

Water Efficiency in Buildings Network

University of Brighton



Water Efficiency in Buildings Network

Meeting: G07, Chadwick Building, University College London



Date: 22 September 2011

Members Meeting Report

Attendees

- Dr Jon Burton, Social and Economic Research
- Dr Nick Gant, Community integration/ Architecture
- Dr Sarah Bell, Engineering, technology and society
- Prof Sue Roaf, Sustainability of Buildings
- Dr Stephen Coupe, Sustainable/ Integrated systems
- Prof Andrew Miller, Sustainability of the Built Environment
- Joanne Zygmunt, Waterwise
- Dr Poorang Piroozfar, Architecture and Building Technologies
- Dr Abdullahi Ahmed, Building Services
- Dr Charles Russell, Carbon Management and Climate change
- Dr Heather Smith, Water Governance
- Dr Kemi Adeyeye, Architecture and Building Technologies
- Siraj Tahir, UCL
- Ike Omambala, Waterwise

Apologies

- Dr Luiza Campos, Environmental Engineering
- Dr Jonathan Chenoweth, Environmental Strategy and Policy
- Dr James Ebdon, Water quality/microbial risk assessment
- Dr Huw Taylor, Environment and Public Health
- Prof Paul Jeffrey, Water Science and Management
- Prof Adrian McDonald, Water and new developments
- Prof David Butler, Water Systems
- Dr Graham Winstanley, Computational Intelligence
- Prof Andrea Schäfer, Environmental Engineering
- Dr Fayyaz Ali Memon, Water Demand Management
- Dr Sue Charlesworth, Sustainable/ Integrated systems

Administrator: Jean Balnave

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Main Report

The network's focus in its first year is particularly on existing homes where it is generally accepted that the implementation of technology and associated behaviour change is more challenging. The network was divided into two main themes (i) Community and Users (ii) Building and Technology to address these issues.

Theme 1: Community and Users

Meeting chair: [Jon Burton](#)

Members and guests: Jon Burton, Sue Roaf, Joanne Zygmunt, Nick Gant, Heather Smith, and Kemi Adeyeye

The scope of this theme was to discuss creating a community of interest: User behaviour and choice; User responsibility; Promoting change, trust and fairness through policy.

Discussion points to cover: How to increase awareness in water users – information and knowledge sharing; Co-creation of value for the water user (i) is there value in creating a community action for change? (ii) exploring the concept of water as a local commodity (iii) linking it with the Localism Bill and the neighbourhood plan; Methodology to assess water efficiency in homes (the people factor).

To deliver: Summary of discussion; further questions and specific policy recommendations.

General

This theme was tasked with exploring water efficiency at the community, household and individual user level. Deliberations built on issues identified at the previous meeting, focussing on localised responsibility. In the current climate, resilience is increasingly an important issue. Individual households and communities increasingly feel the need for resource, economic and social resilience in response to current and future economic and environmental challenges. 'Resilience' was therefore considered more beneficial for the purposes of water efficiency in buildings, rather than 'Sustainability' as a generic term. The main outcome from this session is that, to present and increase user buy-in for water efficiency in buildings:

- The message has to be relevant to be effective. Individual, household and community resilience is a good way to present and target solutions.
- It must be the right message, given by the right person taking into account the individual needs of the individual, and the community.

Specific

The specific outcomes of the deliberations in this theme are further enumerated.

1. Community resilience

Community resilience as a theme is important for encouraging community involvement and for bringing water efficiency to the fore-front of local issues. Resilience is about local issues and strong people build strong communities.

This network generally agrees that water is a local resource and the social dynamics of water needs to be explored and implemented at the local scale to increase involvement and buy-in. This also

supports the premise that generic, broad-brush water efficiency solutions are likely to be less effective than targeted solutions.

Increasing community resilience also impacts on behaviour and social nuances. It provides a logical basis for implementing community wide schemes.

