

# BNWAT03 Baths: market projections and product details

Version 1.0

This Briefing Note and referenced information is a public consultation document and will be used to inform Government decisions. The information and analysis forms part of the Evidence Base created by Defra's Market Transformation Programme.

## 1 Introduction

The Market Transformation Programme (MTP) is designed to transform the market to increase uptake of sustainable products, reducing the operational environmental impact of products.

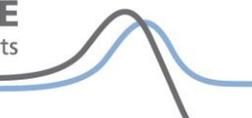
The main ways of doing this are:

- Effective regulation;
- Better information for consumers;
- Incentives to change purchasing trends and habits; and
- Policies on procurement, planning, and construction activity.

The MTP has an important role in providing the evidence underpinning policy development. In its widest sense the MTP covers electrical, heating, lighting, and water using products and appliances in the domestic sector. The MTP is also tackling energy using products in the commercial/non household sector.

This briefing note is for baths, as part of the domestic water using products element of the MTP. Within the bath product group, this note defines the different styles of bath and presents a simple classification system categorising baths based on volume as low, moderate, or high consumptive products.

It is advisable to read this briefing note in conjunction with *BNWAT02 Showers: market projections and product details* as the MTP strategy targets personal bathing as a whole. BNWAT02 sets out useful information to support a transition from high volume baths to smaller volume models, in the context of continuing to promote showering as an alternative to bathing. The strategic aim is to reduce the overall demand for water and carbon emissions currently associated with personal washing.



The information in this note is for England and Wales as Defra and Welsh Assembly Government actions and policies may not be applicable in Scotland and Northern Ireland.

The supplementary note *BNWAT08: Modelling projections of water using products* contains more information on the water sector MTP modelling process and assumptions. It is recommended that is referred to when using this briefing note.

## 1.1 Water sector MTP goal

The purpose of the MTP is to create opportunities that will transform the market towards more sustainable products. The goal of this MTP is to significantly replace market share with the most sustainable bath types by elevating sales of these products above current levels, and above what is projected under the Reference Scenario.

For information the types of bath included in the MTP models are:

- Standard bath;
- Undersized bath;
- Corner bath;
- Shower bath;
- Roll top; and
- Whirlpool;

Previous briefing notes reported on these six product types. However, discussions with manufacturers and other stakeholders have indicated that this is unnecessarily complex. Therefore, this briefing note considers baths in the context of three volumetric thresholds:

- Low consumption = less than 80 litres per use (200 litres if filled to full capacity)
- Moderate consumption = between 80 to 90 litres (up to 225 litres capacity)
- High consumption = greater than 90 litres (more than 225 litres capacity)

Volumes are based on water volume during use which will be less than full capacity due to displacement by the user. The formula to calculate this is:

*Total volume capacity from the bottom of the bath to the overflow x 40 per cent.*

Detailed information on different types of baths is presented in Appendix A. Information on the approaches and methods to measure and report bath capacity and consumption in use is presented in Appendix A.2. This includes information on the Code for Sustainable Homes water use calculator and the BRE Certification and Listing of Water Efficient Baths Scheme.



## 1.2 Purpose of the briefing note

The overall purpose of this briefing note is to inform and advise Government and other policy makers and stakeholders of the environmental benefits of implementing policies and taking actions to actively transform the market.

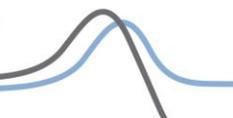
The projections in the MTP define three scenarios, based on assumptions on sales and stock levels of products: Reference, Policy, and Earliest Best Practice (EBP) and the environmental implications of each. These scenarios reflect what is possible if a set of actions is taken. These scenarios should not be considered to be forecasts. These projections are for households in England and Wales only.

Other analysts may assess and use the MTP assumptions as a basis on which to develop their own consumption forecasts. For example, water industry users may use this information to benchmark their individual forecasts and assumptions. Supporting information on the product types, historical stock levels, product specifications and testing, and associated technical issues are included within appendices. More information on how water is used in different buildings is available in briefing note *BNWAT06 Water use in new and existing buildings*.

## 1.3 Content of the briefing note

This briefing note contains the following information:

Section	Information
1	Introduction
2	Bath market scenarios: Base year and scenario assumptions, projection outputs, scenario actions
3	Environmental benefits: water and energy consumption per scenario
4	Recommendations to progress the water sector MTP
Appendix A Product details	A.1 Bath product definitions A.2. Volume per use A.3 Bath lifespan A.4 Bath product innovations
Appendix B The current market	B.1 Baths as a micro-component of water demand B.2 Existing bath ownership B.3 Applicability of water efficient models per building type
Appendix C Transforming the market	C.1 The impact of the globalised market on England and Wales C.2 Factors that influence consumer use and uptake of baths
Appendix D Baths technical specification and testing	D.1 Standards



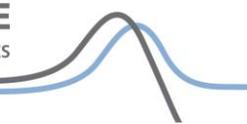
## 2 Bath market scenarios

### 2.1 Future market scenarios

The three standard scenarios presented in this briefing note are in-line with those used elsewhere in the wider MTP. The scenarios are used to project and demonstrate the potential impacts of the market transformation strategies, actions and targets. These are:

- The “Reference Scenario”: This is a projection of what is likely to happen without any new policy intervention. The scenario is based on current trends, technology developments and policies that are already in place.
- The “Policy Scenario”: This scenario estimates what could be achieved through an ambitious but feasible set of policy measures if the agreement of all stakeholders was obtained.
- The “Earliest Best Practice Scenario” (EBP): This is a projection of what could happen if the best available products and technologies were adopted, coupled with ambitious Government policies.

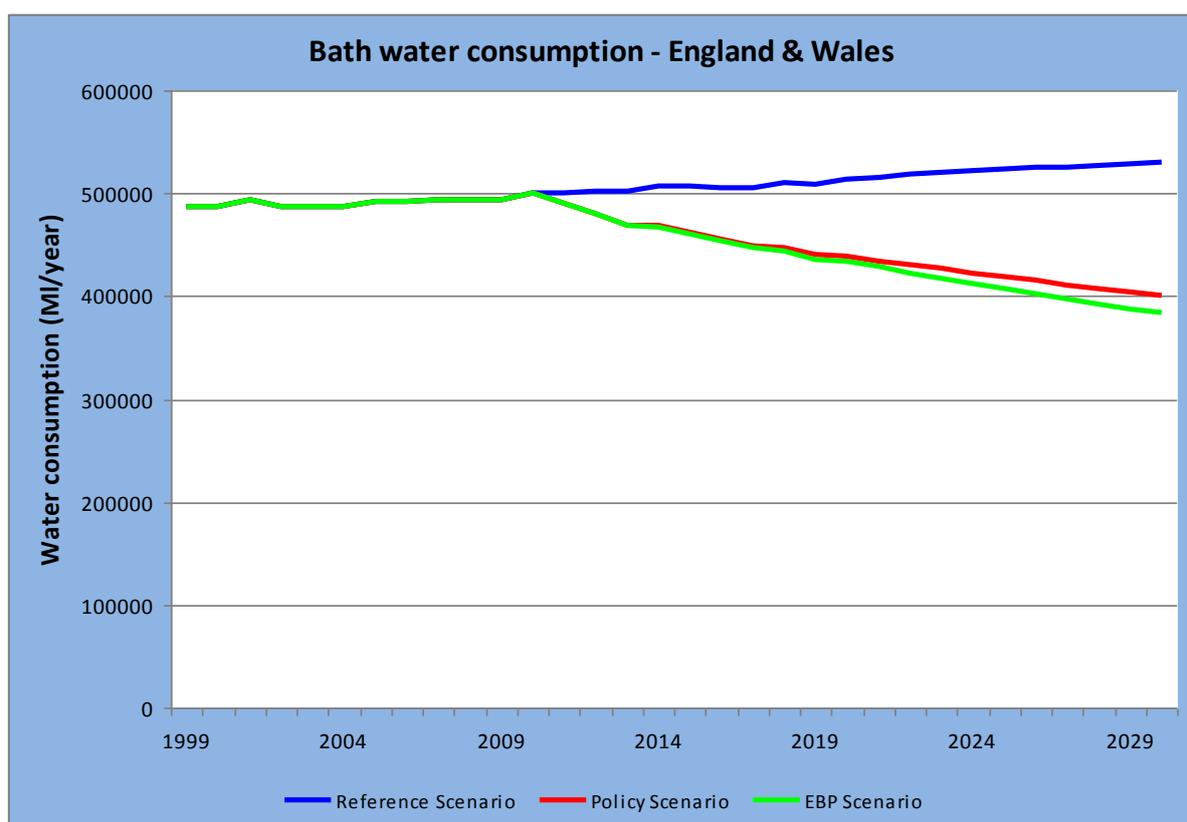
The Policy and EBP scenarios assume that the actions required to ensure the successful implementation of the policies are delivered. The impact of these policy combinations is translated in the MTP model as projected sales and stock levels (ownership) for each of the product sub-types. Further information on the models is available in *BNWAT08 Modelling projections of water using products*.



## 2.2 Summary of model outputs

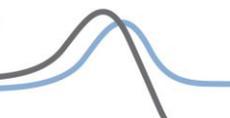
Figure 2.1 shows the future water consumption projections for baths under the three scenarios until 2030. The decline under the Policy and EBP scenarios is a result of reductions in bath volume. Bath ownership as a whole is also projected to decline in all three scenarios. Table 2.1 quantifies the consumption data at key time intervals.

**Figure 2.1 Bath water consumption projections for England and Wales**



**Table 2.1 Baths water consumption projections for England and Wales**

Year	2010	2015	2020	2025	2030
MI/year: Reference	499,926	499,926	499,926	499,926	499,926
MI/year: Policy	506,110	461,464	460,549	506,110	461,464
MI/year: EBP	513,928	438,577	433,275	513,928	438,577



## 2.3 Policies underpinning the scenarios

The key policies that are expected to influence sales and thus stocks of different volume baths in the future under the Reference Scenario are:

- The Code for Sustainable Homes (CSH), or other similar sustainability standard for new homes; and
- The Building Regulations.

The Water Supply (Water Fittings) Regulations in their current form are less likely to impact as they do not restrict bath volumes to the lower consumption levels as defined in this briefing note.

Under the Policy Scenario the same drivers exist but there is a greater emphasis on providing developers, builders and retailers with better information on water efficient baths and their availability to meet the CSH and Building Regulations. It assumes more effective implementation and accelerated take up of the more sustainable products. Additional policies will contribute to the direction driven by CSH and Building Regulations:

- Green Deal;
- EU Green Procurement Policy;
- Ongoing activities of organisations such as Waterwise;
- Policies on Smart Refurbishment and
- Product labelling.

