturers to design products that are more water efficient or developers to include these products in new buildings.

## *Neither of these Regulations specifically covers water conservation or the minimisation of water use*

White goods (e.g. washing machines, dishwashers) contribute to overall household water consumption. However these are not part of the fabric of the building and therefore cannot be regulated by the Building Regulations. These have not been considered in this Regulatory Impact Assessment.

## *Rationale for Government intervention*

Without new regulation to address water conservation, it is likely that the demand for water would continue to increase. In order to avoid water shortages in the future, given that significant new resources are unlikely to be available in the short-term, reliance would be placed upon the consumer to save water voluntarily, or encourage water saving through metering and tariff setting. (In some areas there has been a 70% increase in demand for water since 1974 and demand has doubled since the 1940s). These measures are unlikely to realise the savings that are required to avoid further restrictions on use in the future. This proposal deals with the amendment of regulations to include water conservation measures in new buildings and ensures that water conservation is designed and built in to the fabric of the building and takes the onus away from voluntary actions to constrain demand.

For new dwellings, the Government is already committed to taking action to ensure that new homes use water efficiently under the Code for Sustainable Homes. A Ministerial statement following the end of consultation on the Code, on 9 March 2006, indicated that minimum regulatory standards would be introduced for water efficiency in new homes. The Government subsequently decided to extend the scope of the project to examine the case for action in existing homes and the domestic uses of water in non-household buildings as well.

For existing homes and commercial buildings, the Government has identified a number of potential difficulties with regulating in this area. These include the difficulties of ensuring compliance, high cost and the burdensome nature of imposing regulatory requirements on people's use of water in their own homes. For these reasons, the Government is minded to consider the issue further in the context of the Existing Buildings Review, which is considering a range of measures to improve the sustainability of the existing building stock, including energy and water efficiency. The Review will conclude and make recommendations to CLG Ministers during the course of 2007.

## 3. Consultation

### (i) Within government:

Defra and CLG jointly established a working group to consider the proposal. Representatives from the Welsh Assembly, the Department for Regional Development Northern Ireland and the Cabinet Office Better Regulation Unit either attended, or were included in the Group's written and electronic communications.

The proposals were also discussed with representatives of the Office of Water Services (Ofwat), the Environment Agency and the Consumer Council for Water (CCWater), who was closely involved in the development of policy proposals. These contacts were both formal (as part of the work undertaken by the Group described above) and informal day-to-day contacts at working level.

### (ii) Informal consultation

There has been a programme of informal stakeholder and expert consultation. A working group was formed, in order to steer the proposals, contribute to policy development and act as a peer review group for research and data collection work. The working group met twice, on 4 May and 15 June 2006, and comprised representatives from:

Building Regulations Advisory Committee
Building Research Establishment
Cabinet Office Better Regulation Executive
Communities and Local Government
Consumer Council for Water
Department for Environment Food and Rural Affairs
Department of Regional Development Northern Ireland
Environment Agency
Essex and Suffolk Water
Local Authority Building Control (LABC)
Office of Water Services (Ofwat)
Three Valleys Water plc
Water UK (representing the regulated water businesses in the UK)
waterwise
Welsh Assembly Government
Water Regulations Advisory Service
Water Research Centre plc

## Option A. Whole building performance based on the target water consumption

This option requires that new buildings be designed to meet a target water requirement *per bed space (potential occupancy).*[5] This option gives building designers maximum flexibility on how they would meet a building performance standard, for example by specifying an ultra low flush toilet to compensate for a higher water-using shower.

Detailed guidance (for example, in an Approved Document to supplement Building Regulations), would set out clearly how these performance measures could be met in practice. For example, it could indicate that, for an average property, designed for a specified number of occupants, a 6/4L dual flush toilet, a maximum 12 litre per minute shower and 'push down' taps would meet the standard, based on standard assumptions about normal usage. Designers would then have flexibility to select a combination of fittings to find the most cost effective, or design attractive, solution. Designers of luxury homes wishing to install high water use fittings may have to consider the uses of innovative technology e.g. rainwater harvesting in order to keep within the overall whole house performance target.

The Government proposes that a whole building performance figure for new dwellings is set between 44 and 50$m^3$ per bed space annually (120 to 135 litres per person per day); the current average consumption is 154 litres per person per day. This saving could be achieved using devices that are already on the market or that could easily be produced given appropriate regulatory incentives.