The following recommendations were made to promote water efficiency as an integrated resource management agenda in order to achieve and promote resilience at the local and community level. It is recommended that:

- Water (as well as carbon etc) audits at a community or neighbourhood scale should be carried out as part of the Neighbourhood Plan process. It can be conducted by or coordinated by local government, boroughs and parish councils. Residents and households should be involved in the audits and in proposing measures, strategies and solutions to benefit everyone. Involvement will also increase buy-in to the solutions proposed.
- Individuals, neighbourhoods and communities should be encouraged to future-proof themselves against future costs, risks that may arise as a result of water, and other resource shortages e.g. energy, food etc. They should therefore be empowered/ encouraged to make the change by supporting their bid towards resilience (in any form) e.g. through responsive/flexible tariffs, which will in turn serve as an incentive to join in or make further savings.
- Consider the whole life system; socially, environmentally and explore how water fits into this spectrum from the perspective of the water user.
- On resilience, learn about local resources from local sources. They are better at identifying human, natural, physical resources that can be used to meet local/communal needs e.g. a local community should be able to use local wells to keep cricket pitch watered. Or collects rainwater from the community centre to service public toilets etc.
- Consider using the lessons learnt from case studies of small resilient coherent communities to scale up to assist less defined communities mostly in urban areas.
- Focus on the people who are willing to make the changes and empower them to make those changes.

Constraints to promoting water efficiency at the community level:

- Creating strong communities of interest is a high resource activity.
- There may be many smaller communities within larger urban areas.
- There are different social expectations within families and communities that need to be understood.
- Community spirit that often develops during risk events such as droughts, floods can be difficult to promote if there are no immediate threats.
- Getting the balance right regarding efficiency and community spirit is important. There may be concerns about privacy, and other local action issues, e.g. 'nosy neighbour' syndrome, vigilante attitudes etc.

2. Increasing and maintaining awareness

Awareness in itself does not necessarily lead to change of behaviour in the long term. The theme deliberations on this subject centred on the interplay of information, knowledge, and awareness on one hand, and experience, behaviours, attitudes and perceptions on the other. The main points raised on awareness are enumerated below:

- The **visibility** of water is vital for raising awareness. An approach may be to ask communities and households to think of and highlight water issues in their homes and local context and if they

identify 'problems', encourage them to explore and suggests ways to resolve it. Many communities, especially in inner cities, are not aware of environmental and ecological issues because pipes and rivers are not visible.

- Flyers and websites are a relatively cheap method to give advice on how to build local resilience and keep individuals updated about their community. Include water issues in local, community newsletters and council correspondences.
- By tapping into existing community groups, it may be possible to provide joint resource efficiency messages that are locally appropriate and relevant.
- Water meters, and other information devices should be make visible and accessible to the user.
- Water bills should focus on the core objective; show consumption and cost information in a clear and comprehensible manner. If this core message is unclear, other water efficiency messages may be lost.
- Shock messages and risk events should not be relied on as a means to promoting behaviour change. Evidence suggests that consumers often revert back to old consumption behaviour after risk e.g. drought is no longer prevalent. It has also been proposed that technological intervention without education can sometimes lead to waste e.g. the energy saving light bulbs and the tendency to leave lights on for longer. Technological interventions can also lead to the assumption that the problem is solved and can therefore be forgotten.
- Trust is an issue with water efficiency awareness campaigns. It is important that the right message is presented by the right party. There are confidence issues when a company is promoting less use of its commodity, most customers might think the consequence of this will be increased prices/ tariffs.

3. Motivation

Motivation is required to commit to long term change. Some individuals react negatively to more top-down measures and will prefer to be made to understand why resource issues are important, why they need to change and be given choices on how to achieve the change. Water users can be motivated by the many benefits of water efficiency, which are not necessarily financially motivated.

- Water users need to be motivated to use available information to create their own knowledge, to adopt water saving technology and adopt behaviour change. Water, energy, environmental and economic messages can be combined by emphasising that by saving water they also save energy, carbon, money, promote healthy rivers etc.
- There are social dimensions to motivation that can be engendered through information and awareness but also from communal and social identity and belonging. Hence suggestions of comparing households bills with neighbourhood consumption levels. This can be translated for bottom-up measures that encourage the flow of information and feedback up the spectrum. The sense of value in customers can increase participation and the motivation to change for the common good.
- Instruments like the Neighbourhood plan can be used to increase community involvement, offering a tool for contributing to and influencing local plan and policy. Water efficiency should be part of resource management issues that are considered when preparing or updating neighbourhood plans.
- Financial motivation is a good motivation for a percentage of the population. Using this as a motivational factor should yield commensurate dividends, in proportion of and equivalent to the expectation raised, otherwise, it may lead to negative effect if very little savings is made compared to the time, cost and other investments made.