These will all support uptake by providing information and incentives to procure sustainable products<sup>1</sup>.

The key influencing policies affecting the Reference and Policy Scenarios are also applicable to the EBP Scenario, but the impact is assumed to be much greater, with more households opting for the most efficient products available, (e.g. a greater number of homes will attempt to achieve Code for Sustainable Home level 6).

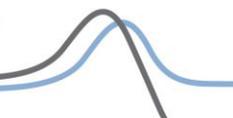
## 2.4 Base year and generic assumptions

The following assumptions have been applied to calculate all three bath projections:

- Ongoing development of new-build homes<sup>2</sup> has increased the market for bathroom products in England and Wales. The demand for additional housing, in-line with

<sup>1</sup> Outcome of an MTP stakeholder workshop, October 2010.

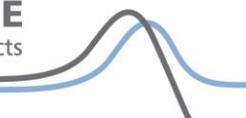
<sup>2</sup>England: [www.communities.gov.uk/documents/housing/xls/table-104.xls](http://www.communities.gov.uk/documents/housing/xls/table-104.xls)  
Wales: [www.communities.gov.uk/documents/housing/xls/table-106.xls](http://www.communities.gov.uk/documents/housing/xls/table-106.xls)



changing demographic factors including a higher proportion of single-person households, will continue to stimulate the new-build sector;

- In 2010, 94 per cent of households in England and Wales had a bath installed. This is projected to fall to 83 per cent by 2030;
- In 2010 there were 22.5 million baths in stock in homes in England and Wales. This is projected to increase to 24.4 million by 2030;
- In 2010, 1.5 million baths were sold;
- By 2030, 1.6 million baths will be sold per annum;
- Baths have a lifespan of 15 years;
- In 2010 the frequency of bathing (amongst households owning a bath) was 0.68 times per person per day. This is expected to change over time.

Table 2.2 presents more detailed assumptions on how these policies would manifest under each scenario. Table 2.3 presents the key assumptions of ownership, frequency of use, and volume per use. Table 2.4 summarises how sales of different product types is projected to change over time, under the three scenarios. These projections are illustrated in Figure 2.2, and the impacts on projected stock levels are illustrated in Figure 2.3. The actions that would be required for this to take place and for the projections to be realised are presented in sections 2.5.1 to 2.5.3. Further detail on the implications of population growth and housing development on the bath market is presented in Appendix C.



**Table 2.2 Bath scenario projections assumptions**

Scenario	Reference	Policy	EBP
Sales and ownership	Overall stock levels increase slightly, largely driven by the increase in new homes.	As per Reference Scenario. However, there is a slight trend of existing homeowners removing baths, in favour of modern shower enclosures.	As per Policy Scenario, except that the trend for homeowners to remove baths is more prevalent than in the Policy Scenario.  Bath sales are dominated by well designed, lower volume baths. Sales of 'medium' volume baths decline and larger volume baths become more peripheral. Small bath sizes take a larger market share more quickly due to more aggressive marketing strategies.
New build installations	The increase in total ownership is only slight as many new homes (especially flats) do not have a bath included in the specification. The trend towards smaller properties means that bathroom space is at a premium and therefore smaller baths are likely to be more installed more often in the future. Installations in new houses (rather than flats) offset removal rates from existing housing.	A greater number of new homes are designed to meet water efficiency targets, e.g. due to the Code for Sustainable Homes. Consequently, the size of baths and associated volumes will decrease.	Nearly all baths installed in new properties are small volume baths.
Volume per use	Information from bathroom manufacturers' brochures and online catalogues show that smaller bath sizes are available. The growth of showering and the wide range of showers now available may reduce the sales of baths.  A reduction in litres per use over time reflects the uptake of more efficient baths with a lower volume.	As per the Reference Scenario but the reduction is more rapid and then maintained. A mandatory labelling scheme is implemented which highlights the water consumption of bath designs, making it easier for developers and home owners to access water saving options.	Volume per use declines more dramatically and rapidly than in the Policy Scenario.
Frequency of use	Bath use declines as more people switch to showering as the preferred method of personal washing.	The frequency of use is expected to decrease further with the policy and EBP scenarios. Frequency of use decreases which reflects the shift from bathing to showering.	As per the Policy Scenario.

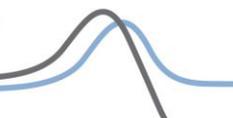


Table 2.3 presents the ownership, volume per use, and frequency of use data used in the MTP model, which may help to inform demand forecasts.

**Table 2.3 Ownership, volume, and frequency of use**

Reference Scenario

Year	2010	2015	2020	2025	2030
Ownership (baths per property)	0.94	0.94	0.9	0.87	0.83
Litres per use*	84.48	84.83	84.95	84.95	84.95
Frequency of use	0.68	0.66	0.63	0.61	0.58

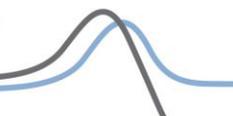
Policy Scenario

Year	2010	2015	2020	2025	2030
Ownership (baths per property)	0.94	0.94	0.9	0.87	0.83
Litres per use	84.48	80.92	80.58	80.58	80.58
Frequency of use	0.68	0.61	0.55	0.51	0.46

EBP Scenario

Year	2010	2015	2020	2025	2030
Ownership (baths per property)	0.94	0.94	0.9	0.87	0.83
Litres per use	84.48	79.98	77.22	76.30	76.30
Frequency of use	0.68	0.61	0.55	0.51	0.46

See *BNWAT08: Modelling and Assumptions* for information on the assumptions.

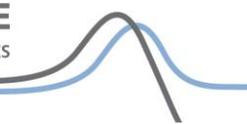


**Table 2.4 Product mix of baths under the scenarios**

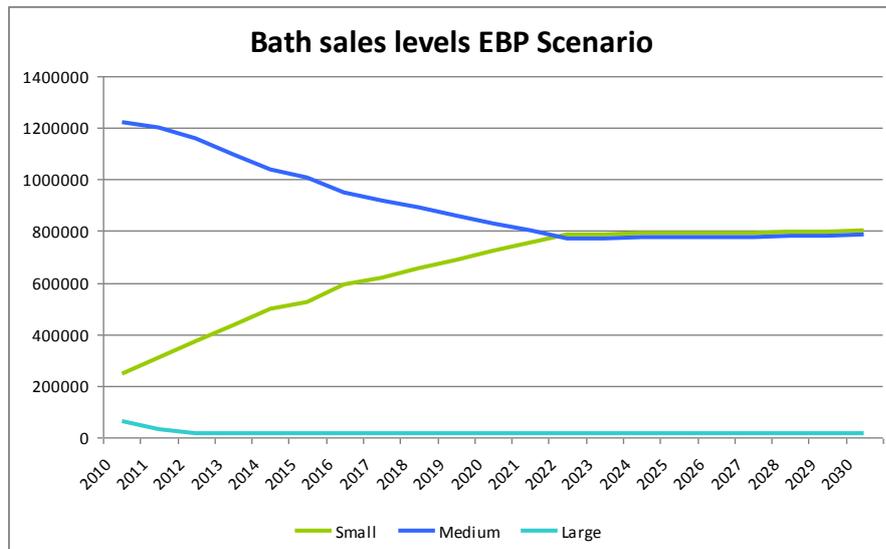
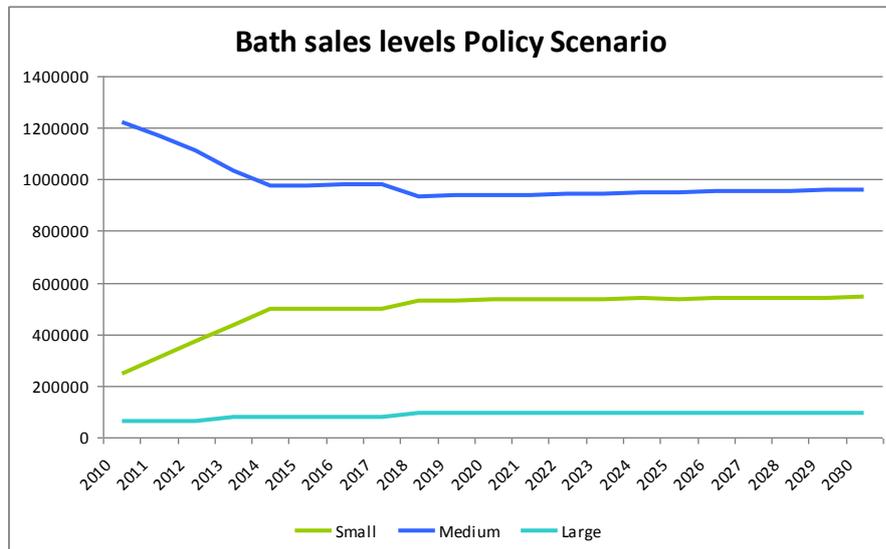
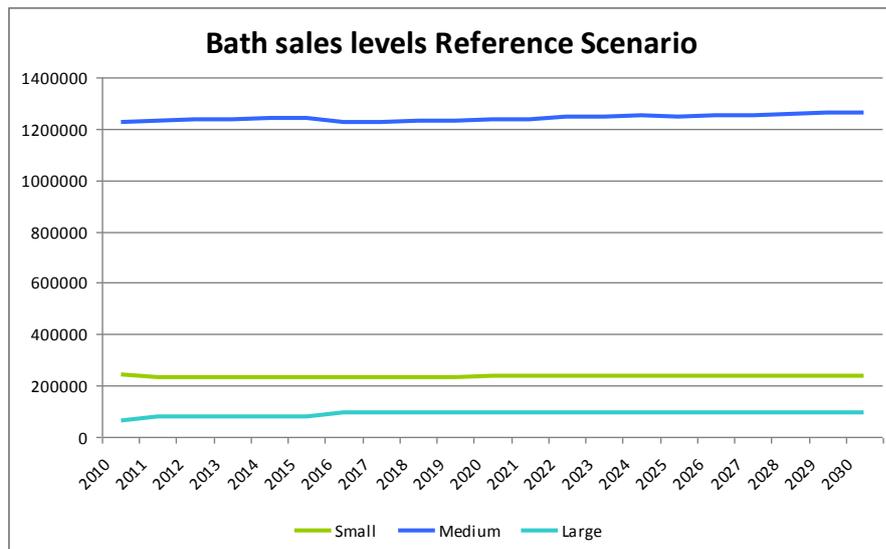
Percentage of sales: England and Wales – Reference Scenario			
Sub product	Small	Medium	Large
Bath volume (litres)	<80	80 – 90	> 90
2010	16	80	4
2015	15	80	5
2020	15	79	6
2025	15	79	6
2030	15	79	6