This option is less easily applied to commercial buildings because of the diversity in use of such buildings. For buildings with few or no visitors the building standard could be set at 20% of the value for housing using expected staff numbers as a surrogate for bed space. Where large numbers of clients are expected and catered for the whole building performance is less definable.[6]

## Option B. Approach based on minimum standards for key fittings

This option would set a wholly fittings-based standard rather than having any overall limit for the dwelling. Each group of water fittings would have a water efficiency performance specified as a maximum water use or flow rate.

This option has the advantage of directly encouraging market transformation (encouraging the uptake of more water efficient fittings). Thus in commercial buildings whether a staff only water demand or a client-driven water demand is exercised is immaterial to the water saving which is expressed through the individual water efficient facilities.

The downside is that it would be possible to comply with the minimum standards in key components such as showers, toilets and taps, but still install high volume use items such as aerated spa baths if they are outside regulation. It also gives less flexibility if a designer wishes to use a particular fitting.

5 Actual occupancy of houses yet to be built is not known. The term ' bed space' is the design capacity of the home reflecting expected occupancy. Actual occupancy may be lower or higher than this figure. Bed space is the term used in many reports commissioned by government relating to the environmental demand of new housing.

6 A quantitative assessment of the benefits of water demand reduction in commercial premises has not been attempted because of the diversity in the water demand in such buildings and because such promises are metered.

Fitting standards will be based on:

- 6 litre/4 litre dual flush toilets
- 4.5 litre low flush toilets
- A maximum flow rate for mixer and electric showers of 12 litres per min.
- A maximum flow rate for power showers of 20 litres per min.
- Water efficient bidets
- 'Push-down' taps , other than for baths
- Taps – flow restrictor for outdoor taps
- Baths maximum capacity of 230 litres
- Water efficient waste disposal and water softening systems
- Automatic stopcocks

## Option C. Do nothing

In the absence of any regulatory or fiscal incentive to control water demand, this demand will continue to rise at an annual rate of 1-2% reflecting historic trends. Demand in the south east is anticipated to be at least at the high end of this trend. To maintain an acceptable supply – demand balance therefore will require a major increase in supply through the development of new resources (surface, groundwater or saline). It is assumed that the industry has already exploited the most cost effective sources and thus additional sources will have at least the same financial impact as existing sources. However the increased abstraction, pumping, storage, desalination, transmission and treatment of new resources will have several negative economic impacts namely:

1. Negative impact on habitat and biodiversity.
2. Increase in energy use (both embedded and operational) releasing additional carbon.
3. Increasing difficulty in achieving the requirements of the Water Framework Directive.
4. Land loss.
5. Visual impacts on landscape.
6. Loss of future resource availability.

Thus option C 'do nothing' is not a simple static scenario against which other options can be measured. Option C will create additional costs to the water companies and to the public.

For **non-domestic buildings,** the proposal is to adopt EITHER one of the existing benchmarks in this area, or to adopt a component-based approach similar to that outlined at Option B for new homes, but with the inclusion of standards for fittings not usually in domestic use e.g. urinals.

There are a number of different benchmarks in use and they are evaluated more fully in the consultation document. The Government proposes that, if a whole building performance standard is chosen, it should be based on the lower level of the BREEAM office standard, which would equate to normal usage of about 15-20 litres per full time employee (FTE) per day.

For **new non-domestic buildings**, the options are:

## Option D Whole Building Performance Standard

A whole building performance standard of 20 litres per FTE per day would apply, subject to certain conditions.

## Option E Component Based Approach

A component based approach, mirroring Option B above, but with the addition of standards for male urinals and other fittings not in domestic use

## 5. Costs and benefits

### *Sectors and groups affected*

**Occupants** of new buildings are unlikely to notice any great difference in the effectiveness of the fittings installed, but will benefit from lower water bills (as those properties are metered). We do not anticipate that the more water efficient fittings will be significantly any more expensive to buy or install than the range that is currently available.

**Water companies** may be able to defer investment. Water companies are more likely to be able to keep pace with the growth in demand, which in some areas is currently outstripping their ability to deliver new water resources. Using water more efficiently might also reduce the anticipated increasing frequency of restrictions and drought orders and so there may be a positive effect on water availability.

