

Evaluation of the water saving potential of social housing stock in the Greater London Area

Prepared for the Greater London Authority

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Waterwise is an independent, not-for-profit, non-governmental organisation that promotes water efficiency in the UK. Our aims are to decrease water consumption in the UK by 2010, and to build an evidence base to support large-scale water efficiency initiatives. We are the leading authority on water efficiency in the UK. In England, we sat on the Environment Minister's Water Saving Group, and in Scotland, we convene the Saving Water in Scotland network.

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We conduct our own research and occasionally undertake work as consultants. In addition to research, we are also involved in policy-making, advising, public relations and other activities.

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2 CONCLUSIONS

- This study's survey and calculations have shown that within the water use efficiency agenda for London's social housing stock, the installation of efficient showers will deliver greatest value in terms of saving water, energy, carbon dioxide, and utility charges to the property, of all retrofit / refurbishment options.
- The scenarios explored have shown that within reasonable assumptions regarding behaviour, water and energy savings through shower installations can be expected. What is more uncertain is the savings in utility costs to the property and the total carbon dioxide attributable to personal washing. This is due to the disproportionate weighting of electricity, in terms of cost and carbon dioxide, in comparison to gas as a heat source. Given that this weighting relates to current methods of energy generation, it is difficult to advise as to whether the London's social housing providers and funding agencies should be aiming for a low carbon housing stock (under current conditions), or for a low energy housing stock under the assumption that government will be reducing the carbon dioxide intensity of electricity generation in future.
- The basic model used for the scenarios concluded that efficient mixers out-performed electric showers in terms of over-all resource efficiency. However, the model does not account for heat losses due to hot water storage, which will be present in some gas boiler systems, but not in electric showers. Electric showers also have the advantage of providing their own heat source and operating on low pressures, therefore making them much more versatile and attractive as bulk purchases to apply to all social housing stock. There is also a question regarding the ultimate aim of refurbishment. The research rests on the premise that a standard originally intended to improve quality of life should now cover the environmental performance of a building, and that the two are complementary. However, where the installation of an electric shower increases the current carbon dioxide footprint of personal washing, and may increase utility bills slightly, the potential increase in the quality of life of the occupants must not be ignored and may take precedence.
- In regards to delivery, savings in toilets, taps, and baths are possible through simply integrating water efficiency standards into the current procurement process for Decent Homes refurbishments. Indeed, some councils reported that this measure had already been taken, whilst others reported to be willing to do so given more information on available technologies and suppliers. It is therefore advisable that basic information on water efficiency standards, available technology, and suppliers be provided to those developing Decent Homes programmes, as this may provide a low cost avenue to water savings.
- The installation of showers through the Decent Homes programme is blocked by a like-for-like replacement policy. We therefore recommend that the standards be revised to include showers as a standard in social housing. The identified trade-off between mixer and electric showers should be accounted for in new standards, which should encourage mixers where plumbing allows. As suggested in the scenarios, shower installations could accompany boiler upgrades which are likely to provide the sufficient water pressure for mixer showers to be installed.

3 RECOMMENDATIONS

The data gap concerning water using fittings in current stock must be addressed

It was assumed that social housing authorities and “Arms-Length Management Organisations” (ALMOs) would collect information on water-using appliances present in existing social housing stock; however the majority of social housing providers contacted were unable to provide such information and reported that for the most part, the fittings present are only known for stock already visited under the Decent Homes programme.

This was particularly the case for ALMOs, where information was limited due to their having only recently acquired responsibility for upkeep. There is therefore a large information gap in current water using fittings in social housing. This to some extent could be addressed by defining responsibilities for holding and managing such data, as there does not seem to be such a definition currently. Once this responsibility is defined, field research may be necessary to collect the remaining data.

Integrating water efficiency into current basic fitting standards is a low cost solution which should be pursued

A number of social housing authorities reported to be considering or in the process of developing environmental standards for procurement, which could include water using devices used in Decent Homes visits (most often toilets, taps, and baths). There was support for further guidance on retro-fit compatibility, products, and installation. Such support could then help each authority to develop its own water efficiency standards which could be integrated into Decent Homes refurbishments already planned.

Current Decent Homes Standards should be revised to encourage water efficiency and remove the current disincentive to install showers

The majority of social housing was constructed before showers were considered a standard fitting, and have not been refurbished to include a shower since. The Decent Homes program was almost unanimously cited as the mechanism under which social housing is visited for retrofit and refurbishment. Current standards and the funding reflecting those standards allow for replacement of fittings on a like-for-like basis. Under such a structure, sustainability policies governing procurement can encourage water efficient toilets, taps, and to some extent wet white goods, but will not support the installation of showers. This has led to perverse incentives such as the replacement of baths with baths. Given the water, energy and carbon saving potential of shower installations, as well evidence that showers are in demand from tenants; there is a need to update Decent Homes standards to include shower installations.

Electric showers should be considered only when mixer showers are incompatible

While water and energy savings are relatively assured when installing showers (within reasonable patterns of behaviour), the distinction between mixer showers (typically using water heated by gas) and electric showers becomes relevant when accounting for the carbon dioxide and utility impacts of showering; due to electricity having approximately three times the carbon dioxide weighting per unit energy than gas, and on average being double the cost, electric showers should be avoided where possible *under the current carbon weighting of electrical supply*. If and when the UK moves towards its emission targets, the carbon content of electricity may reduce to a level where this concern will become limited or invalid when compared with a gas energy source.

INTRODUCTION

This study was commissioned with the aim of estimating the potential reduction in water consumption in social housing stock through water efficiency retrofits, and in particular through the delivery avenue of an updated Decent Homes Standard which would include water efficiency criteria for water using fixtures and fittings. Currently, the Decent Homes standard is measured against the age and basic performance of bathroom and kitchen fittings, but makes no comment on their water efficiency. Nor does the Decent Homes standard allow for the installation of showers where baths are present, due to a like-for-like replacement policy. The survey showed that it is likely that approximately 80% of social housing properties own at least one bath and have no shower installed.

Showers and toilets were considered the priority for analysis due to the potential carbon, energy, and utility cost savings possible through hot water savings in showers, and due to the large volumes of water savings through toilet upgrades.

The survey was carried out over three months from January to March 2009. Site managers for council housing associations, as well as Arms Length Management Organisations (ALMOs) were targeted through an emailed survey form (appendix 5).

4 METHODOLOGY

1. The survey was designed to assess the current standards of fixtures and fitting in social housing stock in order to estimate baseline consumption of water (this estimate was combined with some basic assumptions on use patterns, outlined in section 7). The survey also asked respondents to comment on the how receptive housing authorities are to water efficiency standards, and the preferred method of support in delivery (discussed in section 11).
2. Response rates and the quality of data returned were extremely limited. However, where data was returned, it was commonly reported that approximately 80% of stock had baths and no showers. This was cross referenced with market research on historical uptake of showers compared to the age of social housing stock and a conservative estimate of 70% was used as an assumption when projecting water savings through shower installations.
3. Projections for water savings through shower and dual flush toilet installations were then estimated at a per property level using data from a previous social housing refurbishment program.
4. Energy, carbon, and utility projects were estimated under various scenarios of shower type (gas and electric), existing boiler efficiencies, and potential boiler upgrades. These provided a range of possible carbon, energy, and utility impacts and were used to discuss tradeoffs in approach.
5. Per property scenarios were then applied to the entire social housing stock. For shower installations, a rate of 70% baths and no showers was assumed. The number and rate of visits under the Decent Homes program was estimated through social housing business plans to provide an estimate impacts on water, energy, carbon, and utility costs through “piggy backing” on program visits. An additional estimate for shower was applied to all stock in order to estimate net potential yields.

5 TOP LINE SAVINGS ESTIMATES

5.1 POTENTIAL SAVINGS OF SHOWER INSTALLATIONS THROUGH DECENT HOMES INITIATIVES

The minimum number of projected Decent Homes visits in the Greater London Area as defined through published housing authority business plans, combined with an estimate of the number of properties with baths and no showers, was used to estimate the potential number of shower installations possible through an updated Decent Homes Standard. Per property savings in water were based on a micro-component approach outlined in section 6 as a basis to estimate the water, energy, carbon, and financial savings due to the inclusion of shower installations and refurbishments in each visit to properties: By 2013, **2ML of water per day** could be saved and the following impacts on Energy, Carbon, and Utility costs could be made:

TABLE 1: SAVINGS DUE TO SHOWER INSTALLATION UNDER DECENT HOMES

	Minimum (per day)	Maximum (per day)
Energy	188,000 KWh	178,000 KWh
Carbon dioxide	8 tonnes Co2	37 tonnes Co2
Utility costs to stock (net)	-£980	£7, 100

5.1.1 POTENTIAL SAVINGS OF DUAL FLUSH INSTALLATIONS THROUGH DECENT HOMES INITIATIVES

The same methodology was used for the inclusion of a dual flush toilet refurbishment in all planned Decent Homes visits: By 2013, savings of up to **7ML per day** could be achieved. This is based on previously observed savings of approximately 60 litres per property after the replacement of high volume single flush toilets in social housing.

A further estimate was made of the total water saving potential of all London social housing stock, irrespective of the Decent Homes Initiative. Toilet retrofits were not included, as there is evidence that homes which have already been visited under Decent Homes may have already had dual flush toilets installed, and so application to the entire stock would yield an over-estimate.

5.2 POTENTIAL SAVINGS OF SHOWER INSTALLATIONS IN ALL ELIGIBLE GREATER LONDON SOCIAL HOUSING STOCK

If all social housing stock in the greater London area were to be refurbished for decreased hot water consumption through shower installations, **10ML of water per day** could be saved and the following range of energy, carbon dioxide and utility savings could be achieved.

TABLE 2: SAVINGS DUE TO SHOWER INSTALATIONS ACCROSS ALL SOCIAL HOUSING STOCK

	Minimum (per day)	Maximum (Per day)
Energy	518,000 kWh	653,000 kWh
Carbon dioxide	11 tonnes Co2	107 tonnes Co2
Utility costs to stock (net)	-£8, 200	£20, 800

6 SURVEY RESULTS

6.1 RESPONSE RATES AND KNOWLEDGE OF STOCK

A total of 37 councils and ALMOS were targeted for the survey. The response rate was 46%, or a total of 17 received responses (Appendix 1). Lack of knowledge of water efficiency in existing stock and in the standards of the equipment used in home refurbishments was commonly cited as a reason for not being able to return surveys. Where surveys were returned, only 7 councils/ALMOS were able to provide information on typical water using components installed in homes based on the standards used under the Decent Homes program; water efficient toilets, taps, baths and showers were all identified as measures within these 7 responses. Little can be inferred on the general standards applied when refurbishing, as the returned data cannot be guaranteed to be representative (Table 3). A further barrier to data collection was identifying the appropriate contact to provide information on stock; in some cases Waterwise was referred to three or four successive contacts until it was decided the data wasn't available.