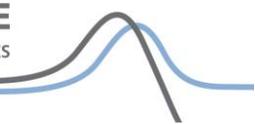
Percentage of sales: England and Wales – Policy Scenario			
Sub product	Small	Medium	Large
Bath volume (litres)	<80	80 – 90	> 90
2010	16	80	4
2015	32	63	5
2020	34	60	6
2025	34	60	6
2030	34	60	6

Percentage of sales: England and Wales – EBP Scenario			
Sub product	Small	Medium	Large
Bath volume (litres)	<80	80 – 90	> 90
2010	16	80	4
2015	34	65	1
2020	46	53	1
2025	50	49	1
2030	50	49	1

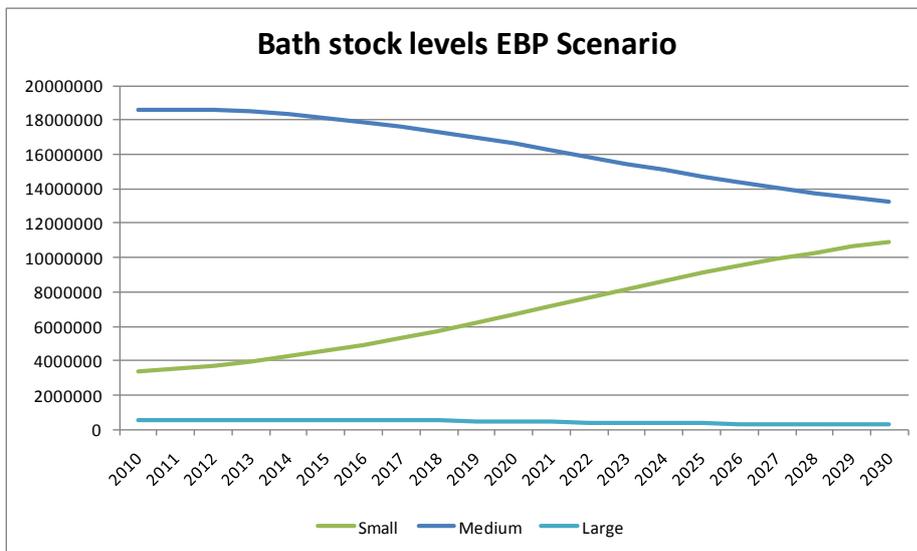
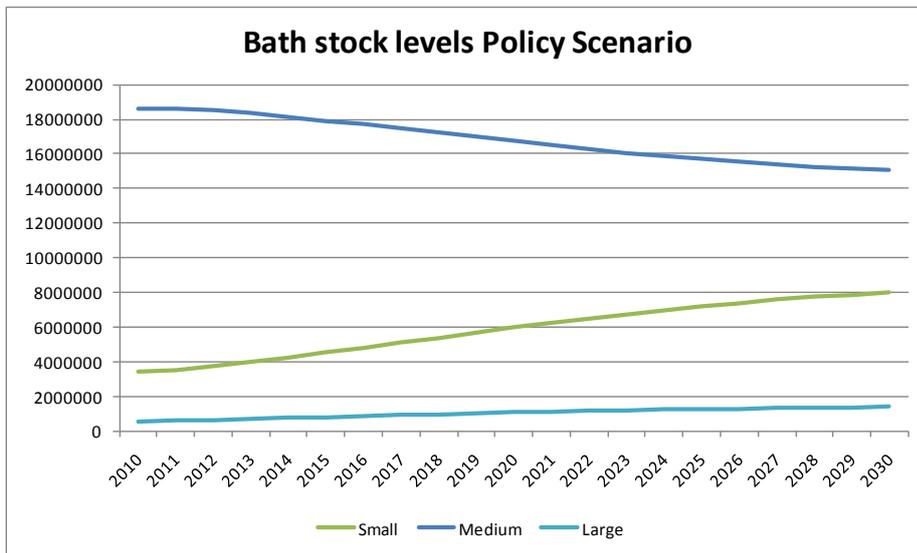
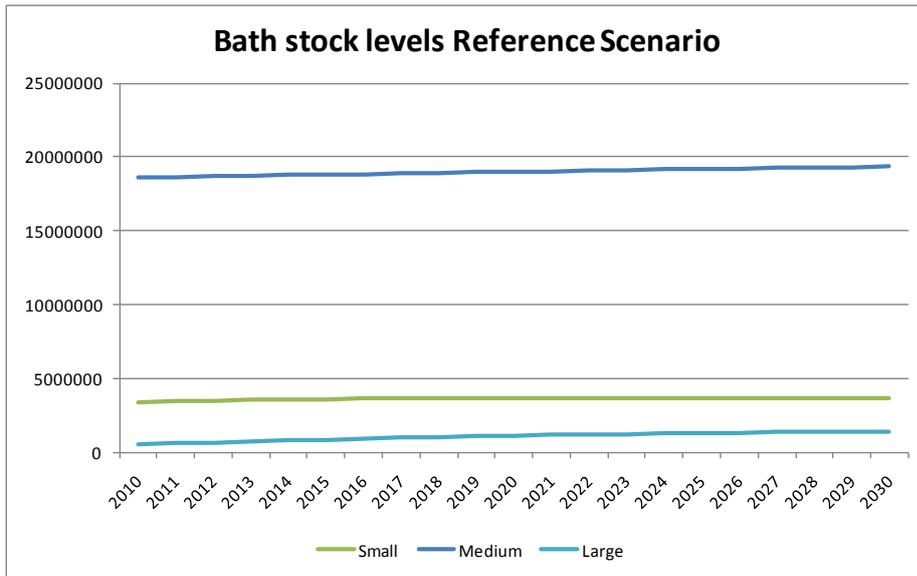


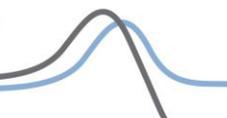
**Figure 2.2 Bath sales under the scenarios**





**Figure 2.3 Bath stock levels under the scenarios**





## 2.5 Actions

Action is required to transform the market. Many of the actions require Government to take the lead but other stakeholders would be required to take ownership of actions to ensure that market transformation takes place.

### 2.5.1 Actions to achieve the Reference projection

The Reference Scenario is not very demanding. It requires current policies and activities to continue, such as the manufacture, sale and promotion of smaller volume baths.

Actions to deliver the Reference Scenario projection:

- Manufacturers should continue to produce the smaller/lower volume baths that appeal to householders in terms of ergonomics and aesthetics;
- Manufacturers and water companies have role to continue educating/informing customers of the need to save water and the options that are available to them. They should continue telling customers how showering usually uses less water than bathing, and how saving hot water will help them to reduce their energy bills. Water companies should continue to provide this information online and in literature issued with water bills;
- Retailers and manufacturers have a role to dispel uncertainties regarding the performance and water savings of lower volume baths. Comfort is likely to be a key factor. Retailers should to continue stocking smaller volume baths.

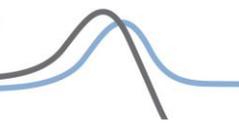
### 2.5.2 Actions to achieve the Policy projection

The focus of the Policy Scenario is to encourage existing home owners to remove higher volume baths.

Participants at a “Guardian Sustainable Business”<sup>3</sup> event discussed the approaches that successful businesses are using to influence consumer sustainable behaviours and procurement choices. One key point is that business and Government should move away from trying overtly to convince people to change. Messaging and influencing actions need to be much more subtle, appealing to relevant values and behaviours that will in turn generate the procurement choice required. Appealing to peoples’ values to change behaviour is one option, but actively incentivising people to change their behaviour can in turn lead to a change in values that may be sustained in the longer term. The following list of actions includes various steps to implement the policies that have been specified, but also actions that target consumer procurement choices:

- Purchasers of water-using products (i.e. the public) need to know who they can trust to give them information on the consumption level and performance of products. At a stakeholder workshop in 2010, the general consensus was that information is better

<sup>3</sup> <http://www.guardian.co.uk/sustainable-business/events> (quotes protected under the Chatham House Rule).

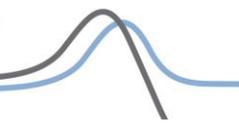


received from sources that are independent of the water companies. Stakeholders across the industry need to work together to identify/develop a source of information that is independent, credible, and trustworthy. This would support the next action:

- The Bathroom Manufacturers Association (BMA) to pursue the implementation of a single, consistent product labelling scheme to be adopted by manufacturers and retailers within England and Wales. This would require leadership from the BMA to encourage collaboration between manufacturers and retailers to progress this. Product labels should provide clear information on how much water the product uses and how this translates into the water efficiency level of the product. Accepted industry standards for testing and certification of bath volumes may be a pre-requisite of a labelling scheme.
- A labelling scheme once developed, should be applied to all sales in England and Wales (including imports).
- Manufacturers should be encouraged to produce a greater range of smaller/low-volume baths. By providing directional messages, Government can make it clear the significance of bath size with respect to water use and demand management. Manufacturers pick up on strong, clear messages and will be more likely to pursue this, to be seen as 'doing the right thing' whilst developing sustainable products that are attractive to the consumer, and give the company a competitive edge.
- Information on the value of saving water should be made readily available at the point of sale (in store or online). To be most effective, affecting procurement choices of most not just the 'green element' of customers this information needs to be conveyed in a manner that is attractive to the consumer. To this end it is recommended that retailers work with water companies (or experts within the water industry) to clarify the fundamental message, and marketing specialists to ensure the messages are attractive. Lower volume baths should be highlighted in-store and online, although the emphasis should be on performance and comfort, and potential financial savings of reduced water use (especially hot water) rather than 'water efficiency'.
- Water companies and developers should seek out opportunities to work together to promote 'water efficient' developments and specifically the performance of lower volume baths. However, once developed the promotional language should be designed to appeal to customers' values and behaviours.
- Current Government policy prevents widescale marketing campaigns. However, Government should encourage and enable stakeholders to undertake co-ordinated marketing where possible. This could make use of modern marketing approaches such as using social networks and viral marketing.

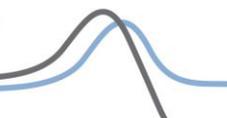
### 2.5.3 Actions to achieve the Earliest Best Practice (EBP) projection

The EBP scenario is based on the assumption that sales of small volume baths significantly outstrip larger volume models. It is important that smaller volume baths are designed to



meet user expectations. Earliest Best Practice is a very ambitious scenario and as such would require more extreme measures to shift the market in the required direction within short timescales.