**Developers and builders** will initially experience some costs in understanding and implementing the requirements of the regulations. The requirement to notify the building control authority or water company might also lead to some additional cost, but the bulk of this notification/inspection work can be picked up at the same time as other statutory inspections, so this should only lead to a very small increase in costs.

**Manufacturers** of plumbing fittings could be affected by the cost of additional testing of products and/or the need to develop more water efficient products, but again, this is not thought to be substantial and most manufacturers already have more efficient fittings in their ranges.

### *Race equality assessment*

We believe that the options proposed do not require any change in users' habits and therefore will not impact unfairly on any particular groups. Some faiths require the use of e.g. running water for handwashing and the consultation document will seek views on this point from faith leaders and the wider community.

### *Health impact assessment*

It is important that any provision for the conservation of water should not promote efficiency to the point where health and sanitation are compromised. The proposed provisions aim to reduce consumption of water by fittings rather than to change users' habits. The benefits of this approach will be in having fittings that continue to function satisfactorily but use less water. In assessing fittings for minimum standards, they must also continue to maintain their fitness for purpose.

There is likely to be a need to make provisions for exemptions in cases where individuals have chronic health problems or disabilities which will require modifications to their facilities to address a specific need.

### *Regional differences*

Although there are regional differences in the supply and demand balance, allowing for these regional differences would be difficult and counterproductive in the legislation for the following reasons;-

- The bathroom manufacturers do not design or supply bathroom fittings on a regional basis; their market is national, European or even international in nature.

- Water is heavy and both its treatment and transport result in significant carbon emissions which contribute to climate change. This means we should reduce our use of water in all parts of the country.

- It is important for future sustainability that all members of the public and society in general value water as a precious resource to be used wisely, not just a commodity. Regional standards would not help to promote this message to the wider community.

- A sufficient degree of market transformation needs to be achieved if standards of water efficiency are to be raised and maintained for the future.

### *Antique baths and fittings*

In some cases, developers and builders will want to fit antique items in keeping with the fabric of the building. In most cases this should not present a problem (flow restrictors can easily be installed for taps and showers), but it may cause some difficulty when installing baths and toilets – this issue has not been considered any further here, but we would welcome any views from the consultation on whether these should be treated as special cases.

## Summary of costs and benefits

### *Dwellings*

*The study has identified that costs will arise principally from* additional costs of inspection by building control/approved inspectors or the cost of setting up and obtaining membership of a competent persons scheme (if that is the chosen mechanism) and from familiarising and training staff in local authorities and building companies in the requirements of the new regime. Costs may be incurred at some performance levels from the additional costs of fittings that must be used to meet the more stringent standards and from the requirements for individual fixtures and fittings to be tested to ensure that they are both fit for purpose and deliver the level of performance (in terms of water efficiency) claimed. Further details of how costs are compiled are included in Annex 1. All costs exclude VAT, which is not levied on new construction work.

In practice although individual aspects of costs are incurred by different players, these costs will typically in the short term be passed on to prospective homeowners in the purchase price of new homes. In the longer term they may be factored in to land prices. The costs are therefore shown in summary in column C of Table 2 below as costs to consumers. The overall costs are assumed to be the same whether option A or option B is chosen.

For a performance standard of 135 litres per person per day the costs reflect purely additional costs of checking and enforcing compliance with the regime. There are no additional costs incurred for fittings or testing as this standard can be met using readily available fittings on the market. For a performance standard of 125 litres per person per day the costs also include an estimate of the increase in costs of fittings over the standard. The average cost per house has been assumed at £50. Cost figures for 130 and 120 litres per person per day have been interpolated from these figures assuming that increases between each level can be represented by a simple straight line. The costs associated with testing of new fittings will apply equally to options A and B, but the costs are estimated to be trivial at less than £1.00 per new home. Details of the costs are set out in Annex 1.

Benefits fall into two main categories, those for the consumer through decreased water bills – all new homes are metered and so there is a tangible benefit to the consumer of a water efficient home – and to society through associated reductions in carbon emissions from the abstraction, treatment and supply of potable water by the statutory water companies. These benefits are shown in Table 2. A further marginal benefit in reduced carbon emissions may also occur through reductions in the energy used to heat water, where less water is used in water efficient fixtures and fittings. Benefits will also accrue to the environment from the reduced impact on the natural environment through protection of wetlands and rivers by reducing over-abstraction, and reducing low-flow incidents. No attempt has been made to put a monetary estimate on this benefit. Furthermore, steps to manage water demand will also assist the UK to meet its obligations under the Water Framework Directive in a more cost-effective way.