TABLE 3: LEVEL OF INFORMATION RECEIVED ON WATER EFFICIENCY STANDARDS FROM RESPONDENTS (BASE = RESPONDENTS ONLY:17)

Council	Provided data on water efficiency standards in refurbishments	Water efficiency measures U = unspecified N = not installed under program S = standard device E = efficient device				
		Taps	Baths	Showers	Toilets	Dishwashers and washing machines
1. Barnet						
2. Brent	X	U	U	U	U	U
3. Camden	X	E	E	U	E	N
4. City West	X	S	E	N	S	N
5. Greenwich	X	E	N	E	E	E
6. Hackney Homes						
7. Homes in Havering						
8. Hounslow Homes	X	S	S	E	E	N
9. Islington						
10. Kingston	X	S	S	S	E	N
11. Lambeth						
12. Lewisham						
13. Newham						
14. Peabody	X	S	S	N	E	S
15. Southwark						
16. Sutton Housing Partnership	X	S	S	E	S	N
17. Tower Hamlet Homes						
Total provided refurbishment standard information	7					
Total efficient device categories reported		2	2	3	4	1

7 ALTERNATIVE APPROACH TO ESTIMATING SAVINGS

The lack of information from ALMOs and councils concerning water using equipment in existing stock has meant that an estimate of the potential to save water must be based on assumptions of housing stock age and the fittings likely to be present, rather than reported fittings.

Waterwise have assumed that the majority of social housing in London is likely to be at least 30 years old: our reasoning for doing so is in part based on phone interviews and survey responses from social housing representatives, but in part on the fact that a majority of social housing was built to address post-war housing shortages and slowed dramatically in the early 1980s.

7.1.1 TOILETS

Toilet flushes will typically range from 9 – 16 litres per flush for older models, and most installed before 2001 can be assumed to be inefficient. Water companies and local authorities have targeted toilets in efficiency campaigns, especially where the stock is known to be over ten years old, as they provide large volumes of savings and are relatively unaffected by uncertainties in occupancy behaviour.

7.1.2 SHOWERS

Limited data exists on current stock. When councils and ALMOs did provide data on the number of homes with a bath and no shower (9 responses); none quoted a figure less than 70%, the typical response being around 90% (table 4). Whilst this limited response is not sufficient to assume an average penetration of showers in social housing, the estimate of a minimum age of stock of 30 years, combined with data collected by Waterwise on national levels of shower penetration in housing stock from 1970 to 2005 (figure 1), suggests that 70% baths with no showers in social housing is a reasonable assumption.

TABLE 4: EVIDENCE FROM SURVEY OF PREDOMINANTLY BATH ONLY PROPERTIES IN SOCIAL HOUSING STOCK (BASE = 17)

Respondent	% Bath and no shower U=Unspecified
1. Barnet	U
2. Brent	"majority are likely to have baths only"
3. Camden	U
4. City West	"99%"
5. Greenwich	"99%"
6. Hackney Homes	U
7. Homes in Havering	"Majority of stock bath and no shower"
8. Hounslow Homes	U
9. Islington	"The great majority: 95%+/-"
10. Kingston	"6300 units" : note: total stock reported as 4800: 100% bath and no shower assumed from this response
11. Lambeth	U
12. Lewisham	U
13. Newham	U
14. Peabody	"5000 homes with showers" Note: total stock reported as 16813: 70% bath and no shower assumed for this response
15. Southwark	"90%"
16. Sutton Housing Partnership	"85%"
17. Tower Hamlet Homes	U

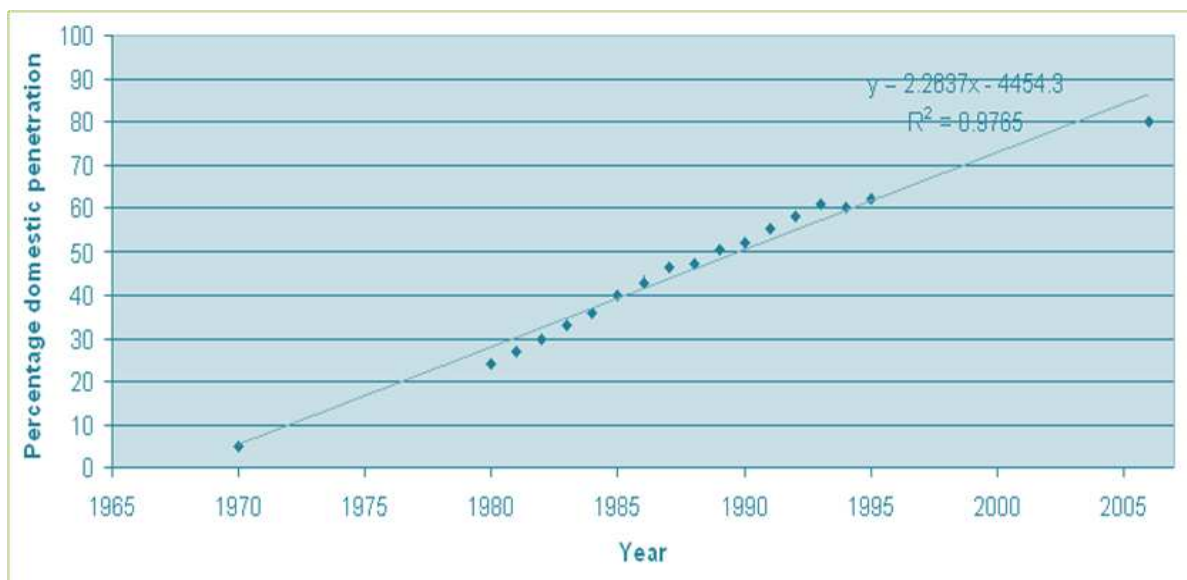


FIGURE 1: WATERWISE FIGURES FOR HISTORICAL SHOWER OWNERSHIP IN UK HOUSING STOCK¹

¹ Waterwise (2008) The water and energy implications of bath and showering behaviors and technologies, available at <http://www.waterwise.org.uk/images/site/Research/final%20water%20and%20energy%20implications%20of%20personal%20bathing%20-%20for%20est%20apr%2009.pdf>, accessed 14/05/09

8 PER HOUSEHOLD WATER SAVING ESTIMATES

To estimate the water, energy, carbon dioxide, and utility bill savings attributed to replacing bath with shower use, micro component data from the Anglian Water “Golden 100” monitoring programme² was used to estimate the volume consumption attributable to each. The associated energy, carbon dioxide, and utility costs are then estimated through an in-house energy model, which accounts for the temperature rise required, the efficiency of the heating source, and the carbon dioxide weighting of heating sources (gas Vs electric). A simple before and after comparison is then made across a number of scenarios which account not only for a change from bathing to showering, but also potential changes in heating sources (e.g. gas heated bath water to electric shower) and heating efficiency (e.g. a boiler upgrade in the same visit as a shower installation) (figure 2). Details of this calculation, including assumed variables are available in appendix 3.

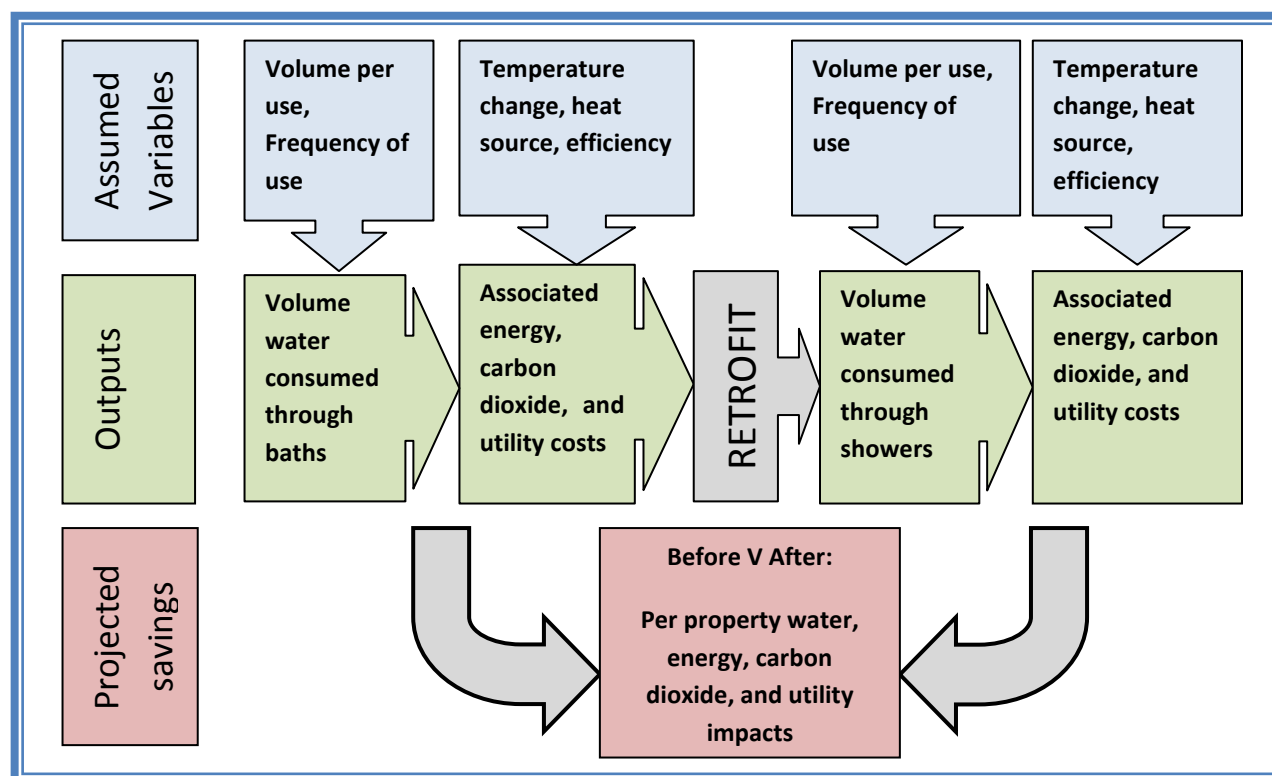


FIGURE 2: CALCULATION PROCESS FOR ESTIMATES OF WATER, ENERGY, CARBON DIOXIDE AND COST IMPACTS OF REFURBISHMENT

The weakness in such an approach is that it assumes shower and bath use are mutually exclusive, and so does not account for bath use once a shower is installed over a bath. There is currently very limited data concerning how bath and shower use interact and so this simplistic assumption had to be made. There have been similar issues in the development of the Code for Sustainable Homes, which also struggles to capture how the use of fittings interact to produce a final water consumption value. The assumed water saving of 32 litres per property per day can be confirmed as being in the correct order of magnitude and within reasonable limits when compared to real data for social housing retrofits which Waterwise collected through the monitoring of the Preston Water Efficiency

² WRc. (2007) UC7325: Analysis of shower event data captured using Identiflow. WRc.