4. Water efficiency and technology

Advanced technology enables water efficient products and systems to be available to households and communities. However,

- It should be factored in when making recommendations, that the different types of equipment and technology suit different households and lifestyles. This may result in different levels of efficiency with the same product. Targeted and integrated solutions should be offered based on a systemic audit of both building, technology and socio-occupancy data.
- With technology there is often a trade-off e.g. washing machines and dishwashers are generally more efficient but there is normally a trade-off between water, energy and time. Users will differ in their opinion as to which requirement should be prioritised.
- If design expectations are to be achieved in newly built homes, relevant information about measures and systems must be passed on to the user, so that the performance and use of the systems can be better aligned.
- Reinstating the hierarchy of water commensurate to use should be considered as a long term measure. Even more water and energy efficiency may be achieved by using the right type/quality of water for the right activity. The debate on water recycling and reuse needs to be systemic and dispassionate in this respect.

5. Water charges and bills

People may not perceive how much they actually use as water use is habitual, hence most users do not appreciate the amount of water they consume, especially at the activity level and are often surprised when told. Water companies can help maintain awareness through smarter metering, clear consumption data, fairer tariffs to reward savings and penalise waste, as well as grants or tax-free schemes to encourage uptake of technological solutions where appropriate.

- Frequent billing should be available where appropriate. Regular bills may help make water consumption and the link with cost more visible to water customers.
- Water efficiency messages should be consistent and from a homogenous source. A form of branding of messages from water companies is probably needed. As an example, most people will recognise the Olympics symbol. So a single 'image/brand' should be proposed and used on every awareness message, leaflet etc.
- Once again, targeted bills and information are always better than generic data on bills. Similar, flexible and customisable tariffs could help. However, this should still be simple and situations similar to tariffs in the energy sector must be avoided.
- Tariff trial methodology should be standardised across the board for ease of comparison and for better usability of the data.
- Water poverty may be a problem for some households (*measured by the water bill costing more than 3% of disposable income*). Special tariffs may need to be implemented in these cases but only on a needs basis. Water should be charged based on consumption as a rule, with safeguards implemented to protect the vulnerable and other exceptions.
- Unlike the energy sector, the nature of the water industry does not allow domestic customers to demonstrate choice and switch suppliers. To have faith in water companies, users must believe that they are being treated fairly.
- Suppliers should work with local authorities and local interest groups to produce an integrated resource audit and plan, which integrates water, energy, food, transport etc, at the local/community scale under the neighbourhood plan and consider as part of the Localism framework.

Theme 2: Building and Technology

Meeting chair: [Stephen Coupe](#)

Members and guests: Stephen Coupe, Andrew Miller, Poorang Piroozfar, Ike Omambala, Abdullahi Ahmed, Charles Russell, Sarah Bell, and Siraj Tahir.

The scope of this theme was to discuss technology at the (a) household and (b) community scale: Opportunities at the local level, communal solutions; Promoting water efficiency and water efficiency technologies by solving individual/local problems; Measuring and increasing knowledge of available technologies; Information systems and feedback through technology.

Discussion points to cover: Define technology performance criteria and how these can be measured; Discuss how technology can/does influence points of demand in homes and communities; Propose implementation strategies for the first two scope points.

To deliver: Summary of discussion; further questions and specific policy recommendations.

General

Water companies in the UK have regional jurisdiction and are responsible for different resource zones within the region. Water resource management plans are individually risk assessed and local issues are the drivers for water supply strategies. Sufficient means and tools are generally in place to obtain data to manage this process as regulated by Ofwat and the Environment Agency. The water supply side of the water spectrum is therefore more robust and easier to alter than the demand side. The demand side is more variable, and less assured.

Supply and demand problems are different, but they are intertwined because of infrastructure and technology. Water efficiency technology at building scale level could shape demand. Water efficiency strategies should therefore be co-created with all the major stakeholders, such as a wider range of water consumers and building professionals. Knowledge elicitation procedures should especially include those that have so far been less visible in the policy decision making process.

This theme was tasked with exploring water efficiency from the perspective of the building infrastructure, technology of fixtures and fittings, products, water recycling and reuse and to review current evidence on these.

In their deliberations, the group extensively considered whether the approach to evidence should be generic or should be considered in the context of the non-deterministic variables thereby allowing scope for personalisation and customisations which may in turn maximise the usefulness of the outputs.

