Communities and Local Government

defra
Department for Environment Food and Rural Affairs

Water efficiency in new buildings

A joint Defra and Communities and Local Government policy statement

www.communities.gov.uk
community, opportunity, prosperity

Communities and Local Government

defra
Department for Environment Food and Rural Affairs

Water efficiency in new buildings

A joint Defra and Communities and Local Government policy statement

July 2007
Department for Communities and Local Government: London

Department for Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
Telephone: 020 7944 4400
Website: www.communities.gov.uk

If you require this publication in an alternative format please email alternativeformats@communities.gsi.gov.uk

Communities and Local Government Publications
PO Box 236
Wetherby
West Yorkshire
LS23 7NB
Tel: 08701 226 236
Fax: 08701 226 237
Textphone: 08701 207 405
Email: communities@twoten.com
or online via the Communities and Local Government website: www.communities.gov.uk

75% recycled
This publication is printed on 75% recycled paper

July 2007

Product Code: 07 HC 04748/d

Introduction

1. Water is a precious and increasingly scarce resource. The drought of 2004–06 across much of England raised the profile of water supply and demand issues and raised awareness of the vulnerability of water resources to prolonged dry spells.

2. Despite the severe flooding we have seen recently in parts of England, the case for improving water efficiency remains compelling. Climate change models suggest that drought events will occur more frequently. The sorts of heavy down-pours we have witnessed tend to run-off to drainage systems and rivers long before they can seep down and boost the underground water resources which are so important in maintaining long-term water supply in parts of the country, the south east in particular.

3. There is increasing awareness that growth in water demand is becoming unsustainable and we are close to exceeding environmental limits. If we are to maintain the balance of supply and demand and secure sustainable supplies into the future, then our buildings must play a part in helping to reduce the demand for water.

4. This document provides a brief summary of the key findings emerging from the responses to our consultation paper *Water Efficiency in New Buildings* published in December 2006 and sets out the next steps that we will take to develop our policies in this area.

Why take action now?

5. Average household demand has increased by around 55 per cent over the last 25 years and continues to increase at 1 per cent per annum. Average consumption of water per person in England and Wales in 2005/06 was around 150 litres/day (l/d). This compares to an average consumption per person of around 140 l/p/d in 1992/93.

6. Growth in the use of water has been largely attributed to an increase in the number and range of appliances in households and increases in the frequency of their use, and to changes in household size. The proportion of households with washing machines and dishwashers has increased with ownership now at 95 per cent and 33 per cent respectively. There have been other changes too, such as the increased popularity of power showers.

7. There have also been important demographic changes. The population is growing and ageing and the number of households has increased – by about 30 per cent in the last three decades of the 20th century. These changes are expected to continue with around a further 220,000 households each year by 2026 of which 72 per cent will be single person households. Household growth and decreased household size are both important drivers for increased water demand. Water use in a single-person household is typically 40 per cent higher than the average per person consumption in a two-person household.

8. Across much of England, the water already being abstracted accounts for all the available water resources in the summer months. In many areas of England groundwater resources are also being used to their limit. In some places abstraction of water is already beyond the limits at which environmental stress or damage occurs and such abstractions place the UK at risk of failing to meet environmental standards set by European legislation, such as those likely to arise from the Water Framework and Habitats Directives.

9. Even if we were able to dramatically reduce carbon dioxide emissions tomorrow, further changes in the climate over the next 40 years are inevitable as a result of historic carbon dioxide emissions and the slow response of the climate system. Changes in climate may also change the availability of water for abstraction at certain times of the year. The occurrence of higher summer temperatures and lower levels of rainfall could increase the risk of drought in the long-term. Accompanied by more variable conditions this means that our climate will be less predictable; there will be more hot, dry years and more wet years. For example, the Hadley Centre Climate Change Model suggests that in future about one-in-three summers will be both hotter and drier than the hot, dry summer of 1995; that nearly all summers will be hotter; and that one summer in ten will have less than 25 per cent of present day rainfall. This in turn means lower flows in rivers and greater environmental impacts from abstraction.