Initiative: a pilot project in which 365 social housing properties were fitted for water efficiency. Savings from the project estimate installing showers over baths to yield a saving of approximately 40 litres per property per day, marginally higher than the estimate through the micro component approach. It is accepted that not all social housing will be comparable to the Preston Initiative, both in terms of technology and demographics, however the project does serve to confirm the estimates provided to a limited degree.

Where the heating source for water changes between components (i.e. when an electric shower is installed over a gas heated bath), the carbon dioxide and utility charges associated with hot water use through each component will be different and therefore an estimate of carbon dioxide and utility costs requires data on the distribution of volume of water used across each component. This data is not yet available, however it should be noted that in scenarios where electric showers are installed, the effects of heavier carbon dioxide weightings and utility costs in electrical supply may not be as pronounced as calculated. ***It should be noted that in general, without reliable data on behavioural patterns within a home, the precise quantifiable benefits of any retrofit or refurbishment are uncertain.***

8.1.1 CALCULATED SAVINGS FOR SHOWER OVER BATH INSTALLATIONS

TABLE 5: ESTIMATED SAVINGS DUE TO SHOWER INSTALLATION: BASED ON WRC MICROCOMPONENT DATA, PER PROPERTY³

Component	Vol/use (litres)	Freq/prop/day	Daily vol (litres/prop/day)
Shower	25.7	1.46	37.52
Bath	73.3	0.95	69.64
Shower installation (Daily saving)			32.11

TABLE 6: WATERWISE EVIDENCE BASE DATA FOR SAVINGS DUE TO SHOWER INSTALLATIONS, PER PROPERTY⁴

EVIDENCE BASE DATA: Preston project				
Water efficiency measure	Estimated savings (l/prop/day)	Installation rate	Estimated savings adjusted for installation (l/prop/day)	Adjusted for measured savings (l/prop/day) ⁵
Shower installation (Daily saving)	45.22	99%	44.77	39.46

8.1.2 CALCULATED SAVINGS FOR TOILET REFURBISHMENT

TABLE 7: WATERWISE EVIDENCE BASE DATA FOR SAVINGS DUE TO TOILET REFURBISHMENT, PER PROPERTY⁶

EVIDENCE BASE DATA: Preston project				
Water efficiency measure	Estimated savings (l/prop/day)	Installation rate	Estimated savings adjusted for installation (l/prop/day)	Adjusted for measured savings (l/prop/day) ⁷
New dual-flush toilet	70.27	100%	70.27	61.32

³ WRC. (2007) UC7325: Analysis of shower event data captured using Identiflow. WRC.

⁴ Waterwise (2008) Evidence base for large scale water efficiency in homes, available at http://www.waterwise.org.uk/images/site/Policy/evidence_base/evidence%20base%20for%20large-scale%20water%20efficiency%20in%20homes,%20waterwise,%20october%202008.pdf, accessed 14/04/09

⁵ The adjusted value is a compromise between bottom-up estimates of water saving through micro component data, and top-down data of recorded reductions in net water consumption. For further details on this calculation, please see (3).

⁶ Ibid (4)

⁷ Ibid (5)

9 CONSTRUCTION OF SHOWER INSTALLATION SCENARIOS

Four key scenarios were constructed for refurbishments. These represent what Waterwise feel would be the most likely conditions under which water efficiency refurbishments would occur. The first two scenarios describe possible paths to refurbishment within planned visits under the Decent Homes programme; the second two scenarios describe possible paths to refurbishment for all social housing stock⁸;

- **Scenario 1:** Low efficiency (60%) boiler: on visit electric shower installed
- **Scenario 2:** Low efficiency (60%) boiler: on visit boiler upgraded (90%) and mixer shower installed
- **Scenario 3:** Stock average (72%) boiler: on visit electric shower installed
- **Scenario 4:** Stock average (72%) boiler: on visit mixer shower installed

Scenarios are described and justified below, and percentage impacts on water, energy, carbon dioxide, and utility costs *due to bathing* are summarised below. Where a boiler upgrade is included in the analysis, the energy savings due to improved efficiency in space heating and hot water heating for use outside personal washing, have not been included. Full lookup tables for all water, energy, carbon dioxide, and utility cost impacts of refurbishments are available in appendix 3.

9.1 SCENARIOS 1 AND 2: REFURBISHMENT UNDER PLANNED DECENT HOMES VISITS

9.1.1 SCENARIO 1

Low efficiency (60%) boiler with bath, electric shower installed on visit: This scenario describes the most typical social housing retrofit. Boiler efficiency is low as it is assumed the home has not been visited for retrofits previously. It is also assumed that an electric shower is installed due to its ability to operate on low water pressure and produce hot water independently, both advantages in older buildings.

The refurbishment is estimated to decreased both water and energy consumption due to personal washing by about half; however, carbon dioxide savings are far less pronounced due to a move to an electrical source for hot water. Where it is assumed that there is no water meter present, there is a possibility that retrofits will increase a property's utility costs due to the switch from gas to electricity.

TABLE 8: SCENARIO 1 IMPACTS

Scenario 1: FROM: 65% efficient boiler with bath TO: 65% boiler and electric shower fitted	
Component	Percentage decrease
Water	46.12%
Energy	68.60%
Carbon Dioxide	14.36%
Utility cost (including water)	55.14%
Utility cost (not including water)	-8.70%

⁸ Boiler categories and efficiencies sourced from SEDBUK national boiler efficiency database: <http://www.sedbuk.com>

9.1.2 SCENARIO 2

Low efficiency (60%) boiler: boiler upgraded (90%) and mixer shower installed on visit: This scenario explores the possibility of combining boiler upgrades with hot water efficiency retrofits. A boiler upgrade is likely to improve hot water pressure as new boilers typically provide pressurised hot water supplies through unvented/pressurised heating systems, providing enough additional pressure to allow for mixer showers.

As the energy source for hot water remains constant before and after the refurbishment (gas boiler), the impacts on energy, carbon dioxide, and energy utility costs also remain in proportion. *Boiler upgrades are likely to introduce additional utility savings due to hot water use in taps: these have not been included in the calculations.*

TABLE 9: SCENERIO 2 IMPACTS

Scenario 2: FROM 65% efficient boiler with bath. TO: 90% boiler and mixer shower fitted	
Component	Percentage decrease
Water	46.12%
Energy	65.11%
Carbon Dioxide	65.11%
Utility cost (including water)	53.95%
Utility cost (not including water)	65.11%

9.2 SCENARIOS 3 AND 4: REFURBISHMENT IN ALL SOCIAL HOUSING STOCK

9.2.1 SCENARIO 3 AND 4

Stock average (72%) boiler: on visit bath replaced with electric shower (**Scenario 3**) OR replaced with mixer shower (**Scenario 4**). Boiler efficiencies are likely to be mixed due to past upgrade work; mixer or electric may be possible under these conditions. Where an electric shower is installed, disproportionate impact on carbon dioxide and utility bills is seen, similar to scenario 1. The negative impact on energy utility bills is more pronounced, as electric shower performance is now being compared with a more efficient boiler. Where a mixer shower is installed, water, energy, carbon dioxide and utility costs of bathing are cut by approximately half.

TABLE 10: SCENARIO 3 IMPACTS

Scenario 3: FROM: 72% efficient boiler with bath. TO: 72% boiler and electric shower fitted	
Component	Percentage decrease
Water	46.12%
Energy	56.52%
Carbon Dioxide	5.13%
Utility cost (including water)	53.27%
Utility cost (not including water)	-20.40%

Potential water savings in Greater London social housing stock

TABLE 11: SCENARIO 4 IMPACTS

Scenario 4: FROM: 72% efficient boiler. TO: 72% boiler and mixer shower fitted	
Component	Percentage Decrease
Water	46.12%
Energy	61.35%
Carbon Dioxide	61.35%
Utility cost (including water)	52.03%
Utility cost (not including water)	61.35%

9.3 SCENARIO SUMMARY AND DISCUSSION

Figure 3 summarises the property level impacts of shower over bath refurbishment. An unexpected outcome is the carbon dioxide and utility impact of scenarios which include electric shower installations (Figure 3). Assuming a national average, electricity is a much more carbon dioxide intensive (more than double the carbon dioxide) and costly (more than triple the price) source of energy per kWh delivered (table 12) and therefore reduces, or in some cases negatively affects, the effect of reducing energy consumption through hot water. As these are scenarios and not projections, this trade-off should not be taken as certain, but it does represent a real risk in installations. Given that the model used does not account for losses in hot water storage tanks, it should be noted that an overlooked advantage to electric showers is that they heat only the water they use, requiring no stored heated water. This may redistribute the equations slightly in favour of electric showers, but given the large discrepancy in utility cost and carbon dioxide weighting between gas and electricity, the risk is likely to remain.

It could be argued that the fundamental objective of shower installations is to reduce household energy consumption, and that the carbon dioxide weighting of the electrical grid will reduce in the long term as government moves closer to its emissions targets through more sustainable forms of energy generation. However, the negative impact on tenants' utility bills must be treated with caution, and has in the past been cited as a reason for not installing electrical showers in social housing⁹. It is also important to note that when a water meter is present, negative impacts on utility bills are cancelled¹⁰. Most social housing is not metered at present; however there is currently a drive in the water industry to expand meter penetration and social housing may be targeted. Compulsory metering is a key focus in the business plans by all four London water suppliers.