Other main points are that:

- Technology should not be promoted as the ultimate solution for water efficiency to water users. It is important that expectations are managed and customers investing in technologies should be clearly presented with not only the performance facts but also the extents of its limitations e.g. cost, maintenance etc.
- Cost/benefit and performance calculations and methodology for products, fittings and fixtures should be standardised to benefit the customer and aid their decision making process. This is essential even if labelling is not compulsory.
- Avoid idealism and bring realism into water efficiency expectations, which in turn feed into performance expectation technologies that support it. This will increase credibility and buy-in.

Promoting technologies that provides quick-fixes and can solve all water efficiency problems should be avoided.

Specifics

The specific outcomes of the deliberations in this theme are further enumerated.

1. Water Supply/ Demand

- Considering the water hierarchy, alternative water supply sources for non-portable uses should be considered in areas which have considerable water stress, bearing in mind that communal and regional solutions are likely to be more effective considering cost to supplier and consumers, infrastructure efficiency and operational issues, as well as physical and environmental impact.
- Future infrastructure developments should consider the possibility that water companies could supply both potable and not-so-portable water on the regional scale in order to make carbon and energy savings in treatment processes as well.
- The supply, demand processes should be made more visible to consumers, especially highlighting the impact on local ecology. Visual simulations of the impact of supply and demand processes using climate change models may help increase awareness and highlight future threats to resource availability and the impact on local resilience.
- If alternative sources are to be applied as relevant, relevant pricing/tariffs should be provided as well. This is in line with recommendations made for other water efficiency interventions, and is required to motivate the behaviour change needed for the long term impact of the intervention. Charges for waste are currently charged as a fixed percentage of water consumption. It was suggested that an alternative approach of 'sewer-pipe-up' rather than 'supply-pipe-down' taking into account energy and waste water treatment costs, may be more appropriate because alternative supply sources displaces waste water as well as fresh water.
- More case studies are needed to provide more realistic performance data for water recycling and reuse systems which can be fed into future performance assessments. Demonstrations such as the Eco-village project will help provide this evidence base.
- To further encourage water recycling and reuse, properties that are not directly connected to the main sewerage/ drainage systems should be offered rebates on water and waste charges. This should be based on calculations of accruable 'benefits' derived from such systems.

2. Information and Knowledge

- It was recommended that the multi-disciplinary approach expounded by the water efficiency network should be further explored and applied to a wide range of water efficiency issues, decisions and policy. This approach ensures that knowledge is shared and not lost. A suggestion was a database where different experts/expertise can be stored to aid the sharing of information and knowledge between agencies and across organisations. The academic network can contribute to this but practise gaps can be filled by practitioners and others.
- *A portal to serve as a signpost to the disparate information on water efficiency in buildings will be highly beneficial.* Existing information sources such as data, reports etc from the Environment Agency, Defra, Water companies, research organisations, NGOs etc will be more accessible if there is a simple portal that shows what information is where.
- Case study results are disparate and few results show the medium to long term impact of technological interventions and the consequential impact on behaviour change. To improve applicability, research and case studies need to include as part of its design, a measure of impact that exceeds a short period of time. Funding and grant resources should be targeted to a handful of robust longitudinal studies, rather than several disparate ones.
- Availability and access to water information is crucial. There are gaps in the evidence and information focussed on buildings because water companies seem to be the only source of

information. Water consumption data is available but it is dependent on metering technology, which is only now starting to become more widespread.

- Building reviews and subsequent commendations should be based on independent comparative studies to determine the extent to which it contributes to savings. This should be based on integrated performance indicators which considers; design, technology, systems, people factors etc, all measured at various post-occupancy stages. Design and operational evidence are fundamentally different in almost all cases.
- Independence certification of data and information is important and this should apply to water efficiency and performance claims for buildings, products, fittings and fixtures.

3. Subjectivity of Buildings

- More information is needed to see if water use can be defined based on a building's characteristics – is there correlation between the building age, number of rooms, infrastructure, post codes etc? Usage depends on occupancy; the number of rooms does not give a good indication of occupancy. This data is not readily available. For study purposes some of the parameters will need to be isolated.
- Water usage may be more to do with the age of the fixtures in the building rather than the age of the building itself. If research finds that the age of the building does not correlate to age of fixture and fittings, it is an important observation.
- Building resource efficiency is not independent of other factors. Old, inefficient bathrooms may result in people spending less time in them. A nice bathroom may encourage long baths. New energy efficient homes can lead to more energy usage due to peoples' lifestyles. An inefficient draughty home may use less heating due to the person's more frugal lifestyle and heating only the room that is being used, whereas having a more efficient heating system results in the whole house being heated.
- The building location may reflect environmental characteristics and socio-economic factors which in turn influence the response by its users in terms of water, and other resource consumption.
- Homes with gardens normally use more water, so maybe the size of the garden and an outside tap is relevant. More details are therefore needed for the correlation between buildings, spatial functions and water provisions – fixtures etc.