10. Climate change will not only affect water availability, but also the demand for water. Our understanding of the relationship between climate and water use is not perfect, but it is clear, for example, that longer periods of hot weather are likely to result in people showering more frequently. However, demand for water is not just a function of climate, some are as a result of societal choices and individual desires to use water in different ways. The increase in both the number, and water use characteristics, of water using appliances will also contribute to increasing demand.

11. A study by the Stockholm Environment Institute made some attempt to characterise the relationship between demand for water under a warmer drier climate. Scenarios incorporating water efficiency into policies and according conservation a high priority, show decreases in demand.

12. Promoting water efficiency in homes and workplaces is, therefore, essential if we are to achieve sustainable water resource management.

Existing measures to improve water efficiency

13. It is clear that measures to slow or reverse the trend of increasing household consumption are most likely to succeed if they involve the key water sector stakeholders. For this reason, the Defra-led Water Saving Group was set up in October 2005 and brings together, under Ministerial chairmanship, Defra, Communities and Local Government, Ofwat, the Environment Agency, water companies, the Consumer Council for Water, Water UK and Waterwise.

14. The Group has put in place an action plan to deliver collaborative measures on water efficiency. The projects include raising customer perceptions and awareness, promoting best practice in water efficiency, and considering the need for changes to the regulatory framework. This work is part of a wider effort by Government to ensure the long term sustainability of water supplies.

15. The measures now being proposed for new buildings will complement other measures which have emerged from the Group. For example, a proposal for accelerating the growth of water metering in areas of serious water stress in England was the subject of a recent consultation by Defra, the outcome of which will be announced shortly.

16. A number of projects outside the ambit of the Water Saving Group will also provide outputs that should deliver real improvements. These include:

    - the voluntary labelling scheme under development by the Bathroom Manufacturers Association which will identify the WC suites; independent flushing cisterns; taps and combination tap assemblies for use with wash basins and bidets; shower controls; and baths that meet specified efficiency criteria; and
    - proposals from the Market Transformation Programme for a database to provide information on the water efficiency of individual fittings that can be used by developers and regulators.

17. The Department for Business, Enterprise and Regulatory Reform and Defra also provide funding to Envirowise which delivers free and confidential advice to UK businesses to enable companies to increase profitability and reduce environmental impact. There is also a well-established Enhanced Capital Allowances scheme which provides accelerated tax relief to businesses investing in designated sustainable water technologies.

Why we need to do more

Homes

18. Housebuilding failed to keep pace with the demographic changes in the last part of the last century – rates of building halved over the same period – leading to a significant gap between supply and demand.

19. Kate Barker's[1] report into housing affordability made clear that we need additional housing provision and that is why we have set out our ambition to increase housing supply to 240,000 homes per year by 2016.

20. By the middle of the century, if we build the houses we need, about a third of all homes standing will have been built between now and then. So we need to build new homes in a way that does not compromise our wish to create sustainable communities. New homes offer an opportunity to build in ways that will help transform the market for water fittings and reduce the amount of water needed by individuals to meet their aspirations. We want to use the new development we have announced today to help deliver economies of scale and to help drive down the costs of water efficient fixtures and fittings. In this way technologies will be delivered that can help make it easier to tackle water efficiency in existing homes when replacing water fittings.

Workplaces

21. Water consumption in the workplace also needs to be tackled. Over half the population – and two thirds of those of working age – spend up to a third of their day at work. Much of the water used for domestic purposes such as toilet flushing and hand washing will, therefore, be used at work rather than at home. Workplaces offer a further opportunity to design in water efficiency. Furthermore, if individuals see water being used efficiently at work, they are more likely to adopt the same practices at home.

[1] Kate Barker was appointed (by Government) in April 2003 to conduct an independent Review of UK Housing Supply; leading to a final report in March 2004.

22. We want to make water efficiency a higher profile issue for businesses, both to save water and to help reduce overhead costs at the same time. Water bills are a relatively small part of companies' overheads – even compared with energy and waste costs – but nevertheless water efficiency measures can be cost-effective and the widespread use of water meters at industrial and commercial properties provides a financial incentive.