In general, it can be concluded that in terms of water, energy, carbon dioxide and utility impacts, electric showers are a compromise under current carbon weightings for electric supply. However, they also represent a likely technology to be used in refurbishment due to their ability to operate at low pressures and independently of hot water supplies. ***Where a gas heating system is relatively new and therefore likely to be of good efficiency (70% or above) and provide sufficient water pressure, a mixer shower should always be the preferred fitting.***

TABLE 12: UNIT CARBON DIOXIDE FACTOR AND COSTS PER KWH ENERGY

Utility	CO2 factor (kg CO2/kWh) ¹¹	Price (pence/kWh) ¹²
Gas (kWh)	0.21	4.03
Electricity (kWh)	0.56	13.95

⁹ Personal correspondence: Andrew Tucker, Greater London Authority.

¹⁰ In the current stock, it is unusual for individual properties to be metered and therefore the risk to increasing utility bills remains. Under government aspirations for future metering levels of domestic properties, it is likely that social housing will see an increase in metering.

¹¹ Defra (2007) Guidelines to Defra's GHG conversion factors for company reporting

¹² Energy Saving Trust analysis of Uswitch data, valid on date of publishing

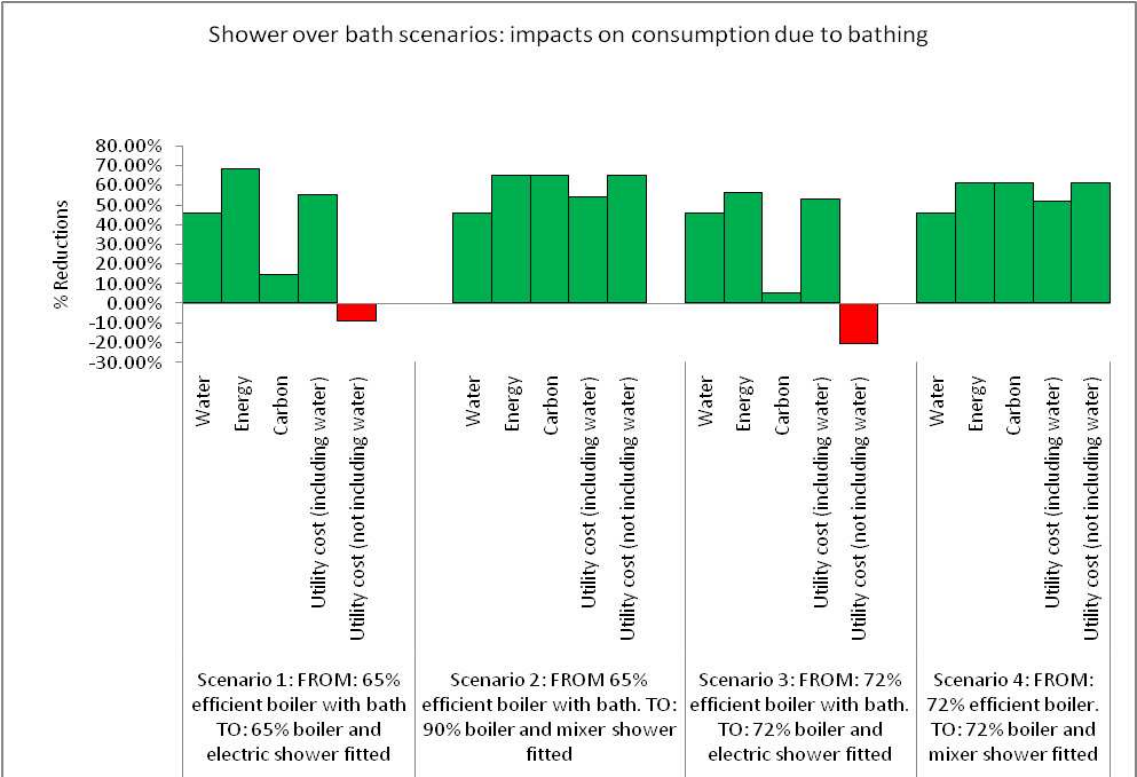


FIGURE 3: GRAPHICAL COMPARISON OF SCENARIO IMPACTS

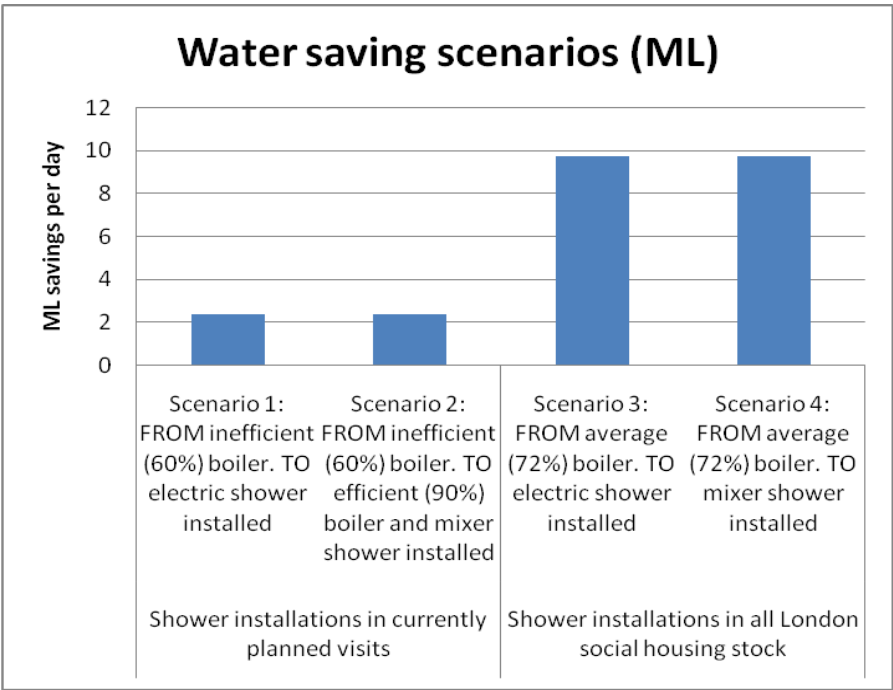


FIGURE 4: WATER SAVING SCENARIOS

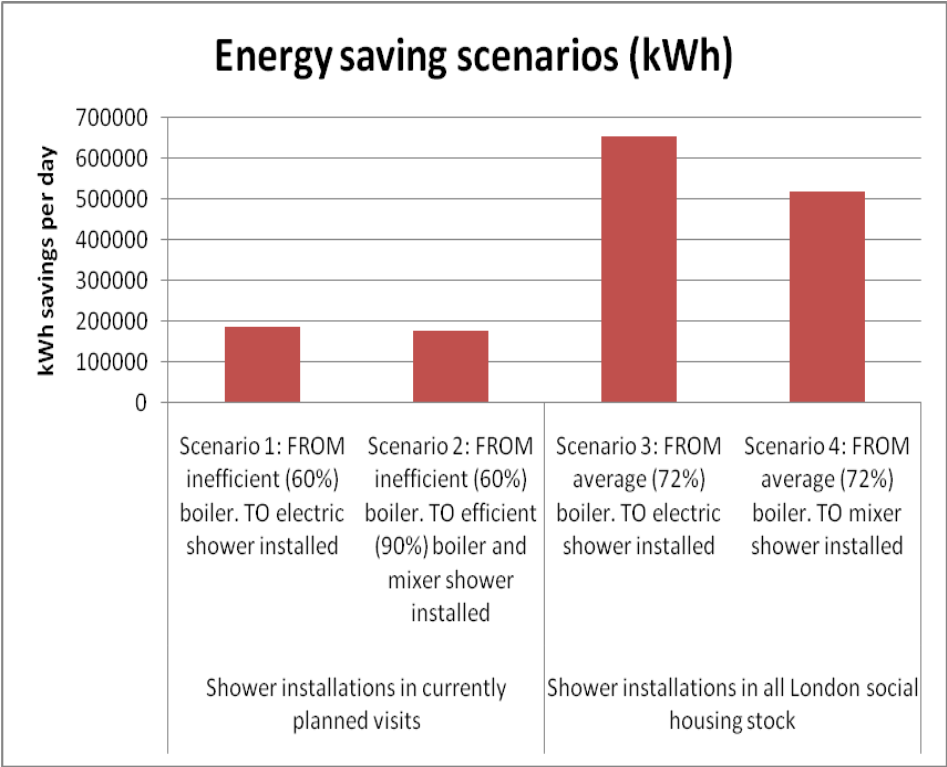


FIGURE 5: ENERGY SAVING SCENARIOS

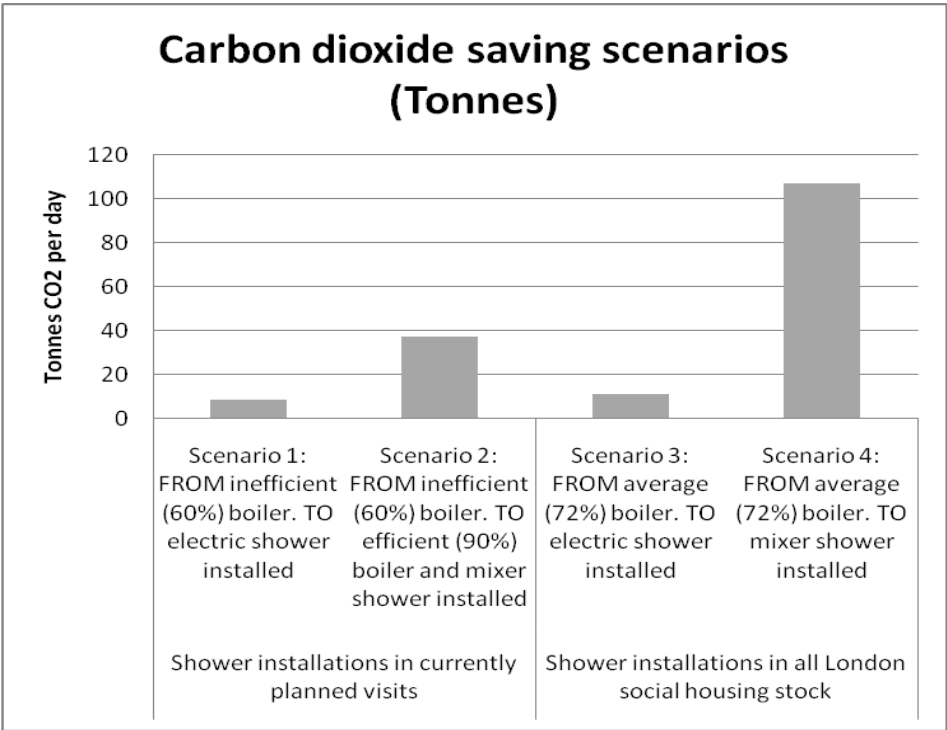


FIGURE 6: CARBON DIOXIDE SAVING SCENARIOS

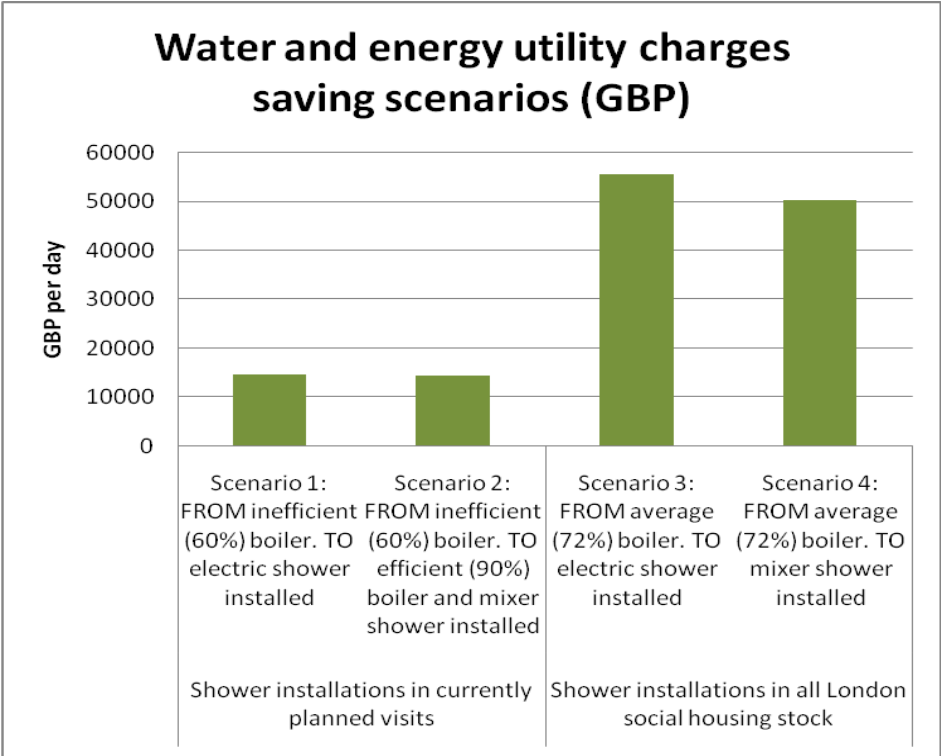


FIGURE 7: WATER AND ENERGY UTILTIY SAVING SCENARIOS

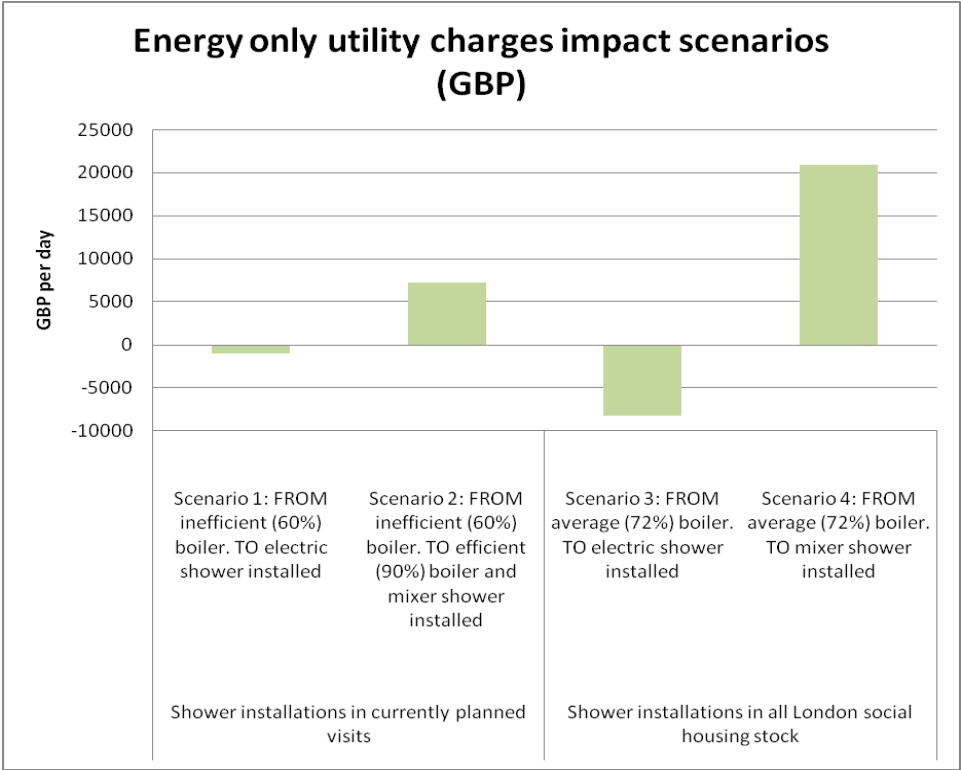


FIGURE 8: ENERGY UILITY IMPACTS ONLY

10 APPLYING PER PROPERTY SAVING SCENARIOS TO TOTAL PLANNED VISITS AND TOTAL STOCK

The projected minimum number of visits under the Decent Homes programme was calculated using the Communities and Local Government's live reporting table on London borough Business Plan statistical appendices. The tables report the target number of non - Decent Homes in each borough by year, and therefore also account for the maintenance of current stock (i.e. visits to homes which are newly defined as non standard over the projected years). The approach taken was to compare final 2013 targets with current levels and assume any drop in non-Decent Homes levels to be the minimum number of visits necessary, assuming no new properties falling below Decent Homes standards (table 13). Details of these calculations are provided in appendix 4.

It should be noted that Decent Homes visits may be due to any aspect of the home falling below standards, not exclusively bathrooms. The projections therefore assume that shower refurbishments will be offered in all visits, irrespective of what initially triggered that visit.

TABLE 13: ESTIMATED MINIMUM VISITS UNDER DECENT HOMES PROGRAMME

Borough	Minimum visits ¹³ by 2013
Ealing	3,785
Southwark	0
Havering	2,512
Lewisham	9,106
Bexley	0
Greenwich	7,359
Tower Hamlets	1,757
Hounslow	0
Bromley	0
Newham	9,629
Hammersmith and Fulham	3,316
Wandsworth	0
City of London	668
Kensington and Chelsea	749
Croydon	1,464
Richmond upon Thames	0