Details of how the benefits arising from savings in water use and reductions in carbon emissions are set out in Annex 1.

The estimated costs and benefits accruing from the factors identified above are summarised in Table 2 below.

Table 2: Summary of costs and benefits to society and consumers for different levels of water efficiency standards

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| **Option** | **Target** | **Costs £m (costs to householders, 10 Year period)** | **Benefits £m (savings to householders, 10 Year period)** | **Benefits £m (carbon savings, 10 year period). Minimum estimate applied** | **Aggregate benefits** | **Benefit Cost Ratio** |
| Option A | 135 | 20.3 | 368.6 | 147 | 515.6 | 25 |
| Option A | 130 | 64 | 465.6 | 196 | 661.6 | 10 |
| Option A | 125 | 109.9 | 562.6 | 232.8 | 795.4 | 7 |
| Option A | 120 | 154.5 | 659.6 | 269.5 | 929.1 | 6 |
| Option B | 135 | 20.3 | 368.6 | 147 | 515.6 | 25 |
| Option B | 130 | 64 | 465.6 | 196 | 661.6 | 10 |
| Option B | 125 | 109.9 | 562.6 | 232.8 | 795.4 | 7 |
| Option B | 120 | 154.5 | 659.6 | 269.5 | 929.1 | 6 |

Costs and benefits to the water industry are often deemed to accrue from either the 'saved' costs of developing new sources or the 'lost' income of reductions in demand for water supplied. We have chosen not to include either as we believe it is reasonable to regard neither the costs nor the revenues as having been saved or lost when we are dealing with new buildings. The long run marginal costs may not apply in the future under the changing climatic, energy and regulatory context and so calculations based on these would have limited value.

Table 3: Projected Carbon Savings

| | | |
|---|---|---|
| Water carbon/household/year | 70kg | |
| Water carbon in England and Wales | 1,750,000,000 kg | |
| Water carbon in England and Wales | 1,750,000 tonnes | |
| Water carbon costs per year | £122,500,000 | |
| Water carbon costs over 10 years | £1,225,000,000 | |
| Water carbon savings @ 22% /10 years | £269,500,000 | |
| Water carbon savings @ 19% /10 years | £232,750,000 | |
| Water carbon savings @ 16% /10 years | £196,000,000 | |
| Water carbon savings @ 12% /10 years | £147,000,000 | |
| Water carbon reductions/savings @ 12% | 270,000 tonnes | £18,900,000 |
| Water carbon reductions/savings @ 16% | 360,000 tonnes | £25,200,000 |
| Water carbon reductions/savings @ 19% | 428,000 tonnes | £29,960,000 |
| Water carbon reductions/savings @ 22% | 484,000 tonnes | £33,880,000 |
| Water industry spend | £600M/year on electricity | |
| Approx. average price | £65/MWhr (delivered) | |
| Annual demand water industry | 9.23M MWhr/year | |
| $CO_2$ produced[7] | 170.4M tonnes $CO_2$/year | |
| Electricity supplied | 345 Terawatt/hr[8] | |
| $CO_2$ | 0.494 tonnes $CO_2$/MWhr | |
| overall $CO_2$ emission from water industry electricity demand: | 4.5 million tonnes $CO_2$/year[9] | |
| @ 50% supply related | 2.25 million tonnes/year | |

## *Commercial buildings*

We have found it extremely difficult to source any clear evidence of levels of water use in commercial buildings and the costs and benefits associated with domestic uses of water in these settings. In the absence of monetary evidence we have chosen to propose regulations that draw on the BREEAM standard which is considered to represent best practice in major commercial developments. By adopting this standard we believe that we will ensure that it becomes standard practice across all commercial developments irrespective of size. We have not attempted to estimate the likely water savings or place a monetary value on these, nor compare them with any costs of regulation. However, our judgement is that this is likely to be the right balance between costs and benefits and achieve parity of treatment between houses and commercial development and contribute to achieving the desired transformation in the market.