- One option would be to restrict sales of larger volume baths in order to achieve this. However, this could be seen as too much interference in the market. Alternatively, incentives such as reduced taxation on smaller baths could encourage uptake, whilst disincentives such as greater taxing of the higher volume products could reduce uptake. However, Government attempts to force people to think, behave, or shop sustainably are rarely popular, as people do not respond well to having their choices curtailed, or being told what is right. Government should engage with high profile consumer groups (such as Which!) to rigorously test lower volume baths with regard to their performance and suitability in different types of bathroom and user situation. This may form part of a research programme. Consumer groups (such as Consumer Focus) are critical in promoting the performance of products.
- More creative options include working with retailers to encourage active promotion of smaller volume baths in-store and online, with the larger baths available but less accessible.
- Under the ambitious EBP scenario the Government may wish to explore options for developing economic incentives or funding streams to support a large-scale programme for high-volume stock replacement.

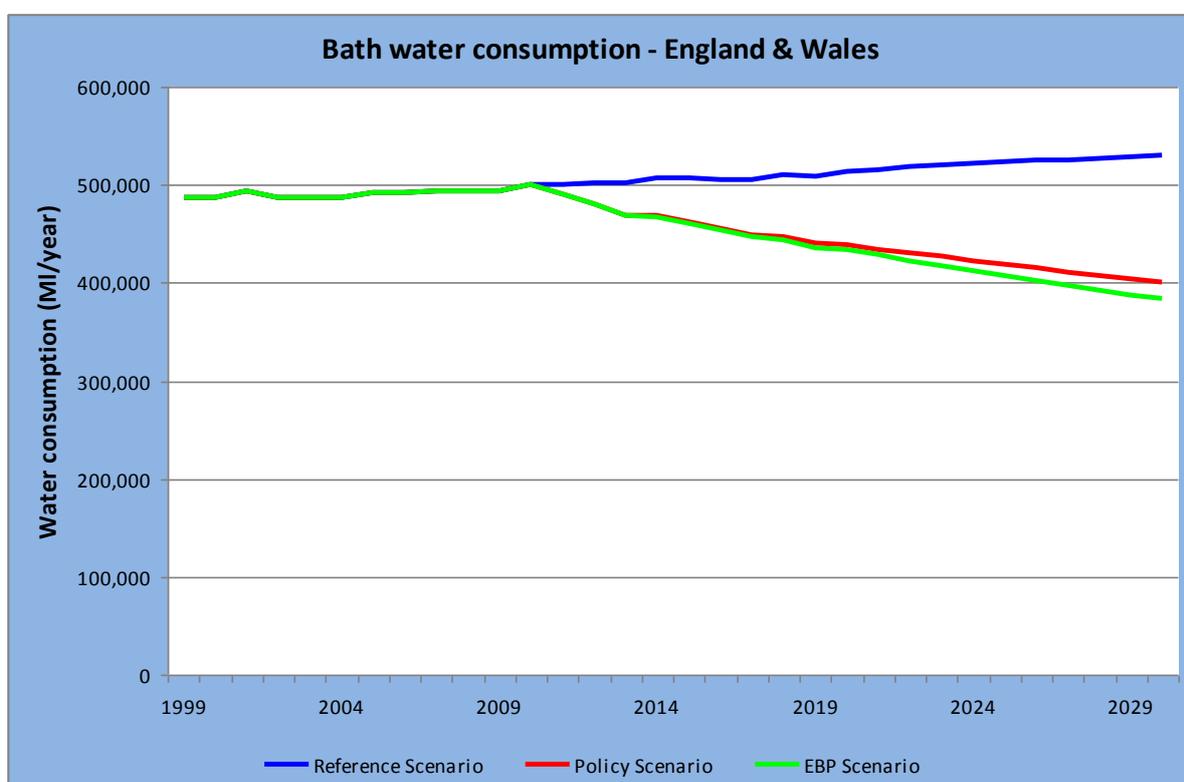


### 3 Environmental Benefits of the MTP

#### 3.1.1 Reduced water consumption

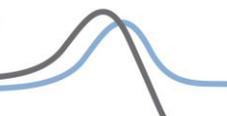
This section quantifies how much water could be saved per person and across England and Wales as a result of achieving the Policy and EBP scenarios. It takes into account the population forecasts published by the Office of National Statistics (ONS). The water saved is assumed to be potable water. The calculations are based on the assumptions set out in Section 2. Figure 3.4 illustrates the projections of total water consumption from baths across England and Wales. Table 3.2 summarises the main results and quantifies the water savings.

**Figure 3.1 Total annual bath water consumption across England and Wales**



**Table 3.2 Total annual bath water consumption across England and Wales**

Year	Total bath consumption (MI/year)			Total (MI/yr) Saved	
	Reference	Policy	EBP	Policy	EBP
2000	487,791	487,791	487,791	0	0
2010	499,926	499,926	499,926	0	0
2015	506,110	461,464	460,549	44,646	45,561
2020	513,928	438,577	433,275	75,351	80,653
2030	529,654	399,883	383,416	129,772	146,239



These figures are based at the national level and whilst saving water is an issue for the whole country, the 'value' of water is likely to be greatest in areas of water stress or where water requires more energy intensive treatment. More information on this is available in the Environment Agency publication, *Areas of Water Stress Final Report*<sup>4</sup>. Demand management is a key option to reduce pressure on resources.

### **3.1.2 Reduced energy consumption**

All potable water supplied to homes includes the embodied energy associated with abstraction, treatment, and distribution. By reducing the volume of water that is used per bath, embodied energy will also be reduced. However, far greater amounts of energy are used to heat water for bathing.

In England and Wales households use approximately 1.1 million Ml of hot water each year (excluding washing machines and dishwashers) and this is forecast to increase to 1.3 million<sup>5</sup> Ml/yr by 2030 unless hot water is used more efficiently<sup>6</sup>. Total carbon emissions arising from hot water use in households is approximately 9.9 MtCO<sub>2</sub>e/year (1.5 per cent of the total UK net carbon emissions<sup>7</sup>).

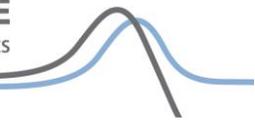
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<sup>4</sup> Environment Agency (2007). Areas of water stress: final classification

<sup>5</sup> BNWAT08 Water and energy use.

<sup>6</sup> 2010 water sector MTP model

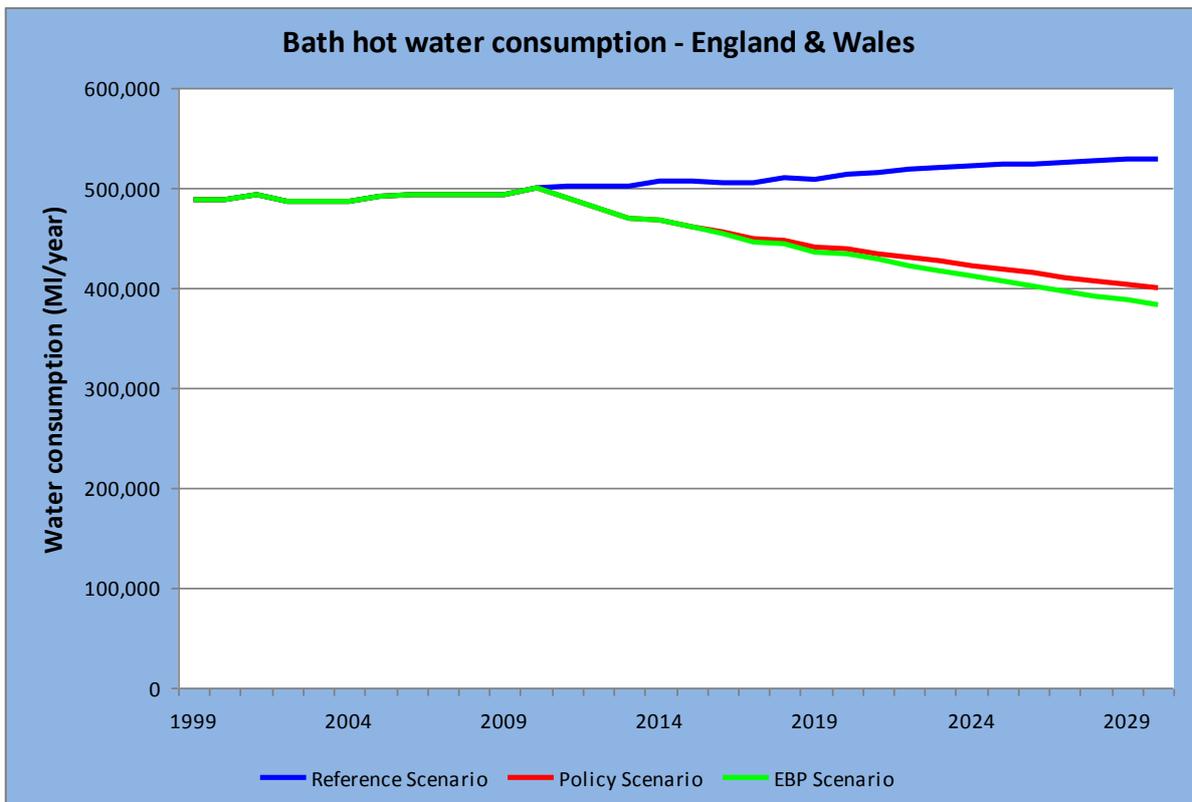
<sup>7</sup> BNWAT08 Water and energy use.