Harrow	2,323
Barnet	2,708
Lambeth	8,946
Sutton	2,173
Enfield	2,641
Hillingdon	23
Brent	121
Merton	1,715
Hackney	7,842

¹³ Projection based on comparison of 2013 target with current level: there is therefore an assumption made that no homes will become newly classified as non-decent in the interim years: this assumption yields a minimum expected number of visits.

Waltham Forest	5,576
Islington	8,133
Redbridge	1,281
Camden	9,694
Westminster	0
Haringey	6,189
Barking and Dagenham	7,708
Kingston upon Thames	0
Total	107,418

10.1 RESULTS

A: Table 14 represents scenarios 1 and 2 applied to all planned visits under the Decent Homes program (107, 418 visits), total savings are presented for water, energy, carbon dioxide and net utility impacts to all tenants.

TABLE 14: PROJECTED SAVINGS, PER DAY, DUE TO REVISED DECENT HOMES STANDARDS

Scenario 1: FROM: Inefficient (65%) boiler with bath. TO: inefficient (65%) boiler with electric shower	Water: Litres	2	Mega Litres
	Energy: kWh	187847	kWh
	Carbon dioxide: kg Co2	8	Tonnes Co2
	Utility costs (Water and energy): Pence	14746	£ GBP
	Utility costs (Energy only): Pence	-960	£ GBP
Scenario 2: FROM: Inefficient (65%) boiler and bath. TO: Efficient (90%) boiler with mixer shower	Water: Litres	2	Mega Litres
	Energy: kWh	178292	kWh
	Carbon dioxide: kg Co2	37	Tonnes Co2
	Utility costs (Water and energy): Pence	14428	£ GBP
	Utility costs (Energy only): Pence	7185	£ GBP
Additional measure: Replacement of high volume single flush toilet with dual flush toilet		7	Mega Litres

B: Table 15 represents scenarios 3 and 4 applied to all greater London social housing stock, total savings are presented for water, energy, carbon dioxide and net utility impacts to all tenants.

TABLE 15: PROJECTED SAVINGS, PER DAY, DUE TO COMPLEAT SOCIAL HOUSING REFURBISHMENT

Scenario 3: FROM: Average (72%) boiler with bath. TO average	Water	10	Mega Litres
	Energy	653467	kWh
	Carbon dioxide	11	Tonnes Co2

(72%) boiler with electric showers	Utility costs (Water and energy)	55420	£ GBP
	Utility costs (Energy only)	-8239	£ GBP
Scenario 4: FROM average (72%) boilers with bath. TO average (72%) boiler with mixer shower	Water	10	Mega Litres
	Energy	517931	kWh
	Carbon dioxide	107	Tonnes Co2
	Utility costs (Water and energy)	50230	£ GBP
	Utility costs (Energy only)	20873	£ GBP

11 DELIVERY OPTIONS

11.1 CURRENT LEVEL OF ACTIVITY AND AWARENESS OF WATER EFFICIENCY

Given the limited response rate from surveys, it is difficult to comment on the current level of retro-fit and refurbishment activity which includes water using appliances: Decent Homes visits apply to other standards in the home beyond water using appliances. The limited response rate suggests that data on water fittings housing stock is currently not being stored and managed in standardised and accessible manner. In some cases, respondents stated that such data would require data collection. Where refurbishment and retrofit was reported, it was attributed to the Decent Homes program, and therefore likely to be standard fittings. Dual flush toilets were most commonly cited as a water efficient device being installed in homes (four respondents), followed by taps with aerated heads or controlled fittings (three respondents).