7 Average $CO_2$ per unit electricity produced by energy utilities in 2005.

8 The equivalent to one thousand gigawatt hours (GWh).

9 0.494 tonnes $CO_2$/yr x 9.23M MWhr/yr.

## 6. Risks

The risks for doing nothing are outlined in section 2 Purpose and Intended Effect and include more frequent and severe water shortages if demand continues to grow. The risks from the various options considered are set out in the table below.

| Option | Description | Risks |
|---|---|---|
| ***New Dwellings*** | | |
| Option A | Whole building performance of 120-135 l/h/d | Low risk option, as the standard is achievable and the inspection mechanisms are already in place. |
| Option B | Minimum Standards for Components | Needs a certification system (or self certification standard) to ensure fixtures and fittings meet the standard.<br>There may be high volume use fittings that are outside the standards and certification scheme, e.g. aerated spa baths, hot tubs, etc. |
| Option C | Do nothing | See Option C narrative above. |
| ***Water use in the workplace*** | | |
| Option D – **New Buildings** | Whole building performance of 20 l/h/d | Low risk option, as the standard is achievable and the inspection mechanisms are already in place. |
| Option E | Minimum Standards for Components | As for Option B above; with the addition of component standards for fittings not in domestic use e.g. urinals. Low risk. |

## 7. Small Firms Impact Test

Initials soundings suggest that the proposals might have an impact on two broad business sectors:

- construction companies – both those focussed on housebuilding and those building commercial buildings;

- companies producing bathroom and kitchen fittings or components for these fittings.

In light of this, we intend to continue our consultation with Small Business in parallel with our public consultation. A number of small firms and their trade bodies have been included on the distribution list for this consultation. However, during the 12-week consultation period we will be talking specifically to small building companies and small manufacturers of bathroom and kitchen fittings and components to ascertain whether the proposals will have any significant negative impact and to consider practicable steps that we can take to mitigate this. The results will then feed into our analysis of responses to the consultation and shape the final recommendations to Ministers on how to proceed.

Small building companies will be affected by the need to comply with the new Building Regulations standard and the main costs are likely to arise from a need to familiarise themselves and clients with the regulations and meet any additional inspection costs passed on through local authority fees. We expect the any increase in local authority fees will be marginal. We believe that there are likely to be no additional construction costs arising from installation of more efficient fittings as water efficient fittings are already available at little or no extra cost.

Some small firms are already trying to promote innovative and water efficient components or fittings and see the regulations as a growth opportunity. There may though be others who will need to make changes to their products if they are to remain competitive and respond to the requirements of manufacturers that they currently supply. It is possible that some small manufacturers will also need to pay to test their products in order to demonstrate that they comply with e.g. flush volume requirements, or flow/min standards. This may be an additional cost for some of them although the need to seek Water Regulations Advisory Service (WRAS) approval has been in existence for some time.

We provided a copy of the draft Regulatory Impact Assessment to the Small Business Service who are advising us on how best to proceed with consulting small business.

## 8. Competition assessment

Competition in the building trade and between developers will not be affected by this proposal.

In the manufacture of fittings, the market comprises of a large number of both UK firms and importers. The market is not dominated by any one manufacturer. There are no additional set-up costs that emerge from the introduction of the regulations and many of the manufacturers already include water efficient devices in their ranges. The pace of change in the industry is not great and the introduction of regulations is likely to encourage and lead to further innovation and a faster phasing out of the least efficient lines. The regulations would not restrict the ability of firms to choose the price, quality, range or location of their products.

The manufacturers of fittings may need to modify their range and there may be some small advantage to those manufacturers who can move quickly on this. Even so, in the evaluation of the competition effects, there are not thought to be any issues that would unintentionally skew the market.

## 9. Enforcement, sanctions and monitoring

Depending on the route of implementation, the enforcement, sanctions and monitoring will either be carried out by the local authority under the Building Regulations 2000 (SI 2000 No. 2531) or the water company under the Water Supply (Water Fittings) Regulations 1999 (SI 1999 No.1148). This proposal will not introduce any additional sanctions and any notification and inspection work will fall in line with the current arrangements for the existing regulations.