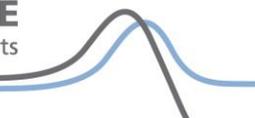


### Energy directly associated with filling a bath

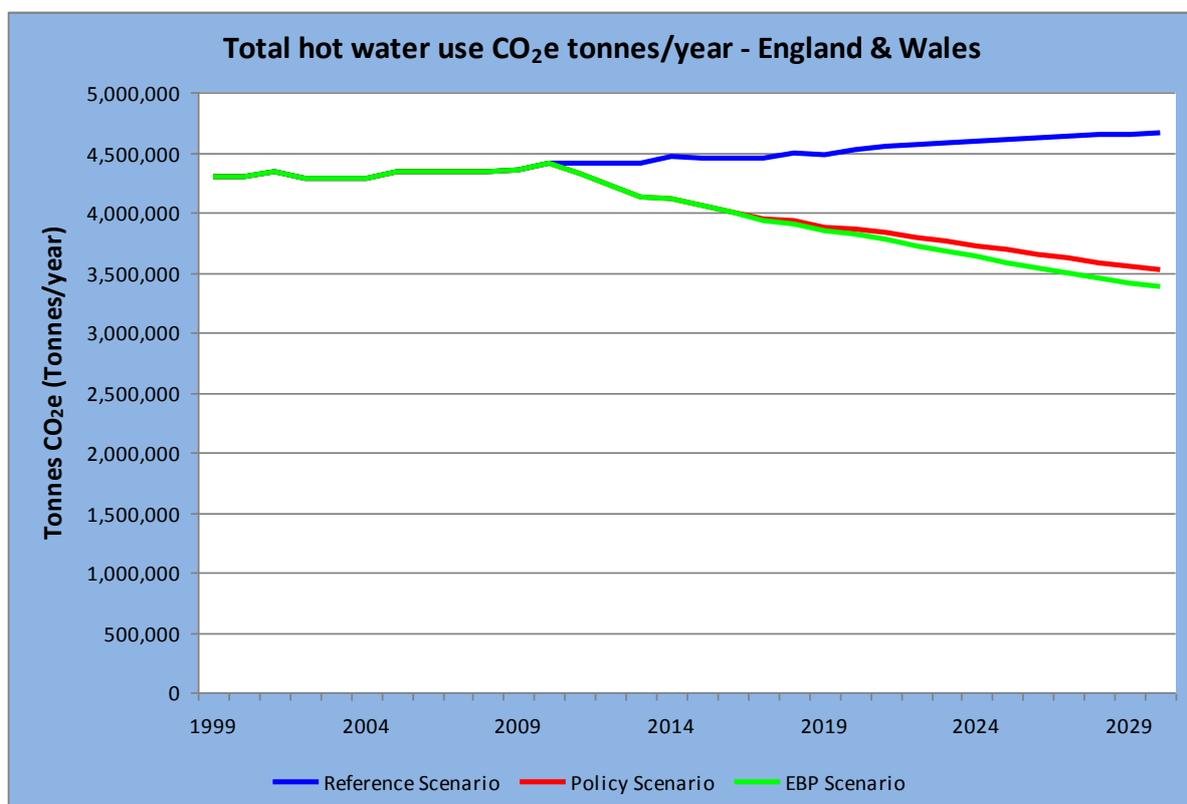
Filling a bath uses hot water, which is heated in the home, usually by a gas-fired boiler. Figure 4.3 shows the projected demands for household hot water use from baths in England and Wales under the Reference baseline, Policy, and EBP scenarios. Reducing water use by effectively transforming the market towards more efficient water using products will also reduce energy use.

**Figure 4.3 Hot water consumption from baths in England and Wales**





**Figure 4.4 Bath (hot) water carbon emissions projected to 2030**

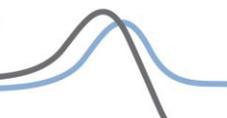


**Table 4.3 Total annual carbon emissions associated with baths hot water**

Year	Total hot bath water CO <sub>2</sub> e (Tonnes/year)			CO <sub>2</sub> e saving (Tonnes /year)	
	Reference	Policy	EBP	Policy	EBP
2000	4,294,703	4,294,703	4,294,703	0	0
2010	4,401,545	4,401,545	4,401,545	0	0
2015	4,455,994	4,062,916	4,054,861	393,079	401,133
2020	4,524,828	3,861,409	3,814,730	663,418	710,098
2030	4,663,288	3,520,727	3,375,744	1,142,561	1,287,545

The results show that under the Policy and EBP Scenarios carbon emissions associated with bath use would decrease considerably. This reflects the reduction in the use of baths combined with the increase in the number of smaller baths in sales and therefore stock figures. This result should be viewed in the context of the same results from the shower model, presented in *BNWAT02 Shower Consumption and Performance*.

More detailed information on water and energy, including the MTP assumptions to calculate energy and carbon emissions is available in *BNWAT07: Water and Energy Use*.



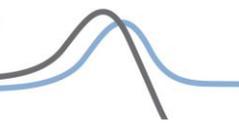
## 4 Recommendations to progress the water sector MTP

The MTP needs to identify and implement actions to overcome customers' habitual procurement decisions and reluctance to buy water efficient products:

- Further work is needed to gain agreement defining the volumes for bath size, so that any future changes in design and consumption can be labelled clearly. To avoid confusion with bath dimensions categories of Low/Medium/High are probably better than small/medium/large. This would need to be agreed by relevant stakeholders before being adopted within a labelling system. Further consultation is required before making changes to MTP.
- MTP recognises there are limitations in assuming that 'in-use volume' is 40 per cent of the maximum bath capacity (total volume held up to the overflow). This approach assumes that larger bath sizes are displaced proportionately. The MTP should work with other water consumption analysts, such as BRE, to agree a consistent approach such as subtracting an assumed typical displacement from the bath measured capacity.
- The MTP and the water industry need to understand more about consumer perceptions of water efficiency and attitudes towards this subject. It is important to consider how appropriate it is to promote certain 'efficient' products if behaviours are found to render them 'inefficient'.
- In the longer term there is clearly a need for the MTP to take more/better account of behaviour. Buying behaviour is of principal interest to MTP. However, there are likely to be links between consumers' behaviour and the decisions they make in terms of how regularly they buy water using products, and their preferences in terms of product performance. The scenario actions include the roll-out of labelling schemes. It would be useful to find out more about how such schemes influence consumers.
- Better/more effective use of international experience/case studies targeting customer purchases would add value to the MTP. It is necessary to understand the context of those situations, including the incentives that those overseas customers have (EBP scenario). Reviews of international experience must consider England and Wales specific characteristics, e.g. plumbing systems, drainage systems, price of and charging methodology for water and information on water scarcity.
- Government, utility companies, researchers should continue to explore the potential to deliver water efficiency in tandem with energy efficiency. The argument that saving water, especially hot water, can help reduce household and industry energy bills is powerful. However, whilst the unit price of water supplied is relatively low (e.g. 94p/m<sup>3</sup> average England and Wales<sup>8</sup>) and the majority of households are still unmetered, the financial incentive of saving 'cold' water is not as strong.

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<sup>8</sup> Ofwat (online). Water service unit costs (2006-07).  
[http://www.ofwat.gov.uk/legacy/aptrix/ofwat/publish.nsf/Content/rpt\\_int\\_08unitcostswater.html](http://www.ofwat.gov.uk/legacy/aptrix/ofwat/publish.nsf/Content/rpt_int_08unitcostswater.html)

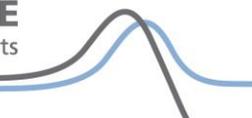


In various situations stakeholders companies have expressed the opinion that whilst water efficiency is appended to energy efficiency it will continue to be viewed as a secondary, less important resource. Not all the reasons for saving water relate to energy directly and until water is recognised as important in its own right many of these issues will not be fully recognised. For example, low flows in groundwater fed rivers and groundwater resources at risk of saline intrusion due to over abstraction.

- Manufacturers have stated that undesirable products would be phased out using usual stock management methods. It would be useful for the MTP to better understand these methods, and the usual timescales to phase out products. In the longer term the MTP should seek more evidence on supplier capacity.
- It is important to understand the extent and influence of house-building at a national level on product uptake, including how sustainability policies in Local Authority Core Strategies influence product uptake.

In line with stakeholder comments, longer term improvements of the water sector MTP may include:

- Making more use of the MTP energy sector 'What-if' tool for water using products. The tool presents a range of scenarios on the future energy consumption until 2020 for nearly 30 domestic and commercial products. As with the water sector MTP it includes a Reference Scenario, a Policy Scenario, and an Earliest Best Practice Scenario. This tool could provide an option to explore regional variation.
- Implementing regular reality checks to ensure MTP is accurate and relevant.
- Quantifying the uncertainty in the modelling outputs.
- Collating better data to understand the base year situation and to inform the projections. More work is needed to determine exactly what data would deliver the required improvements: topic areas (e.g. household data, plumbing systems data, behavioural research, product sales, etc), sources of data, frequency of updates, quality assessment, responsibilities to provide and analyse data, etc. Any actions to identify and collate data must take into account commercial sensitivities/confidentiality.
- It is important that the data relationship between the MTP and the data providers (e.g. the water companies) does not become circular, i.e. that water company data that is based on the MTP briefing notes is not used as a source to update future MTP information. Information on micro-components has been examined by isolating data from the small number of companies that did not use the MTP to develop their own analyses. The MTP should work more closely with the water industry to ensure that the most appropriate and robust micro-component data continues to be made available.
- The MTP should work with Water UK, UK Water Industry Research (UKWIR), water companies, and the Environment Agency to improve the quality of micro-component use data and to re-affirm the baseline situation.



## Appendix A

### Product details

#### A.1 Bath products

A bath is defined as: a sanitary appliance used for partial immersion and washing of the human body or parts of it and for directing water to a waste outlet after use.

##### Standard baths

The term standard bath refers to the traditional rectangular model, typically 1800mm long. Standard baths do not have shallow or narrow/tapered designs.

##### Undersized bath

There is no clear distinction between 'small' and 'undersized' baths. Under-sized often refers to baths that have smaller dimensions than 'regular' baths. They may be shorter in length and/or have a shallower depth. It is often implied that under-sized also means it holds less water. However, there are products available that are marketed as 'small' to target the market of homes with limited space, but the water volumes quoted are in the range of 250 litres (bottom to overflow). MTP considers 'under-sized' baths as distinct from the emerging tapered or 'ergonomically shaped' "peanut" baths.

##### Corner bath

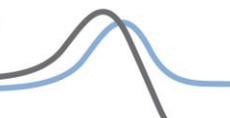
A corner bath will fit into a square corner of a room, and generally is curved on the side opposite this corner. Corner baths come in a range of sizes as designed and produced by the manufacturers and they are sometimes marketed as space saving. How much water is consumed during use is highly dependent on the size of the bath and the bathroom in question.

##### Shower bath

A shower bath is designed to be larger at one end, to allow a person to move more freely in the shower area. It is this larger dimension that increases the total capacity of the bath. (A bath shower refers to a shower that is fitted above a bath, as opposed to a standalone shower cubicle).

##### Roll top

Roll top baths are usually free-standing on legs (although this is not always the case). The dimensions of this type of bath vary from model to model. A review of models currently



available on the market suggests that roll top baths are often slightly deeper than standard baths but that the length is slightly shorter.

## **Whirlpool**

Whirlpool baths are available in different shapes and sizes. They are distinguished from other bath types by the inclusion of integrate jets that pump air into the bath water. In many products the jet force is variable. Whirlpool baths have long been considered a luxury item, for people with large bathrooms. However, manufacturers now claim that a whirlpool, or whirlpool effect can be made available to people with much less space, and at a reduced cost<sup>9</sup>.

## **Outdoor hot tub/spa pool**

Outdoor hot tubs and spa pools have been excluded from the MTP model. However, it is useful to define this group of products. These are specifically designed tubs, generally much larger than 'bathing' tubs that are used indoors. Outdoor tubs are distinct from indoor baths in that their main purpose of use is generally recreational, rather than functional bathing. This purpose of use has implications on how the tub is filled and used. Hot tubs are not drained and refilled after every use. On average it is acceptable to drain and refill a hot tub five times per year. Outdoor hot tubs are available as fixed fittings. Portable hot tub technology is advancing fast and the products that are available in the marketplace are lightweight with all electrical, filtering and heating systems, contained within<sup>10</sup>. The volume of water required to fill a hot tub varies per model. An average hot tub may hold up to 300 gallons<sup>11</sup>(1364 litres).