When asked what type of support would encourage the uptake of efficient appliances in retrofits, the two key factors respondents emphasised were funding and support in developing specifications for standards in fittings. One respondent also suggested that efficiency retrofits could be self-funded through the savings incurred due to lower water rates.

Providing basic advice on water efficient fittings could be a potentially low cost, high impact measure, allowing standards to be integrated into all procurement requirements. This would not address the issue of showers not being installed in some properties, but would improve the performance of taps, baths, and toilets being refurbished. Of those who did respond, there was a strong willingness to work with a third party in developing water efficiency standards.

The suggestions of an interest-free loan system which is repaid through savings to the council due to lowered water rates is also feasible, however the level of metering in each property would have to be confirmed, as many are likely to meter at a building scale only.

12 APPENDIX 1: SOCIAL HOUSING AUTHORITIES CONTACTED AND RESPONSE RATES

TABLE 16: SOCIAL HOUSING AUTHORITIES AND ALMOs CONTACTED

Arms Length Management Organisations			
ALMO	Enquiry instance	Survey sent	Survey response received?
Ascham Homes (Waltham Forest ALMO)	1.	04/02/2009	No response
	2.	04/02/2009	
	3.	05/02/2009	
Barnet Homes	1.	28/01/2009	Received 19/02/09
	2.	n/a	
	3.	via Pam Wharfe	
		via Chris/Pam	
Brent Housing Partnership	1.	n/a	Received basic data 16th Feb (remaining data to follow)
	2.	n/a	
	3.	n/a	
	4.	28/01/2009	
CityWest Homes (Westminster CC ALMO)	1.	28/01/2009	Received 13/02/09
	2.	10/02/2009	
	3.	n/a	
	4.	n/a	
Ealing Homes (same as Ealing Council)	1.	28/01/2009	No response
	2.	n/a	
	3.	n/a	
	4.	29/01/2009	
Hackney Homes	1.	28/01/2009	Received 18/02/09
	2.	03/02/2009	
Hammersmith & Fulham Housing Management Services	1.	28/01/2009	No response
	2.	10/02/2009	
Homes for Haringey	1.	28/01/2009	No response
	2.	n/a	
	3.	n/a	
	4.	n/a	
	5.	via Les/Kevin	
Homes in Havering	1.	28/01/2009	No survey, but,

	2.	11/02/2009	stock is typically late 1970s/early 1980s. Refurbishment includes toilets and often the option of a shower for those with baths. Refurb cycles of about 15 years are common. Stock is very mixed due to ad-hoc refurb programs
Hillingdon Homes	1.	28/01/2009	No response
Hounslow Homes	1.	28/01/2009	Received 11/02/09
	2.	n/a	
Homes for Islington	1.	28/01/2009	Received 18/02/09
	2.	03/02/2009	
Kensington & Chelsea TMO	1.	28/01/2009	No response
	2.	n/a	
	3.	10/02/2009	
Lambeth Living	1.	n/a	Received
	2.	n/a	
	3.	28/01/2009	
	4.		
Lewisham Homes	1.	28/01/2009	Received 13/02/09
	2.	09/02/2009	
	3.	n/a	
	4.	n/a	
	5.	n/a	
	6.	n/a	
Newham Homes	1.	28/01/2009	Received
	2.	n/a	
	3.	28/01/2009	
	4.	n/a	
Sutton Housing Partnership	1.	28/01/2009	Received 17/02/09
	2.	n/a	
	3.	n/a	
Tower Hamlets Homes	1.	n/a	Only partly completed 04/02/2009
	2.	04/02/2009	
	3.	05/02/2009	

Organisation	G15 members		
	Enquiry instance	Survey sent?	Survey response received?
Family Mosaic	1.	28/01/2009	No response
Peabody Trust	1.	28/01/2009	Received
Organisation	Survey sent?		Survey response received?
SHIFT members	1.		No response
London Councils Housing Directors' Group and PAs			
Borough	Enquiry instance	Survey sent?	Survey response received?
Barking & Dagenham	1.	28/01/2009	No response
	2.		
Camden	1.	28/01/2009	Received 03
	2.	n/a	
City of London	1.	n/a	
	2.	n/a	
	3.	04/02/2009	
	4.	n/a	
	5.	n/a	No response
Croydon	1.	28/01/2009	No response
	2.	04/02/2009	
	3.	04/02/2009	
Greenwich	1.	04/02/2009	Received 23/02/09
	2.	04/02/2009	
Hammersmith & Fulham	1.	28/01/2009	No response
	2.	n/a	
Harrow	1.	28/01/2009	No response
	2.	05/02/2009	
Kingston	1.	11/02/2009	Received 17/02/09
	2.	28/01/2009	
Merton	1.	28/01/2009	No response
Richmond	1.	28/01/2009	No response

	2.	11/02/2009	
Southwark	1.	28/01/2009	RECEIVED
	2.	11/02/2009	
Councils unable to help			
Council	Enquiry instance	Survey Sent?	Survey received?
Bexley	1.	28/01/2009	N/a
Bromley	1.	No stock	N/a
Enfield	1.	28/01/2009	
Redbridge Homes	1.	n/a	N/a
	2.	28/01/2009	
	3.	n/a	
Redbridge	1.	see Redbridge ALMO	N/a
Wandsworth	1.	n/a	N/a
	2.	28/01/2009	N/A

13 APPENDIX 2: QUALITATIVE DATA FROM SURVEY RESPONDENTS

Q: Do you have any future plans to refurbish/retrofit with water-using items? If yes, what water-using items will be included?

TABLE 17: REPORTED PLANNED WATER USING FITTING REFURBISHMENTS

Number		
1.	Barnet	"No"
2.	Brent	NO RESPONSE
3.	Camden	NO RESPONSE
4.	City west Homes	"No"
5.	Greenwich council	"None at present"
6.	Hackney Council	"We would like to develop a strategy with assistance from water authorities and other organisations."
7.	Hounslow Homes	"Approx 250 units per annum are receiving Kitchen and Bathroom refurbishments on a programmed basis. Some adhoc replacement of WC/Bath / Showers/sinks"
8.	Islington Homes	"Kitchen and bathroom equipment"
9.	Kingston Homes	"No - Budgetary situation does not allow for this."
10.	Lambeth Council	"Yes. New bathrooms and kitchens - sinks, showers, baths and WCs"
11.	Lewisham Homes	"YES, 50% of properties to be included in planned works in next 7 years"

		(depending on £145m bid for government funding)."
12.	Newham	NO RESPONSE
13.	Peabody	"We are refurbishing with water-using items through our DECENT programme (kitchens, bathrooms) e.g. taps, sinks, baths etc"
14.	Sutton Housing Partnership	"Yes. Decent Homes programme commencing 2009. Will include renewal of kitchens and bathrooms together with heating and hot water installations."
15.	Southwark	"unknown"

Q: Do you have any future plans to refurbish/retrofit with water efficient items?

TABLE 18: REPORTED WATER EFFICIENCY STANDARDS IN REFURBISHMENTS

Number		
1.	Barnet	"2070 on the Decent Homes programme"
2.	Brent	NO RESPONSE
3.	Camden	"...where we are replacing or repairing taps they are fitted with aerating valves which minimise water flow, where wc cisterns or baths are to be renewed they are replaced with lower volume/twin flush units."
4.	City west Homes	"No"
5.	Greenwich council	"None at present"
6.	Hackney Council	"Yes. But we need develop this further"
7.	Hounslow Homes	"none"
8.	Islington Homes	"Yes - we use water efficient dual flush WCs as a matter of course."
9.	Kingston Homes	"N/A"
10.	Lambeth Council	"Regarding future Decent Homes contracts from 2010 - Dual flush toilet - 4/6 litre capacity / Spray or flow taps to basin and sink / Thermostatic overbath shower - max 3 litres/minute"
11.	Lewisham Homes	"No"
12.	Newham	NO RESPONSE
13.	Peabody	"Early in the new financial year (2009/10) we will be working on a Peabody Materials Specification that will standardise materials across the business. Products will be evaluated for their water efficiency e.g. bath size, tap flow rates etc."
14.	Sutton Housing Partnership	"All baths will have shower mixers provided. WC cisterns will meet modern standards in terms of water usage."
15.	Southwark	"Unknown liase with Decent Homes Contractors. Appollo are one of the Contractors used, they may be able to help"

Q: What kind of support, and from whom, would encourage you to include water efficient items in your refurbishment/retrofitting programs?

TABLE 19: REPORTED PREFERRED SUPPORT FOR ECNOURAGING WATER EFFICIENCY IN STOCK

Number		
1.	Barnet	"N/A"
2.	Brent	NO RESPONSE
3.	Camden	NO RESPONSE
4.	City west Homes	"N/A"

5.	Greenwich council	"Additional Grant funding without the need to match fund from the government. Or the ability to enter a partnership on an interest free loan basis. Where amounts saved as a result of using this new technology could be ploughed back into a fund to payback the original loan."
6.	Hackney Council	"Water authority, constructors, supplies chain, other organisations, resident and contractor liaison officers."
7.	Hounslow Homes	"Evaluation of current products been used in refurbishment with regards water efficient."
8.	Islington Homes	"Financial support of some kind would be helpful"
9.	Kingston Homes	Grant funding
10.	Lambeth Council	"We already promote water saving as part of our sustainable construction policy commitments"
11.	Lewisham Homes	"Grant Aid"
12.	Newham	NO RESPONSE
13.	Peabody	"Financial support for water efficient showers would be welcome. Financial support would have to meet the total works costs of installing a shower over a bath (including tiling etc)."
14.	Sutton Housing Partnership	"Best practice advice will be welcome from whichever source."
15.	Southwark	"Unknown - Statagic Services to be contacted"

Q: Would your organisation be interested in working with other organisations (eg. water companies, NGOs or government departments) in future refurbishment/retrofitting programs that would include water efficient items?