# References

1. Water resources for the future: a water resources strategy for England and Wales. Environment Agency, March 2001.

2. Security of supply, leakage and water efficiency. 2005-6 report. Ofwat, November 2006.

## Sections 10-12

Sections 10-12 should be completed after consultation and included in the full RIA.

### 10. Implementation and delivery plan

### 11. Post-implementation review

### 12. Summary and recommendation

Summary costs and benefits table

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| **Option** | **Target** | **Costs £m (costs to householders, 10 Year period)** | **Benefits £m (savings to householders, 10 Year period)** | **Benefits £m (carbon savings, 10 year period). Minimum estimate applied** | **Aggregate benefits** | **Benefit Cost Ratio** |
| Option A | 135 | 20.3 | 368.6 | 147 | 515.6 | 25 |
| Option A | 130 | *64* | 465.6 | 196 | 661.6 | 10 |
| Option A | 125 | 109.9 | 562.6 | 232.8 | 795.4 | 7 |
| Option A | 120 | *154.5* | 659.6 | 269.5 | 929.1 | 6 |
| Option B | 135 | 20.3 | 368.6 | 147 | 515.6 | 25 |
| Option B | 130 | *64* | 465.6 | 196 | 661.6 | 10 |
| Option B | 125 | 109.9 | 562.6 | 232.8 | 795.4 | 7 |
| Option B | 120 | *154.5* | 659.6 | 269.5 | 929.1 | 6 |
| Option C | | Not costed | | | | |
| Option D | | Not costed | | | | |
| Option E | | Not costed | | | | |

**Declaration and publication (to be signed in final version following consultation)**

*I have read the regulatory impact assessment and I am satisfied that the benefits justify the costs*

**Signed .....**

**Date**

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# Annex 1

## Calculation of Carbon Savings

**This section describes how the carbon savings listed in column D of Table 2 in the main text have been calculated.**

Taking the disposable income of an average family on average income, the water supply component of the household expenditure is about 1%. That equates to about 70 kg carbon per year per household.[10] Accepting a round figure of 25 million households and £70 per ton as a carbon impact cost allows the following determination.

| | |
|---|---|
| Water carbon per household per year | 70kg |
| Water carbon in England and Wales | 1,750,000,000 kg |
| Water carbon in England and Wales | 1,750,000 tonnes |
| Water carbon costs | 122,500,000 £ |
| Water carbon costs over 10 years | £1,225,000,000 |
| Water carbon savings @ 22% | £269,500,000 |
| Water carbon savings @ 19% | £232,750,000 |
| Water carbon savings @ 16% | £196,000,000 |
| Water carbon savings @ 12% | £147,000,000 |

The analysis of potential carbon saving may also be based on reduced electricity usage reported by of a large water company supplying c10% of England and Wales.

| | | |
|---|---|---|
| Water industry spend | £600M/year on electricity | |
| Water carbon reductions/savings @ 12% | 270,000 tonnes | £18,900,000 |
| Water carbon reductions/savings @ 16% | 360,000 tonnes | £25,200,000 |
| Water carbon reductions/savings @ 19% | 428,000 tonnes | £29,960,000 |
| Water carbon reductions/savings @ 22% | 484,000 tonnes | £33,880,000 |

| | |
|---|---|
| Approx. average price | £65/MWhr (delivered) |
| Annual demand water industry | 9.23M MWhr/year |

Average $CO_2$ per unit electricity produced by energy utilities in 2005:

| | |
|---|---|
| $CO_2$ produced | 170.4M tonnes $CO_2$/year |
| Electricity supplied | 345 TWhr |
| Gives $CO_2$ of | 0.494 tonnes $CO_2$/MWhr |

Therefore overall emission of $CO_2$ from water industry electricity demand:

| | |
|---|---|
| | 0.494 tonnes $CO_2$/yr x 9.23M MWhr/yr = 4.5 million tonnes $CO_2$/year. |
| Assume 50% supply related | 2.25 million tonnes/year |

10 Note that this is a modest estimate of household carbon and significantly higher carbon value estimates exist.

These **annual** savings equate well with the values derived from a household basis – a figure of £200 million savings on carbon reduction could be added to the already significant cost benefit balance.

While it is clearly possible to indicate a monetary estimate on reduced carbon emissions the more important fact is that there will be real measurable and physical reduction in carbon emissions.