Key messages from consultation and other discussions

23. Last December we consulted on whether and how we should set minimum standards for water efficiency in new homes and new workplaces. Any regulations regarding water use in workplaces would be confined to domestic uses of water in canteens and washrooms, for example, and not to water used in industrial processes.

24. We suggested that the best approach might be to require new homes to meet a calculated average whole building performance standard, expressed as the amount of water consumed in litres per person per day (l/p/d) and that the standard should be set in the range of 120 to 135 l/p/d. This could be implemented and enforced through an amendment to the Building Regulations.

25. As an alternative to this we asked whether it would be sensible to set performance based standards for individual types of water fittings such as toilets, taps and showers in terms of the maximum water usage for each toilet flush and the maximum flow rates for taps and showers. This could be implemented through amendments to the Water Supply (Water Fittings) Regulations 1999 (SI 1999 No. 1148).

26. In general terms, the proposals to regulate for water efficiency in new homes were well received. 74 per cent of the 187 respondents said that they thought that a whole building performance standard could be made to work for new homes and 56 per cent thought that this offered the most flexible approach.

27. Forty-one percent of respondents opted for a performance standard for homes of 120 l/p/d and two-thirds of those who expressed a view on the ability of manufacturers to provide compliant fittings thought this was not a problem. However there was a clear divergence of opinion between different sectors on whether a standard of 120 l/p/d was achievable with existing fittings and whilst developers and local authorities thought it was realistic and achievable, manufacturers thought it could only be achieved with rainwater harvesting or grey water recycling.

28. Similar proposals were made for workplaces and other non-domestic buildings, such as schools and hospitals, although it was less clear whether it was practicable to use a whole building performance standard. Four different approaches to benchmarking were suggested.

29. Fewer respondents (77) expressed a view on how to deal with water efficiency in the workplace. 62 per cent of respondents felt the BREEAM[2] offices standard should be used as the benchmark if a whole building approach were pursued. However, the consultation did not directly ask whether a whole building performance approach would be more effective than a fittings standard approach and was practicable. Several respondents qualified their benchmark choice, by supporting a fittings standard

[2] The Building Research Establishment Environmental Assessment Method.

approach in their comments arguing that standards for individual types of fittings would be more appropriate and easier to apply across the full range of buildings under consideration.

30. There was strong support for having separate standards for residential institutions such as hospitals (66 per cent) with a suggestion that they should be treated in the same way as homes or workplaces except when they were primarily used for healthcare.

31. Many respondents also provided detailed and lengthy comments which provide important additional information and clarification of the basic statistics.

32. A number of themes were raised consistently by respondents in their comments on each question and in the general comments box. These were that:

    - The whole building performance approach was widely seen as a positive move towards reducing water consumption in new homes but, on its own, it would not deliver the long term water savings that were needed, nor could it be relied upon to drive innovation in the provision of water fittings. There was strong support from all sectors that the whole building performance approach be coupled with a minimum performance of fittings standards.

    - New properties were only a small part of the market and this measure alone would be insufficient to drive the sort of market transformation needed.

    - The approach should be consistent with that taken on energy performance and that progressive targets should be set with the initial target achievable with existing technology and progressively more stringent targets for the future.

    - There was concern about the perceived growth in the use of high water use, or luxury fittings and how these could be accommodated equitably in the drive for water efficiency. There was a divergence of understanding of what might constitute a high use appliance and whether it was practicable to enforce any new regulations on the water use of such products.

    - The current lack of robust information on the amount of water consumed for domestic type uses across the full range of workplaces precluded setting meaningful and workable whole building performance standards. Once again, a package of measures will be needed and performance standards for fittings would be a more effective way of achieving water efficiency. Further research would be needed to develop whole building standards.

33. The results of the consultation are available on the Communities and Local Government website: www.communities.gov.uk/consultations.

The way forward

34. This section sets how we intend to respond to the views expressed by respondents across five themes: regulating in the new housing sector; setting the performance standard for homes; tackling individual fixtures and fittings; regulating in the new non-residential sector; and looking to the future.

Regulating in the housing sector

35. The majority of respondents felt that a whole building performance standard could be made to work, but the two options outlined in the consultation – a whole building approach and fittings standards – were not regarded as mutually exclusive, but as options that addressed slightly different problems. Several respondents favoured a combined approach and saw no reason why both measures should not be introduced.