## **A.2 Volume per use**

The AECB water standards recommend that bath volume is measured to the centreline of overflow<sup>12</sup>. This is a consistent method for determining the maximum capacity of a bath. However, this unit of measure is not the same as consumption which is affected by displacement and other user factors.

The Code for Sustainable Homes' water efficiency calculator uses a method to assess compliance against the water performance targets in Building Regulations 17.K and the Code for Sustainable Homes. This method also follows the recommended approach of defining product volume in terms of maximum capacity to the overflow. However, the CSH calculator takes account of displacement within its assumptions of use. The CSH calculator applies a use factor of 0.11 (per person per day) where there is also a shower, and a higher

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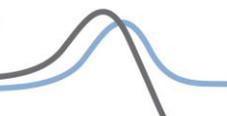
<sup>9</sup> <http://www.armitage-shanks.co.uk/plan/faqs.html>

<sup>10</sup> [www.aquawarehouse.co.uk/hot-tub/hot-tub-questions.aspx](http://www.aquawarehouse.co.uk/hot-tub/hot-tub-questions.aspx)

<sup>11</sup> [www.hottubsbarn.co.uk](http://www.hottubsbarn.co.uk)

<sup>12</sup> AECB Water Standards. Volume 2: Technical background report.

[http://www.aecb.net/PDFs/waterstandards/The\\_AECB\\_Water\\_Vol\\_2\\_V3.pdf](http://www.aecb.net/PDFs/waterstandards/The_AECB_Water_Vol_2_V3.pdf)



use factor of 0.50 where there is no shower (i.e. bath is used more frequently). The CSH embeds the impact of displacement on volume within these factors<sup>13</sup>.

The MTP has a slightly different approach due to the way in which frequency of use is applied in the model. The BRE Certification and Listing of Water Efficient Baths Scheme (which supports the CSH) applies a factor of 0.4 to calculate the volume of water used by a bath (bath only)<sup>14</sup>. MTP uses the 0.4 factor to calculate volume per bath, and then the model calculates overall consumption by applying the frequency of use element separately. MTP recognises that there are limitations in this approach as it assumes a single, proportionate displacement factor is applicable to all types of bath. Section 4 includes a recommendation to review the approaches used to quantify bath consumption (for the purposes of modelling).

In reality volume per use depends on the person using the bath (size of displacement and personal fill preference), and whether or not the user ‘tops up’ and replaces bath water that has cooled down. These additional factors have not been modelled by the MTP.

**Table A.1 Volume per use of products**

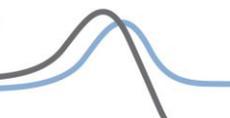
Product	Capacity to overflow	Volume	Volume category	Factors affecting actual volume	UK regulation
Undersized	165 litres	66 litres	Low	Actual displacement, individual fill preference, Topping up with hot water	
Corner	140 litres	56 litres		Actual displacement, individual fill preference, Topping up with hot water	
Shower bath	250 litres	100 litres	Medium	Actual displacement, individual fill preference, Topping up with hot water	Water Supply (Water Fittings) Regulations 1999
Roll top	225 litres	90 litres		Actual displacement, individual fill preference, Topping up with hot water	
Whirlpool	205 litres	82 litres	High	Actual displacement, individual fill preference, Topping up with hot water	
Outdoor tub	400 litres	*		Actual displacement, individual fill preference, Topping up with hot water	Water Supply (Water Fittings) Regulations 1999
*Displacement in larger baths may be more variable.					

Manufacturers’ product specifications refer to the size of a bath in terms of dimensions, not water capacity. When undertaking research into the efficiency of baths this should be taken into consideration. For instance, models are currently being advertised as ‘small’ measuring “just 120x120mm”, but which have a water volume of 250 litres. According to the formula (40 per cent of volume up to the overflow) this equates to 100 litres per use, which the MTP model currently regards as a high consumption product.

<sup>13</sup> SLG (September 2009). The water efficiency calculator for new dwellings.

[http://www.planningportal.gov.uk/uploads/br/water\\_efficiency\\_calculator.pdf](http://www.planningportal.gov.uk/uploads/br/water_efficiency_calculator.pdf)

<sup>14</sup> [http://www.greenbooklive.com/filelibrary/SD175\\_Rev\\_0\\_Bath\\_Certification\\_Scheme.pdf](http://www.greenbooklive.com/filelibrary/SD175_Rev_0_Bath_Certification_Scheme.pdf)



## A.3 Bath lifespan

### Estimate of renewal rate

The lifespan of a bath in the MTP model is assumed to be 15 years. As with other products this will vary from household to household. Bathroom style trends may affect replacement rates. For more information on how product choice may differ between building types, particularly between new and existing housing see *BNWAT06 Water use in new and existing buildings*.

## A.4 Product innovation

### Innovative products

Some manufacturers have begun developing 'water efficient' baths that have reduced water volumes. The designs range from short and/or shallow baths (which are thought to be generally unpopular based on online forums<sup>15</sup>), to tapered or narrowed baths which still enable the user to submerge.

Some of the larger bathroom manufacturers are advertising "water efficient baths" or "water saving baths" on their websites. Some are tapered<sup>16</sup> whilst the saving properties of others are attributed to "clever internal shaping"<sup>17</sup>. Advertised models have capacities (litres to bottom of the overflow) of 130 litres, and 140 litres (bath dimensions 1700\*700).

### Current Manufacturing Capacity

The Bathroom Manufacturers Association (BMA) represents a large number of the manufacturers trading bathroom and kitchen water using fittings in the UK. The UK market is supplied by manufacturers based within the UK and overseas. Within the UK the manufacturing base is comprised of a mixture of companies with wide product ranges and a smaller number of specialist companies manufacturing specialist 'water efficient' products. The relationships between manufacturers and retailers vary, with some manufacturers retailing their own goods as well as supplying retailers, specialist water efficiency manufacturers providing products/parts to larger manufacturers, and retailers sourcing products from many suppliers.

Manufacturers and the BMA have stated that they have the capacity to respond to changes in the market, shifting production to the more water efficient products quickly.

### Non technical innovations

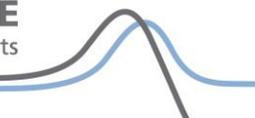
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<sup>15</sup> example forum "Bathtubs to keep or not to keep":

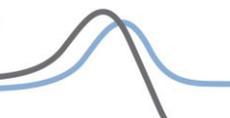
<http://ths.gardenweb.com/forums/load/bath/msg0215202730974.html>

<sup>16</sup> <http://www.ideal-standard.co.uk/concept/watersaving-bath-bath-e730701.aspx>

<sup>17</sup> <http://www.twyfordbathrooms.com/~media/Twyford/Files/Brochure-pdf-files/DesignInnovationFeb2011.ashx>



Other innovations that could help to transform the market include systems that would improve customer use, e.g. introducing a requirement for all baths sold to be labelled clearly stating the bath water capacity and its classification as either low, moderate, or highly consumptive.



## Appendix B

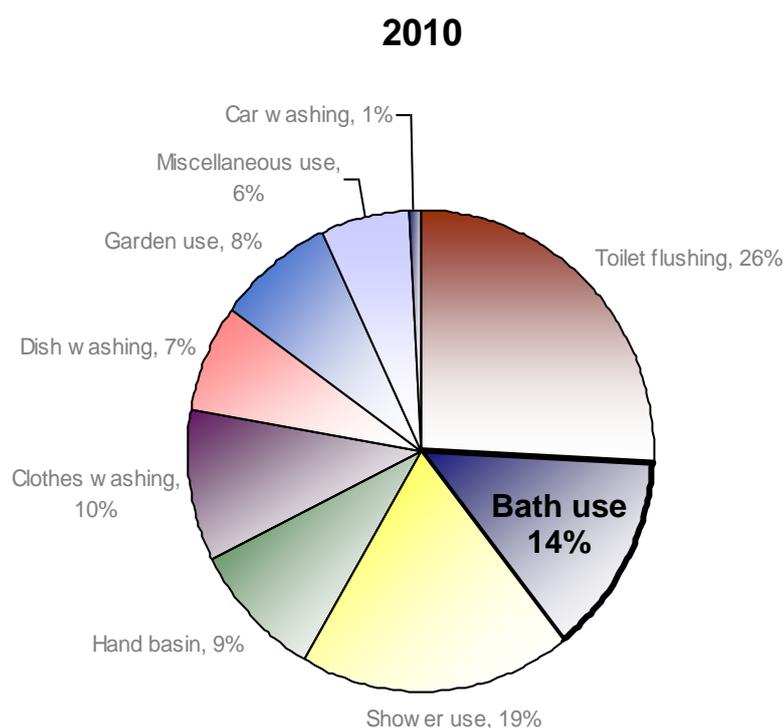
### The current market

#### B.1 Bath as a micro-component of water demand (England and Wales)

The Environment Agency collates and reviews micro-component data from the water companies in England and Wales. Many of the water companies use the information in the MTP briefing notes to develop their analyses. However, some companies develop their own micro-component proportions without the MTP, using customer surveys and other measurement systems.

Figure B.1 shows that, according to these sources in 2010/11 bath use accounts for 14 per cent of household demand for water.