## Calculation of costs and benefits associated with regulation

### Savings

The financial benefits can be calculated from the cost of water and volume of water saved. It is assumed that for existing houses the average per capita consumption (pcc) is 154 litres (Source: Ofwat[4]). The quantity of water saved is the difference between the average water usage and the reduced water usage required by the regulatory minimum standards.

Table A below shows the water savings and associated monetary savings for householders if a regulatory minimum standard of 135 litres per person per day is used. This is a difference in consumption of 19 litres per person per day.

The total water savings in for a household in any one year are derived from the difference between current daily consumption rates and the regulatory minimum for daily consumption multiplied by the average occupancy rate (2.4 persons) and number of days in a year. Thus for a regulatory minimum standard of 135l/p/d:

Water saved = (154-135) x 2.4 x 365/1000

To obtain total savings for England and Wales the savings are multiplied by projected number of new households:

Table A: Savings in water for new housing stock for a mandatory standard of 135 litres per person per day (l/p/d)

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 year total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water saving* (million $m^3$/year) | 3.3 | 6.7 | 10.0 | 13.4 | 16.7 | 20.0 | 23.3 | 26.6 | 29.9 | 33.2 | 183.4 |
| Savings to householder*** (£ million/year) | 6.7 | 13.5 | 20.2 | 26.9 | 33.6 | 40.3 | 46.9 | 53.5 | 60.2 | 66.8 | 368.6 |

**Notes to table A**

- The savings to the customer are based on the weighted average water resource and sewerage rates for all service providers in England and Wales and work out at £2.01/$m^3$ of water. (1$m^3$ = 1,000 litres)

- The average occupancy has been calculated from Tables 401 Household estimates and projections and 421[11] Population estimates and projections. The predictions for occupancy and therefore the change in average 'per capita consumption' for any one scenario have been included in the calculations.
- The total stock predictions are for England and Wales, from 2006 to 2016 are taken from Table 401[12] Household estimates and projections.

Table B: Savings in water for new housing stock for a mandatory standard of 125 l/p/d

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 year total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water saving* (million $m^3$/year) | 5.1 | 10.3 | 15.4 | 20.5 | 25.6 | 30.7 | 35.7 | 40.8 | 45.8 | 50.9 | 280.8 |
| Savings to householder*** (£ million/year) | 10.3 | 20.6 | 30.9 | 41.2 | 51.5 | 61.7 | 71.8 | 82.0 | 92.1 | 102.3 | 564.5 |

**Notes to Table B are as for Table A**

Table B shows the results of the calculations used in Table A, but for a mandatory standard of 125 litres per person per day.

Table C: Volume of water used by typical fittings and assumptions about frequency of use and ownership to achieve a water consumption of 125 litres per person per day

| Device | Volume/ use (l) | Frequency/ head/day (for occ=2.4) | Ownership % | Combined freq & ownership | Total use per person (l/day) |
|---|---|---|---|---|---|
| WC | 4.5 | 5.12 | 100.0% | 5.12 | 23.0 |
| Bath | 67.5 | 0.42 | 88.1% | 0.37 | 25.0 |
| Shower | 35.0 | 0.70 | 76.7% | 0.54 | 18.8 |
| Power Shower | 70.0 | 0.70 | 8.5% | 0.06 | 4.2 |
| Taps | 1.8 | 18.28 | 100.0% | 18.28 | 32.9 |
| *Washing machine* | 38.0 | 0.38 | 93.7% | 0.36 | 13.5 |
| *Dishwasher* | 12.0 | 0.41 | 37.0% | 0.15 | 1.8 |
| *Garden watering and other miscellaneous uses* | 21.0 | 0.41 | 65.2% | 0.27 | 5.6 |
| Total PCC(for occupancy of 2.4) | | | | | 124.9 |

Table C provides an example of how fittings can be mixed to achieve a certain performance standard and the assumptions used in making the calculations.

11 Live Tables On Household and Population Estimates and Projections (www.communities.gov.uk).

12 Live Tables On Household and Population Estimates and Projections (www.communities.gov.uk).

## *Costs*

Whichever option is chosen there is also likely to be a cost associated with the testing of new and some existing products to demonstrate their water use. For toilets, this testing is already undertaken to demonstrate compliance with the Water Supply (Water Fittings) Regulations, so there will be no additional cost to assess water efficiency.