36. This view was a combination of a belief that whilst the whole building performance approach had the merit – particularly for developers – of allowing flexibility in the way standards are met, it could not be relied upon to meet the aim of securing longer term reductions in consumption as it might affect too small a part of the market to encourage the level of innovation by suppliers considered necessary. Although a whole building approach would ensure that developers can specify the appropriate fitting type for his building/client base without exceeding the regulatory standard, inefficient products would not be wholly ruled out for new properties and could continue to be available for retrofitting in new properties, thus negating the expected water savings. However, setting standards for water fittings through the Water Supply (Water Fittings) Regulations 1999 would not in itself prevent non-compliant fittings being offered for sale.

37. To have maximum effect, the standards for new buildings should have an influence on the whole market for water-using appliances including replacement in existing properties. A standard for new buildings alone would have limited impact on retrofit or replacement in both existing and new stock and, therefore, it was desirable to adopt both approaches.

38. Whilst we accept the argument that a combination of standards for individual fittings and a whole house performance standard provides a very strong incentive for market transformation, bringing the two approaches into a single regulation is not practicable as one approach sets minimum standards and the other sets a maximum. Whilst it is helpful to set maximum levels of water use for 'wet' appliances and water fittings, we do not wish to include these in building standards where they may prove to be a barrier to innovation in construction and design. We therefore propose to implement a whole house performance standard within the Building Regulations and Defra will review the Water Supply (Water Fittings) Regulations 1999 with a view to setting, where appropriate, revised upper bounds for the efficiency of toilets, urinals and washbasin taps, for example.

Setting the performance standard

39. More respondents (40 per cent) opted for a standard of 120 l/p/d than for any of the other options presented. However, a close reading of the comments accompanying the tick box responses shows that there is a considerable divergence of opinion on the practicality of this standard. Whilst some thought it could be easily achieved others felt that "achieving this level will in all probability require major improvements to fixture water usage".

40. In a number of instances this choice of 120 l/p/d seems to be a result of respondents wanting consistency with the Code for Sustainable Homes. This suggests a misunderstanding of the way in which the minimum regulatory standards proposed would relate to the Code and its aspirational standards. In some instances the comments imply that respondents saw a level of 120 l/p/d as an aspirational target at which we should aim.

41. We wish to maintain the principle that the standard set in Building Regulations sets a *minimum* level of performance for all, whilst the higher levels of the Code will provide a set of more stretching standards. At present average consumption per person in metered properties including external water use is around 135 l/p/d. We need to take account of external use in the regulatory minimum and fixing on 120 l/p/d would be more onerous than level 1 of the Code which excludes external water use.

42. We are therefore minded to adopt a minimum standard of 125 l/p/d across England and Wales. This is broadly equivalent to level 1 of the Code if an allowance of 4 per cent is assumed for external water use. Responses to consultation suggest that this will be challenging (and will certainly be a very significant improvement on current water use) but unlike 120 l/p/d should be achievable with increased use of the best of today's readily available fittings.

Regulating in the non-household sector

43. Although the response statistics suggest that there is overwhelming support for the adoption of BREEAM office standard, the detailed comments suggest that this option was chosen as the least worst approach. Respondents noted that the standard suggested was for offices only and would not be applicable to a wider range of building types.

44. Respondents reported that there was little robust evidence of water usage in other categories of non-domestic buildings and where it did exist it related to observed consumption in existing offices. Benchmarks derived from this information would be inappropriate for new buildings and unlikely to encourage more efficient use of water.

45. Most water in non-domestic settings is used in washrooms, primarily through taps, toilets and urinals. For all of these reasons respondents recommended that a component based approach that set upper limits on these key fittings would achieve considerable improvements in water efficiency and be far more practicable and workable. Several respondents though thought that effort should be made to develop benchmarks to stimulate technical improvements in the water efficiency of fittings.

46. We agree that in the short term benchmarking is not a robust or practical approach to improving water efficiency in non-residential buildings and we, therefore, intend to address water efficiency through the appropriate use of standards for key water fittings.