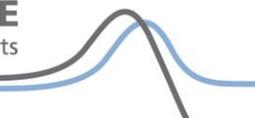
**Figure B.1 Micro components of household water consumption**



Source: Water company WRMPs (based on customer surveys)

#### B.2 Existing bath ownership

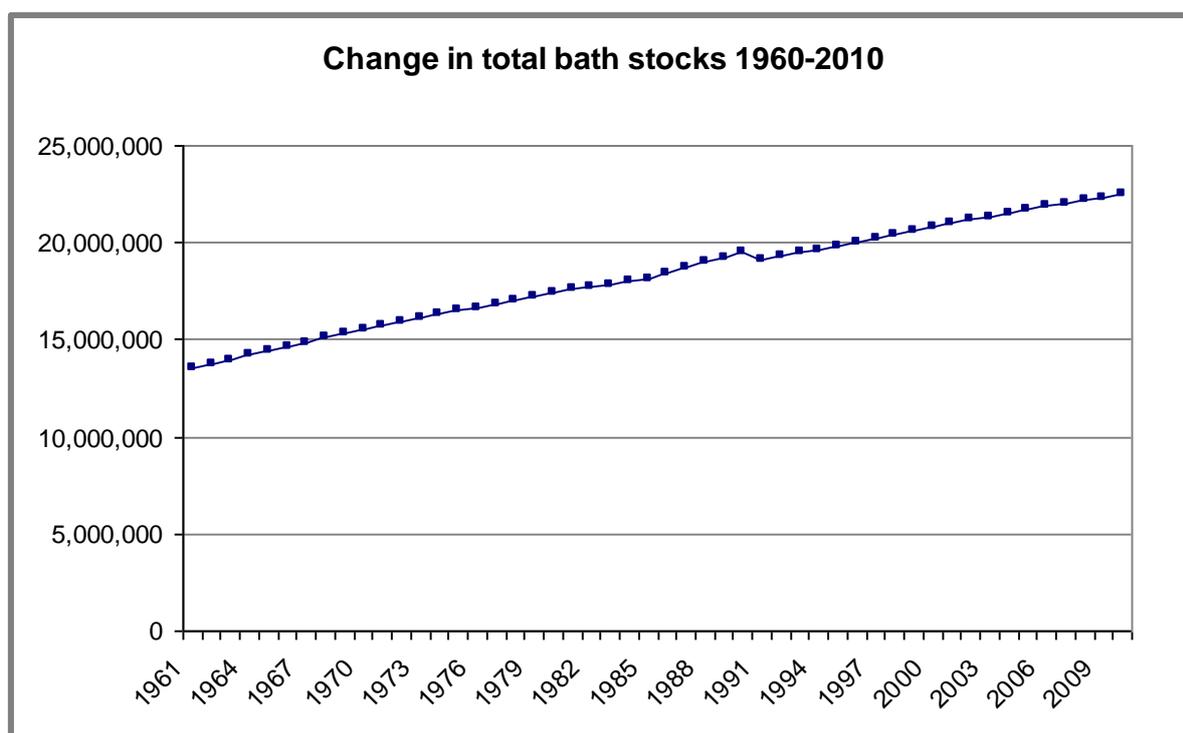
There are approximately 22.5 million baths installed in homes across England and Wales. Overall ownership across households is approximately 94 percent. Ownership has continued



to rise since the 1960s. Figure B.2 illustrates the historical trend. Future projections are presented in Section 2.

The role of baths seems to be changing. Whereas baths used to be used frequently for purely practical washing purposes; they now seem to be used more for ‘luxury’ purposes. This change in roles has led to the increased use of baths in addition to showering, and also to the development of a new market in novelty/luxury units such as spas and whirlpool units<sup>18</sup>.

**Figure B.2 Historical trend in total bath stocks in England and Wales**



Using the three volume based classifications set out in Section 2.1.1 the market share (existing ownership) in 2010 is:

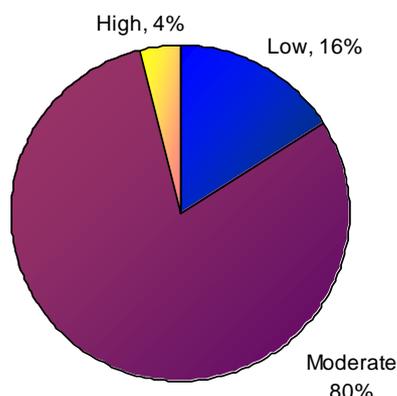
**Table B.1 2010 Bath stocks in England and Wales - Summary**

Low volume	Moderate volume	High volume
3,411,736	18,580,603	546,236
15.1per cent	82.4per cent	2.4per cent

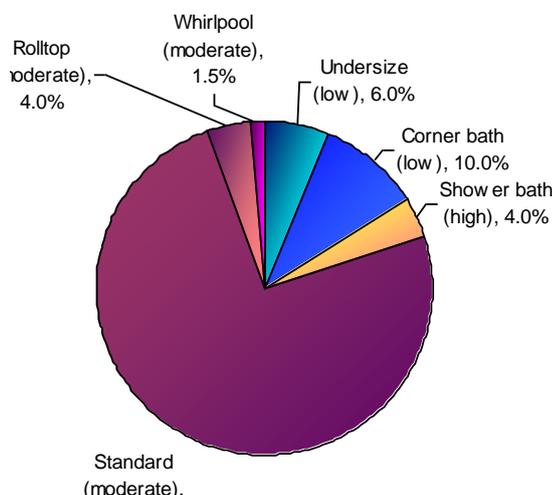
<sup>18</sup> Waterwise (2009). Water and Energy Implications of Bathing Behaviours and Technologies.

**Figure B.2 2010 Bath sales in households in England and Wales**

**2010 Sales of the three main bath volumes**



**Detailed breakdown of product sales**



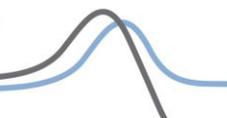
**Table 2.2 2010 proportion of sales market per product type**

Low volume baths		Moderate volume baths			High volume baths
Undersize	Corner	Standard	Roll top	Whirlpool	Shower
6.0%	10.0%	74.5%	4.0%	1.5%	4.0%

A UK survey of 3000 households during National Plughole Week<sup>19</sup> in 2010 reports that the average number of baths taken by each adult had fallen from nine times a month a decade ago, to just five times this year, and 11 per cent of people said they had removed their family bath in the last few years. Reasons for this include a shift in preference towards walk in showers, possibly resulting from changing lifestyles that often leave less time in an average day to wait for a bath to fill and take a long soak.

Stock data is not disaggregated into measured and unmeasured households, i.e. there is currently no data to show if and how metering has affected choice of bath size. Unlike other products, such as showers, it is reasonable to suggest that factors such as available space and lifestyle are more likely than metering to influence homeowners decisions regarding whether to retain/install a bath or not, and what type of bath they prefer. Customers on a metered supply, if they have an incentive to reduce their consumption may simply choose to modify their bathing behaviour, e.g. filling the bath to a lower level.

<sup>19</sup> founded in 2007 to raise awareness of poor sanitation in developing countries. Partnership between Oxfam and Buster.



## Appendix C

### Transforming the market

#### C.1 Impact of globalised markets on England and Wales

As with other products increased awareness of the different product styles that are available overseas influences consumer preferences and demand in England and Wales. Globalised markets and global scale manufacturers directly influences the product ranges that are made available in England and Wales. These ranges include both the more consumptive products, such as the large baths and spas, as well as the more efficient models, the design of which have been driven by markets overseas. More information from manufacturers and retailers dealing in the international market as well as the England and Wales market would be useful to better understand how markets and regulation elsewhere have directly affected their product ranges and how this has affected the ranges they make available in England and Wales.

Overseas initiatives, such as the Water Efficiency Labelling and Standards (WELS) Scheme in Australia, have influenced policy makers' views on the need for product labelling schemes in England and Wales

#### C.2 Factors that influence consumer use and uptake of baths

Uptake of any product is dependent on several factors including cost, user acceptability and product performance. Detailed information on product performance testing and consumer performance criteria are presented in Appendix D.3. However, there are specific factors that have a significant impact on total bath stocks and the type of products that dominate sales, as described for new/refurbished households and existing households below.

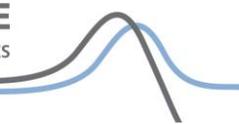
This section examines how the market for water using products is affected by trends, such as population growth and housing occupancy. It also explores the relationship between housing trend (particularly occupancy) and use of products.

##### C.2.1 Housing development and refurbishment

The key driver behind growth in household demand for water is population growth. Figures are currently rising, with the population of England and Wales forecast to rise from approximately 55.2 million in 2010, to 63.0 million in 2030, an increase of 9.15 million<sup>20</sup>. Housing data from CLG shows that the number of households in England and Wales has increased from 17,025,000 in 1971 to 24,037,000 in 2010<sup>21</sup>. Housing levels are forecast to continue increasing in response to the increasing population and the increasing number of

<sup>20</sup> <http://www.statistics.gov.uk/pdftdir/pproj1009.pdf>

<sup>21</sup> England: [www.communities.gov.uk/documents/housing/xls/table-104.xls](http://www.communities.gov.uk/documents/housing/xls/table-104.xls)  
Wales: [www.communities.gov.uk/documents/housing/xls/table-106.xls](http://www.communities.gov.uk/documents/housing/xls/table-106.xls)



low occupancy/single person housing. CLG data suggests that by 2030 the number of households in England and Wales could reach 29,168,600.