The estimated cost of testing other products for flow rate or volume per use is approximately £250[13] for each type. This is based on self-certification and therefore excludes any scheme management costs and product labelling costs.

For taps and showers, there are currently an estimated 15,000 retail items on the market. The same model products are badged by a number of different retail companies. Therefore, it is assumed that there are approximately, 3,000 different products on the market. This value would need to be substantiated during further consultation. The estimated total cost of testing would therefore be £250 x 3,000 = £750,000. It is anticipated that this would be passed through to the fitting purchaser but that the cost per unit would be minimal both in terms of the individual fitting and the additional cost for each house.

For new buildings, there will be a cost associated with the inspection of a property and testing of fitting *in situ* to determine water usage. The cost of a single audit for new housing has been estimated at £10 to align with the RIA for the Code for Sustainable Homes. The costs of regulation are assumed to be the same for options A and B.

The cost per year across new housing stock is given in Table D and is based on the number of new homes built and the costs of an audit for each house set out above.

Table D: Cumulative costs by year for a performance standard of 135 l/p/d (£million)

| Year | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| New Housing | 0 | 10.1 | 20.3 | 30.4 |

**Notes to table D**

- The total stock predictions are for England and Wales, from 2006 to 2016 are taken from Table 401[14] Household estimates and projections.

It has been assumed that there would be no costs for new appliances, as 135 litres per capita consumption per day could be achieved with currently available products and good installation practice. For example, the current Water Supply Regulations require a maximum 6-litre flush and if replaced by a 6/4 dual flush toilet which is readily available (estimated to make up 1% of current stock. Source: Market Transformation Programme) homes could meet the 135 l/p/d standard and the introduction of this product would present no additional cost.

13 Note: This value is based on average test house fees.

14 Live Tables On Household and Population Estimates and Projections (www.communities.gov.uk).

Table E shows the costs of meeting a regulatory minimum standard of 125l/p/d.

It is assumed that the costs of water efficient fittings to meet this standard would be an additional £70 per home. This is made up of an additional cost of £50 for a toilet with a single flush of 4.5 litres and additional costs for taps with flow restrictors of £10 per household and for aerated shower heads with flow restrictors of £10 per household.

Table E: Option B: Cumulative costs by year (£million)

| **Year** | **2006** | **2011** | **2016** | **2021** |
|---|---|---|---|---|
| New Housing | 0 | 109.9 | 219.9 | 329.8 |

# Annex 2

## Attendees at Stakeholder Workshop held on 15 May 2006

| | |
|---|---|
| Stuart BALLINGER | Envirowise |
| Anna BEAUMONT | Sustainable Development Commission |
| Nieves BOTTOMLEY | Defra |
| Dave CALDERBANK | Environment Agency |
| Sean CREIGHTON | PUAF |
| Danny DAVIS | IPHE |
| Martin DUDLEY | Thomas Dudley Ltd |
| Teresa EVANS | CCWater |
| Liz FOORD | CCWater |
| Kate GALLAGHER | Envirowise |
| John GREEN | The Green Light Partnership (facilitator) |
| Brian HAM | TGLP (facilitator) |
| Clare HAWLEY | Defra |
| Bruce HORTON | Water UK |
| Katherine HYDE | BRE |
| Peter JIGGINS | Defra |
| Mike JOHNSON | CLG |
| Walter MENZIES | Mersey Basin Campaign |
| Dave MITCHELL | HBF |
| Sue NOWAK | Defra |
| Mary ONYEJIAKU | CLG |
| Elizabeth POMEROY | Sustainable Development Commission |
| Clare RIDGEWELL | Essex and Suffolk Water |
| Martin SHOULER | Arup |
| Neil SMITH | NHBC |
| Alastair SOANE | BRAC |
| Jeremy TAIT | AEAT Ltd |
| Joe TAYLOR | Defra |
| Martin TOWNSEND | Defra (facilitator) |
| Steve TUCKWELL | WRAS |
| Joanne TURNER | Defra (facilitator) |
| Michael WADOOD | Association of Building Engineers |
| Simon WALSTER | Ofwat |
| Rob WESTCOTT | Environment Agency |
| Joanne WHEELER | WWF-UK |
| Erica WILLIAMS | waterwise |
| Alan YATES | BRE |