47. However, we recognise the value of benchmarks to both stimulate innovation and drive up standards. We therefore propose to investigate the scope for setting a standard or range of standards for non-residential buildings as part of the Communities and Local Government led work of the Green Commercial Buildings Task Group.

Tackling individual fixtures and fittings

48. Respondents identified a weakness in the whole building approach to water efficiency in that, once the new building is occupied, there is no way to discourage residents from making changes to fixtures and fittings in the future that may make their home less water efficient. They also noted that the biggest environmental impact comes from buildings already standing. They, therefore, suggested that we should underpin the whole building performance standard with a component based approach.

49. Water consumption is a function not just of the efficiency of fittings (flow rates for taps, flush levels for toilets, etc) but also of consumer behaviour. Proposals for regulatory change therefore need to go hand-in-hand with measures to achieve behavioural change, such as those being developed by the Water Saving Group.

50. We have therefore concluded that the dual approach proposed by respondents to this consultation and a broader range of other measures, will be of considerable help in meeting Government's broader objective of raising the sustainability of water use in buildings by:

- transforming the market in water using fittings, encouraging innovation in design and performance;
- helping to remove uncertainty and risk for manufacturers and increase demand;
- securing long term savings in water consumption by discouraging the replacement of water efficient fittings installed in new homes with ones that use more water;
- addressing water use across a wider range of non-domestic buildings than could be achieved through setting whole building standards and ensuring equity of treatment between building users; and
- gradually improving water efficiency in existing buildings through refurbishment and replacement of fittings at the end of life with ones that are more efficient.

51. To help achieve this, Defra will consult in 2008 on proposals for revising the Water Supply (Water Fittings) Regulations 1999 in a way that will support the planned changes to the Building Regulations.

Looking to the future

52. Many respondents to the consultation would like us to go further and say now that we will introduce a gradual increase in standards of water efficiency in building regulations over time, as we are intending to do for energy. Many believe this will be essential to combat increasing water shortages particularly in water stressed areas.

53. The Government agrees that there may be an argument for allowing more challenging requirements in some areas but, unlike energy, it is not yet convinced that the argument has been made for requiring this in all areas. We also think it is prudent to give the proposed changes highlighted above time to bed down before we make a commitment to a progressive tightening of standards.

54. In addition, it is becoming clear that the issues of water scarcity and drought are becoming more important across Europe and the recently published communication[1] by the European Commission is expected to identify a range of measures to address current concerns. These measures may include a number of purposals for fostering water efficient technologies and practices in buildings.

55. We, therefore, intend to address the issue of more challenging standards within the context of Defra's new Water Strategy which is expected to be published in the early autumn. This will provide an opportunity to work with key stakeholders to review how a water escalator might fit in with the broader package of measures being developed to address water efficiency and whether an economic case can be made for tighter national standards.

Conclusions

56. Respondents were almost without exception in favour of setting standards for water efficiency. Different approaches were suggested for housing and workplaces which require a twin-track approach to setting standards.

57. Respondents felt that to secure long term savings in water usage in the home and to support market transformation, Government should set both standards for key water fittings and an overall performance standard for homes. Respondents generally felt that a whole building performance standard towards the lower end of the range proposed was achievable with existing fittings.

58. No building performance standards could be set for non-domestic buildings because there was no robust evidence on which they could be based. In the short term robust standards for fittings used in washrooms should achieve significant reductions in water usage in the workplace.

59. Communities and Local Government and Defra will therefore:

- bring forward an amendment to Building Regulations in 2008 to set a whole building performance standard for new homes;
- set that standard at 125 l/p/d;
- Also in 2008, bring forward proposals for revising the Water Supply (Water Fittings) Regulations 1999 with a view to setting new performance standards for key fittings that can be installed in buildings such as toilets, urinals, washbasin taps; and
- Communities and Local Government will, as part of the Green Commercial Buildings Task Group, conduct research and analysis to see if a whole building performance standard could be used for non domestic buildings, and possibly to establish higher water efficiency standards above that base.

[1] http://ec.europa.eu/environment/water/quantity/pdf/comm_droughts/communication.pdf