**Figure C.1 Housing and population forecast (England and Wales)**

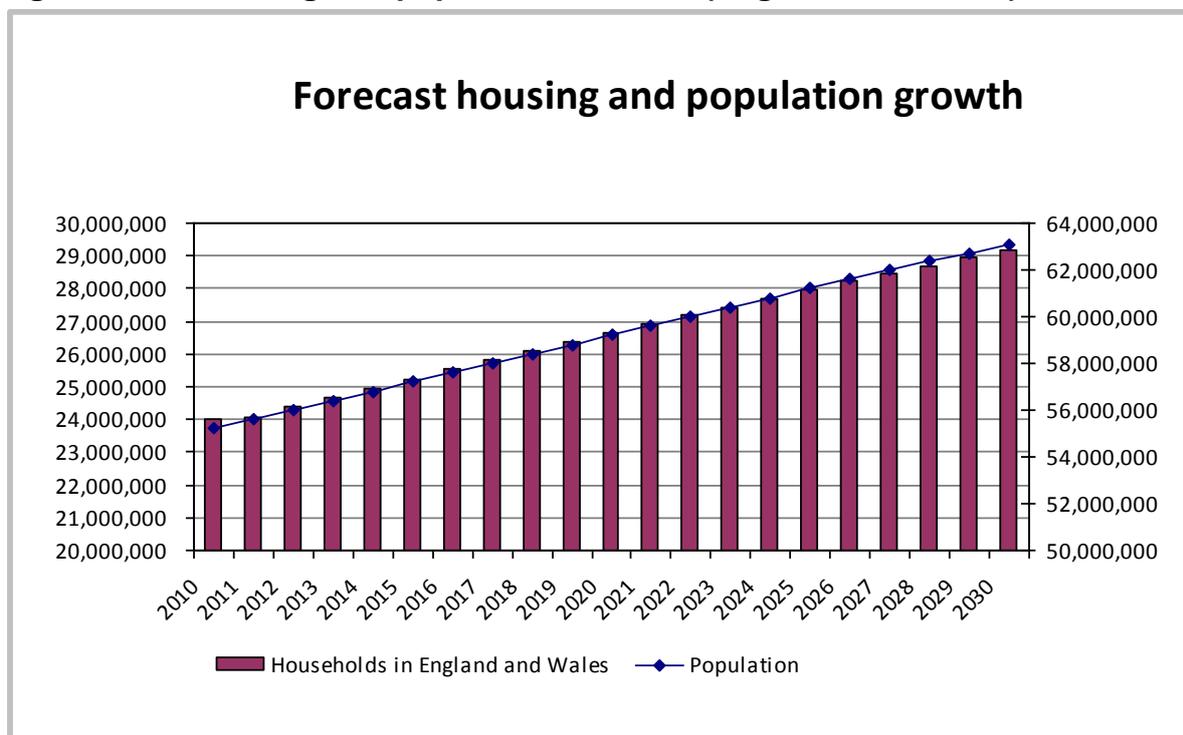
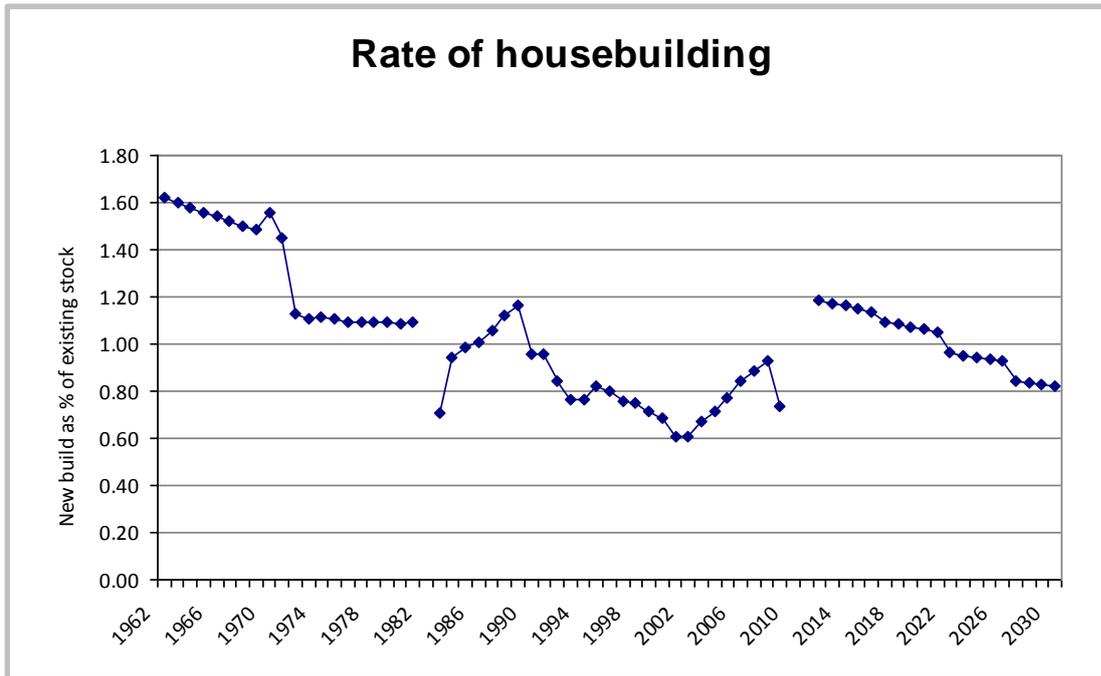


Figure C.2 shows that rates of house building, compared to annual stock levels, have declined steadily since the 1960s<sup>22</sup>. However, rates began to rise in 2002 and are expected to continue to rise, despite the economic situation in 2010/11 as the Government steps up measures to address the housing deficit.

<sup>22</sup> Based on CLG historical housing data (interpolated up to 1990)

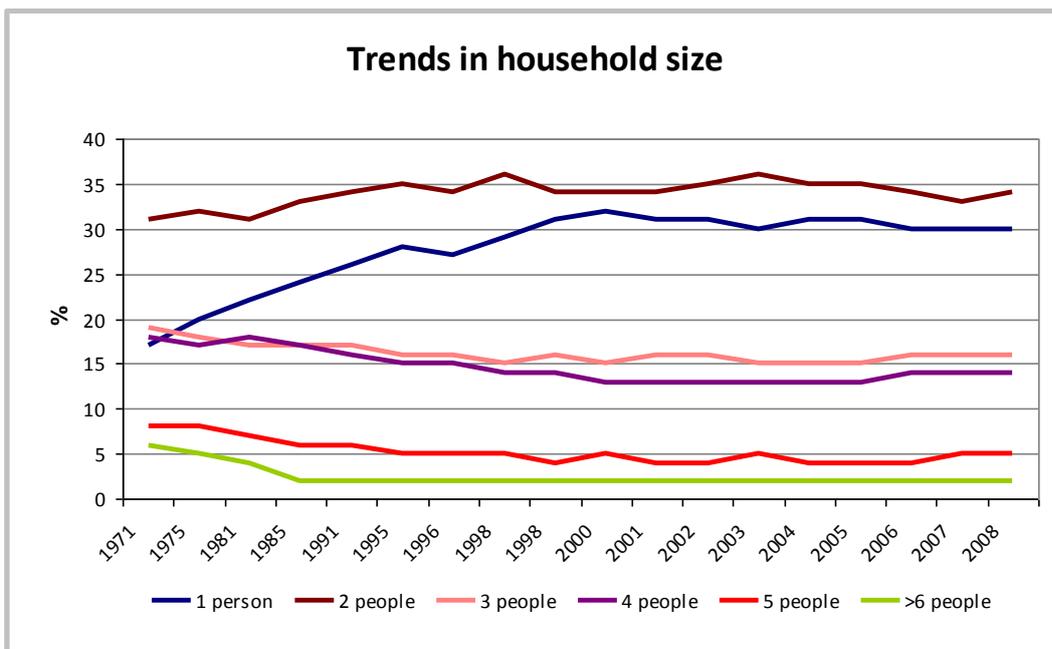
**Figure C.2 Historic and forecast rates of house building**



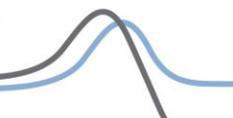
\*gaps exclude erroneous data

Household occupancy in England and Wales has decreased from 2.84 in 1971, to 2.29 in 2010, and is expected to fall further to 2.14 in 2030<sup>23</sup>. The same ONS data source also trends changes in household size to 2008, as shown in Figure C.3.

**Figure C.3 Historical trends of housing occupancy**



<sup>23</sup> [http://www.statistics.gov.uk/downloads/theme\\_compendia/GLF08/GeneralLifestyleSurvey2008.pdf](http://www.statistics.gov.uk/downloads/theme_compendia/GLF08/GeneralLifestyleSurvey2008.pdf)



The data shows that household occupancy appears to have levelled out following a period of change between the 1970s and 1990s. The biggest change has been the rise of single occupant housing which is now 30 per cent of the total housing stock at the national level.

### **C.2.2 Existing housing**

The replacement of the bath with a shower enclosure where space is more limited is increasing, particularly in smaller homes where space is more restricted and en-suite bathrooms are less common. There is recognition of the ease of installation and the flexibility of electric showers in terms of their location in the home and the type of water system.

The use of baths is also affected by the social mixture of people in the home. Families, particularly with small children, may be more likely to use the bath more frequently than people living alone or people living in shared accommodation. Families may also be more likely to re-use bath water.

### **C.2.3 Product pricing**

A key element that must be considered in the context of market transformation is product pricing. If a product has a price premium associated with it then this is likely to negatively impact on uptake. It is also important to recognise that whilst there maybe actual price premiums, the perception that there may be a price premium may be sufficiently strong to influence procurement decisions.

There are significant variations in the price of baths. However, this varies between manufacturers and may be more influenced by the design and materials used (especially plastic compared to cast iron or steel), rather than the water volume of the product.

The significant cost of replacing a bathroom means that the purchase is more likely to be deferred during times of economic uncertainty.

### **C.2.4 User acceptability and product performance**

As stated previously, overall ownership of baths is expected to decline in the future, as the market shifts towards greater uptake and use of showers. However, baths retain their appeal as they provide a relaxing method of bathing. Therefore, user acceptance of baths often depends on users being able to submerge. There are many anecdotal reports that under-sized baths do not meet user expectations. Complaints include water being too shallow, or the bath being too small to relax in.

There has been growth in specialist products to meet the needs of niche sectors and fulfil design requirements. Some manufacturers have made a shift to smaller baths.



## Appendix D

### Baths technical specifications and testing

The Water Supply (Water Fittings) Regulations are national requirements for the design, installation and maintenance of plumbing systems, water fittings and water-using appliances. Their purpose is to prevent misuse, waste, contamination, undue consumption or erroneous measurement of drinking water.

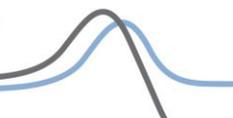
The regulations list the standards which fittings must meet and the 'Water Fittings and Materials Directory', published by the Water Regulations Advisory Scheme (WRAS), gives up-to-date details of a wide range of items which have been tested and proved to comply.

The Water Supply (Water Fittings) Regulations 1999 imposes a legal requirement to notify the local water supplier of the proposed installation of a bath with a capacity in excess of 230 litres (measured to centre line of overflow). This recognises that baths with exceptional volumes have a potential impact on water usage and allows for the compulsory fitting of water meters in domestic properties where larger baths are to be fitted.

#### B.2 Standards

Water consumption associated with baths is not addressed in any British or European Standards as the focus is primarily on bath design and manufacture. For information the current Standards for baths are:

- BS EN 232:2003. Current since August 2003. Covers the joints, holes, Dimensions, and dimension measurements of baths and sanitary appliances. A revised draft was issued in December 2010, 10/30208463 DC, this will expire on 31 March 2011.
- BS EN 14516:2006+A1:2010 (Baths for domestic purposes). Current since September 2006, as amended in August 2010. The Standard focuses on product durability, performance, maintenance, stability, test methods, conformity, quality control, and marking.
- BS EN 12764:2004+A1:2008 (Sanitary appliances. Specification for whirlpool baths). Current since January 2005, as amended in April 2008. The Standard focuses on performance, installation, marking, instructions for use, thermal testing, pressure testing, watertightness tests.



## Related MTP information

- BNWAT06: Water use in new and existing buildings
- BNWAT07: Water and energy use
- BNWAT08: Modelling projections of water using products
- Briefing Note BNW09: Tumble drier test methodologies

## Changes from earlier versions

This briefing note replaces the following previous briefing notes:

- BNWATSH01: Consumer views about showers – summary report
- BNWAT24: Performance and efficiency: reviewing and defining showers
- BNDW Shower: Shower design and efficiency- briefing note relating to policy scenario objectives in Policy Brief
- BNWAT25: Recycling showers – innovation briefing note and incorporates the previous briefing note:
- BNWAT21: Performance standards for water using products – an overview

## Consultation and further information

Stakeholders are encouraged to review this document and provide suggestions that may improve the quality of information provided. Email [info@mtprog.com](mailto:info@mtprog.com) quoting the document reference, or call the MTP enquiry line on +44 (0) 845 600 8951.

For further information on related issues visit <http://efficient-products.defra.gov.uk>