TABLE 20: REPORTED WILLINGNESS TO WORK WITH THIRD PARTIES TO DELIVER EFFICIENCY

Number		
1.	Barnet	Water efficient funds
2.	Brent	NO RESPONSE
3.	Camden	NO RESPONSE
4.	City west Homes	"Yes"
5.	Greenwich council	"Yes"
6.	Hackney Council	"Yes"
7.	Hounslow Homes	"Yes"
8.	Islington Homes	"Yes"
9.	Kingston Homes	"Yes"
10.	Lambeth Council	"The borough always welcomes practical support for best practice but it is unclear what might be offered here"
11.	Lewisham Homes	"Yes"
12.	Newham	NO RESPONSE
13.	Peabody	"Yes - we would be happy to talk to anyone that could provide water efficiency advice or services"
14.	Sutton Housing Partnership	"Yes"
15.	Southwark	"Yes : I would suggest a presentation be given to Strategic Services &

Contractors to advise what is available prior to contracts going out for Tender”

14 APPENDIX 3: PER LITRE ENERGY, CARBON DIOXIDE, AND UTILITY COST CALCULATIONS

Figure 4 outlines the steps taken in calculating the energy, carbon dioxide, and utility costs associated with one litre of hot water consumed in social housing.

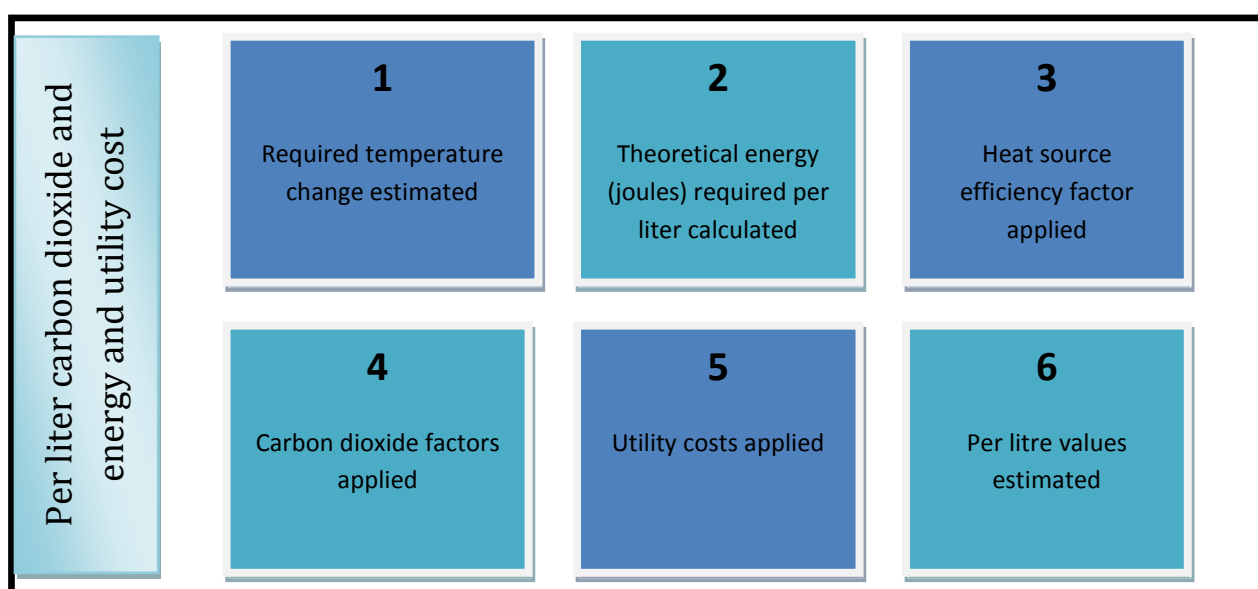


FIGURE 9: STEPS IN CALCULATING ENERGY, CARBON DIOXIDE, AND UTILITY COSTS OF HOT WATER

14.1 1. ESTIMATED TEMPERATURE CHANGE

To calculate the theoretical amount of energy required to heat water, assumptions concerning the temperature of water entering the home, leaving the boiler, and what temperature people typically use for showers and baths have been made (Table 21).

TABLE 21: WATER TEMPERATURE ASSUMPTIONS

Component	Value	Source
The temperature of cold water when it enters your home (Tc)	15C	Energy Saving Trust: Hot water study : to be published
The temperature an average boiler heats and delivers water at (Th)	51.9C	Energy Saving Trust: Hot water study : mean average of figures for combi-boilers (49.5C) and regular boilers (52.9C)
The temperature people typically choose for taps and showering (Ts)	41C	Chartered institute of plumbers and heating engineers recommendation
The temperature people typically choose for baths (Tb)	44C	Chartered institute of plumbers and heating engineers recommendation

14.2 2. THEORETICAL ENERGY CONSUMPTION

A basic energy equation which takes into account the type of material being heated, how much of it is being heated, and by how much it is being heated is used. The equation is given below (Equation 1)

1.1.2 EQUATION 1

$$\Delta Q = MC_p \Delta T$$

Where:

ΔQ = Heat energy required

M = mass to be heated

C_p = Specific heat capacity of water

ΔT = Temperature rise required

14.3 3 HEAT SOURCE EFFICIENCY FACTORS

Because the calculation for the amount of energy needed to heat water is theoretical, it doesn't take into account that boilers aren't 100% efficient. The type of heat source will affect how efficient the process is, and how much carbon dioxide is used. Currently, the most common form of hot water heating is gas, followed by electricity.

The heating efficiencies are added to the energy value through the following:

1.1.1 EQUATION 2: TOTAL ENERGY REQUIRED (JOULES) = (THEORETICAL ENERGY REQUIRED) / (%)

TABLE 22: HEATING EFFICIENCIES OF CURRENT STOCK¹⁴

Energy Source	%age of UK currently using this heating fuel to heat their water	CERT heating efficiencies (predicted stock average for 2010)
Gas	81%	72%
Oil	3%	80%
Electric	14%	100%
LPG	1%	72%
Solid	2%	55%

14.4 4. CARBON DIOXIDE FACTORS

Once the range of possible energy consumption has been calculated for hot water use, a carbon dioxide value is calculated. This is derived through applying a carbon dioxide weighting for a given energy source (table 23).

Note: While there exists a small amount of "embedded carbon" in cold water, due to the energy required to treat, deliver and transport water and waste water, this amount is negligible

¹⁴ Government boiler efficiency database (Sedbuk), available at <http://www.sedbuk.com/>, accessed 14/05/09

compared to the amount of energy required to heat water in the home and is therefore not included in this analysis.

TABLE 23: CARBON DIOXIDE WEIGHTING FACTORS FOR VARIOUS ENERGY SOURCES

Energy Source	CO2 factor (kg CO2/kWh) ¹⁵
Gas	0.21
Oil	0.26
Electric	0.56
LPG	0.23
Solid	0.31
UK average	0.26

14.5 5. UTILITY COSTS

After calculating the amount of water and energy saved, national average figures for water, gas, and electricity costs can be applied. *It should be noted that all utility tariffs are highly variable and that national averages should be considered indicative only.*

TABLE 24: AVERAGE UNIT PRICE OF UTILITIES

Utility	Price (pence/unit)
Water (litres)	0.3
Gas (kWh)	4.03
Electricity (kWh)	13.95

14.5.1

14.5.2 WATER TARIFFS

Only 30% of domestic customers in England and Wales pay for their water through a meter. The rest of customers will pay for water on a flat rate, and so will not save on their water bills if they decrease their consumption. For those that do have a meter, the cost of water is extremely variable across the country. We have assumed an average figure of 0.3 pence per litre for water and sewerage charges. It should be noted that water companies review and update their water tariffs every five years, and so the price of water will change in the future.

14.5.3 ENERGY TARIFFS

Energy tariffs are also extremely varied in unit cost and in structure. It is highly likely that the energy bills are not calculated on a simple per-unit basis, but will involve a certain tariff structure (similar to mobile phone tariffs). In order to give some indication of money saved, we have used simpler per kWh prices; 4.03 pence per kWh for gas, and 13.95 per kWh for electricity. These figures are average values provided by U-Switch and take the energy price rises of autumn 2008 into account. Energy prices are subject to change even more frequently than water, and caution should be taken when using average figures.

¹⁵ Defra (2007) Guidelines to Defra's GHG conversion factors for company reporting

15 APPENDIX 3: FULL LOOK-UP TABLE OF SAVING SCENARIOS

TABLE 25: CO2 IMPACTS LOOKUP TABLES (PER PROPERTY, PER DAY)

Carbon dioxide scenarios: Kg Co2 per day							
			Baths				
			% boiler efficiencies		65	72	90
					0.7503	0.6774	0.5419
Showers (mixer)	65	0.3625	0.3878	-	-	-	
	72	0.3272	0.4231	0.3501	-	-	
	90	0.2618	0.4885	0.4156	0.2801	-	
Showers (electric)	100	0.6426	0.1077	0.0348	-0.1007	-	

TABLE 26: ENERGY IMPACTS LOOKUP TABLES (PER PROPERTY, PER DAY)

Energy scenarios: kWh per day						
				Baths		
				65	72	90
				3.6423	3.2882	2.6305
Showers (mixer)	65	1.7596	1.8827	-	-	-
	72	1.5885	2.0538	1.6997	-	-
	90	1.2708	2.3715	2.0174	1.3597	-
Showers (electric)	100	1.1437	2.4986	2.1444	1.4868	-

TABLE 27: COST IMPACTS (NO WATER METER) LOOKUP TABLE (PER PROPERTY, PER DAY)

Cost scenarios: pence per day (no water meter)						
			Baths			
	% boiler efficiencies		65	72	90	
Showers (mixer)			14.6784	13.2513	10.6011	
	65	7.0911	7.5873	-	-	
	72	6.4017	8.2767	6.8497	-	
	90	5.1213	9.5571	8.1300	5.4797	
	100	15.9549	-1.2765	-2.7036	-5.3539	
Showers (electric)						

TABLE 28: COST IMPACTS (WATER METER PRESENT) LOOKUP TABLES (PER PROPERTY, PER DAY)

Cost scenarios: pence per day (water meter)								
			Baths					
			65		72		90	
			35.5689		34.1418		31.4916	
			17.2212		-		-	
			17.9106		16.4836		-	
			19.1910		17.7639		15.1136	
			19.6140		18.1869		15.5366	

16 APPENDIX 4: GLA REPORTING TABLE ON DECENT HOMES TARGETS

TABLE 29: PROJECTED VISITS UNDER DECENT HOMES PROGRAM¹⁶

Borough	Number of non-decent dwellings(as at 1st April)	Target number of non-Decent Homes for the next five years					Projected number of retrofits ¹⁷
	01/04/2008	2009	2010	2011	2012	2013	
Ealing	3,785	3,984	2,935	1,991	1,087	0	3,785
Southwark	18,320	18,365	17,998	19,329	18,216	18,710	0
Havering	2,982	4,073	3,467	2,336	1,176	470	2,512
Lewisham	9,870	8,220	7,294	4,455	2,545	764	9,106
Bexley	LSVT	LSVT	LSVT	LSVT	LSVT	LSVT	0
Greenwich	7,359	5,247	2,907	0	0	0	7,359
Tower Hamlets	6,859	6,482	6,075	5,742	5,462	5,102	1,757
Hounslow	0	0	0	0	0	0	0
Bromley	LSVT	LSVT	LSVT	LSVT	LSVT	LSVT	0
Newham	9,629	6,850	3,450	530	0	0	9,629
Hammersmith and Fulham	3,316	2,402	1,033	0	0	0	3,316
Wandsworth	0	0	0	0	0	0	0
City of London	668	400	376	0	0	0	668
Kensington and Chelsea	1,354	750	695	665	635	605	749
Croydon	1,464	1,120	560	0	0	0	1,464
Richmond upon Thames	LSVT	LSVT	LSVT	LSVT	LSVT	LSVT	0
Harrow	2,323	0	0	0	0	0	2,323
Barnet	2,708	1,100	786	0	0	0	2,708
Lambeth	8,951	26	21	16	10	5	8,946
Sutton	2,768	2,282	2,357	1,799	1,174	595	2,173
Enfield	2,641	1,936	1,495	945	396	0	2,641
Hillingdon	23	0	0	0	0	0	23

¹⁶ Data from: Business Plan Statistical Appendix (BPSA) –Returns for 2007/2008, available at <http://www.communities.gov.uk/documents/housing/xls/bpsa08london.xls>, accessed 14/05/08

¹⁷ Projection based on comparison of 2013 target with current level: there is therefore an assumption made that no homes will become newly classified as non-decent in the interim years: this assumption yields a minimum expected number of visits.

Brent	121	0	0	0	0	0	121
Merton	4,002	3,684	4,192	4,065	3,494	2,287	1,715
Hackney	7,842	7,439	6,884	6,279	3,279	0	7,842
Waltham Forest	5,576	4,057	2,644	1,238	0	0	5,576
Islington	9,633	6,406	1,266	1,500	1,500	1,500	8,133
Redbridge	1,281	1,269	893	517	235	0	1,281
Camden	10,874	9,284	8,488	7,224	2,975	1,180	9,694
Westminster	0	0	0	0	0	0	0
Haringey	6,758	6,137	5,051	3,622	2,052	569	6,189
Barking and Dagenham	7,708	4,750	2,516	0	0	0	7,708
Kingston upon Thames	1,323	1,521	1,750	2,012	2,314	2,661	0

17 APPENDIX 5: SURVEY SHEETS

17.1 PAGE 1

Social Housing **Stock-take Survey**



Survey aim

To undertake a stock-take of water efficient devices currently in London's social housing to identify opportunities for large scale water savings by retrofitting/refurbishment of water efficient products.

1. Contact details	
Name:	
Title:	
Housing Association/Local Authority:	
Address:	
Phone:	

Email:	-
Water Company area:	

If information is not known for any of the following questions, please state 'not known'

2. Social housing property data				
A. <u>Households in Greater London</u> How many social housing households are within your organisation?	-			
B. <u>Housing type</u> What proportion (number or %) of these social housing properties are: a) flats/apartments b) semi-detached houses c) detached houses d) terraced houses e) sheltered housing f) other (please state)	-			
C. <u>Concentrations of social housing</u> Please name the top ten largest concentrations of social housing within your organisation (eg. flats, housing estates).	Property/Estate name	Postcode	Number of households within estate	Last retrofit/renewal date for water-using items

Potential water savings in Greater London social housing stock

<p>Please provide the postcode and the number of households within the estate (this will help determine water company meter coverage)</p> <p>Where possible, please provide the last retrofit/renewal date for water-using items (eg. when the bathroom, kitchen was last updated)</p> <p><i>This will help us to identify potential areas for priority bulk retrofitting, and to develop assumptions on water use item numbers and total stock details.</i></p>			
<p>D. Outdoor/Communal spaces</p> <p>What proportion (number or %) of social housing properties within your organisation have:</p> <ul style="list-style-type: none"> a) private gardens b) communal gardens c) communal laundries 			

3. Social housing refurbishment				
A. <u>Refurbishment details</u>	Property/Estate name	Postcode	Number of households within the estate	Date of refurbishment or retrofit
For the largest social housing properties refurbished/retrofitted within your organisation, please provide the property/estate				

<p><i>name, postcode, the number of households within the estate and the refurbishment/retrofit date</i></p>				
<p><u>B. Water-using items in social housing properties</u></p> <p>Please complete the 'Water-using items in social housing properties' section on Survey - sheet 2</p>				
<p><u>C. Education material</u></p> <p>Were any of the refurbishment/retrofit programs accompanied by a communications campaign? If so, please state what type of campaign (eg. water saving, energy saving)</p>				

4. Water meters and charging	
<p>What proportion (number or %) of social housing properties in your organisation are metered?</p>	
<p>What proportion (number or %) of meters are located:</p>	

a) inside the property	
b) outside the property	
Are water charges generally paid for by your organisation or passed onto tenants?	

5. Future plans for refurbishment/retrofitting	
<p>a) do you have any future plans to refurbish/retrofit with water-using items? If yes, what water-using items will be included?</p> <p>b) please describe your procurement process (eg. how the items are chosen and where from)</p> <p>c) how many homes do you intend to refurbish/retrofit over the next 2 years?</p> <p>d) do you have any future plans to refurbish/retrofit with water efficient items?</p> <p>e) what water efficient items would you like to include which are currently not part of your scheme and why have you not included these?</p> <p>f) what kind of support, and from whom, would encourage you to include water efficient items in your refurbishment/retrofitting programs?</p>	

g) would your organisation be interested in working with other organisations (eg. water companies, NGOs or government departments) in future refurbishment/retrofitting programs that would include water efficient items?	
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6. Other information	
Please provide any other information you may have which could be beneficial to this survey	

17.2 PAGE 2

If information is not known for any of the following questions, please state 'not known'

Water using items in social housing properties			
1. Number of each item in your organisation's homes (eg. total items, one per house) Please advise the <i>number of, approximate date for the installation</i> and <i>a brief product description</i> for the following water using items in your social housing properties: a) showers b) bath c) toilets d) toilet cistern displacement device e) washing machine f) dishwasher	Number of each item installed by your organisation	Approximate date the item was installed	Product description (please see notes) <i>Please indicate if water efficient</i>

<p>g) kitchen taps</p> <p>h) bathroom taps</p> <p>i) other (please provide details)</p> <p><u>Note</u> <i>Please refer to Sheet 3 'Help on water efficiency' for further information</i></p>	
<p><u>2. Properties refurbished with water efficient items</u></p> <p>What proportion (number or %) of social housing properties have been retrofitted or refurbished with water efficient items?</p>	
<p><u>3. Shower data</u></p> <p>What proportion (number or %) of social housing properties within your organisation only have baths and not showers?</p>	
<p><u>3. Rainwater harvesting</u></p> <p>Do any of your social housing properties have rainwater harvesting or water butts?</p> <p>If so, please advise the property/estate names and postcodes</p>	
<p><u>4. Introduction of water efficient devices</u></p> <p>What proportion (number or %) of water efficient devices were introduced to social housing properties through:</p> <p>a) building-wide renovations</p> <p>b) subsidy programs</p> <p>c) voluntary installations</p> <p>d) other (please state)</p>	
<p><u>5. Expenditure on water efficiency</u></p> <p>If you are happy to provide, please indicate expenditure details for water efficient items installed by your organisation, including:</p> <p>a) the total cost to date</p>	

<p>b) where the items were purchased from and the approximate date of purchase</p>	<p>< item 1 - name and purchase date></p> <p>< item 2 - name and purchase date></p> <p>< item 3 - name and purchase date></p> <p>< item 4 - name and purchase date></p> <p>< item 5 - name and purchase date></p>
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17.3 PAGE 3

Water efficiency information which may help with the survey

1. Definition of Water Efficiency	
An indicator of the relationship between the amount of water required for a particular purpose and the amount of water used or delivered	
2. Typical water efficient devices which may be found/installed in social housing properties	Explanation of device and water savings
WC cistern displacement devices in toilets	This device is installed in WC cisterns in order to reduce flush volume. The amount of water saved each flush is a function of the size of the displacement device. used. A 'hippo' or 'hog' placed in the cistern can retain 2.5 to 3.5 litres on each flush. The WC cistern displacement device is best suited to older WC suites which have flush volumes in excess of 9 litres (i.e installed before 1989). The device is relatively inexpensive and straightforward to install.
Low-flush toilets	Replacing existing 9 litre flush volume toilets with a new low flush or dual flush toilet with a flush volume of 4.5 litres.
Water efficient showerheads	Water efficient showerheads restrict the rate of flow to 9 litres/minutes or less, with no noticeable difference in performance. Flow regulators can also be fitted to showerheads to reduce water consumption.
Spray taps	These taps can replace conventional full bore taps and provide the ability to wash hands under running water at lower flow rates.

Tap flow restrictors and aerators	Installing flow restrictors and aerators can save 3% of the households water use. These can be installed in bathroom and kitchen taps. Aerators can be retrofitted to existing taps, reduced-flow taps or spray-mixer taps.
Low volume baths	Replacing existing baths with a shorter and/or shallower bath will save around 11 litres per bath.
Water efficient dishwashers	Water efficient dishwashers can reduce water consumption from 25 litres per load to 14 litres per load. Dishwashers with a consumption of less than 1.08 litres per place setting are considered water efficient.
Water efficient washing machines	Water efficient washing machines can reduce water consumption from 80 litres per load to 43 litres per load. Washing machines with a consumption of less than 7.5 litres per kilogram are considered water efficient.
Rainwater harvesting systems (including tanks and water butts)	Rainwater can be collected in water butts, tanks (often located in the roof space) and in larger underground storage tanks. The water can be recycled for all domestic purposes. Water butts collecting from the roof require a connection to the existing rainwater downpipe, typically incorporating a filter. The water butt can store around 80 litres of water for use for garden irrigation.
Time monitoring switches on water supply	Switches off the bathroom water supply to ensure that flooding doesn't occur if a resident forgets to switch the taps off.

Further information is available at
www.sustainablehomes.co.uk/upload/publication/Good%20Practice%20Guide%20-%20Refurbishments.pdf