4. Consumer behaviour

- Many targets are based on best case scenarios with assumptions on how much water people use to flush, shower etc. Robust data is needed on peoples' behaviour and activities with water, in and out of the home e.g. during leisure activities, at work. People at work are not using water at home. From a policy perspective, it may be easier to deal with big institutions advising on alternative toilet flushing methods to encourage water efficiency which would also take into account economies of scale.
- Most of the water put into supply is to meet domestic demand which makes it important to understand what it is used for, daily usage patterns and points of peak demand. Some water companies may have some data on this, obtained during tariff trials.
- Environmental conditions can influence supply, but it also influences consumers' behaviour as they naturally adapt to accommodate varying conditions. It may be worth targeting these cycles for implementing water efficiency strategies.

5. Water saving measures

- There are many water efficient saving measures available, some of the most basic being inexpensive and effective if used correctly, and others being more technologically advanced. Solutions should be targeted to suit taking into account building, occupancy and technological factors.

- The amount of savings and cost benefit issues should also be considered when targeting water efficiency solutions for households and in communities and regions. But a systems approach should be applied to this. What amount of investment will provide the best value for the amount of water to be saved? Is cost benefit gauged by saving pence per litre?
- A greywater system was presented during the Industry Session (See Industry Report at <http://www.waterefficientbuildings.co.uk/publications.html>) which demonstrated a short demand and supply loop – a short run from bath water supply to toilet and from toilet to waste, nowhere else. Is this a more effective approach for water recycling and reuse – simple systems to minimise the likelihood of problems that arise from complexity? And will this approach appeal to the market and can it be applied to a wider range of supply issues.
- Users spending their own money on water efficient technology must be well informed. Recommending technologies on the basis of promoting a ‘green image’ may be a good way to get water users interested, but more is needed to convince them of the benefits in the long term so that they can continue to adopt positive water behaviour.
- Many rainwater and greywater harvesting designs are over engineered, expensive and energy intensive, especially with fail-safe, health-safety and risk-avoidance measures built in. Clear and concise legislative/ policy guidance is needed, the guidance should boldly address the issues of ‘hazards’ on the one hand and ‘risks’ on the other.

6. Evidence

- A comprehensive methodology that can be applied across different water efficiency measures and solutions is needed to ensure consistency when quantifying cost benefits. This can be a toolkit whose key function is to evaluate the true value of the effectiveness of the water saving measures, taking into account time, cost, demand/supply and should include sensitivity analysis/ tests which will check how key parameters will affect the final outcome

Conclusion

Policy

Policy recommendations from this meeting can be summarised as follows:

1. Water considerations should be part of every neighbourhood plan and possibly the Localism Bill.
2. The cross-departmental action-based water savings discussion group should be re-established.
3. Evaluation should be part of any water efficient strategy or measure, with credible and achievable targets defined prior to implementation.
4. Implement variable rebate tariffs to reward and encourage water efficient buildings.
5. The minimum requirements for water efficiency should be enforced in both new *and existing* homes.
6. A more realistic approach to risk management and sustainability issues for water recycling and reuse is needed, which takes an objective view of risks, environmental impact, cost and benefit.
7. Metering provides valuable data to aid decisions regarding the design and delivery of buildings, resource management at a regional and national level, and policy. Availability of this data will be beneficial for planning and achieving water efficiency objectives in buildings.
8. A more comprehensive, systems based toolkit for water efficiency in buildings is required. As widely discussed, existing schemes, toolkits, systems fall short in one way or the other.
9. Aggressive retrofit is not always feasible. An integrated holistic approach should be co-created with households and customers as appropriate.
10. Further research to identify the value of water is needed.

Further research

The recurring theme from the network's activities is the need for more studies to gauge and understand the social dimensions of water consumption as well as the role and influence of technological interventions and solutions for improving water efficiency. Questions such as the following need to be answered in order to be able to co-create knowledge and understanding with water users:

- Exactly how much does the average household spend on water/ water related bills?
- Are people worried about their water bills now, will they be worried in the near future?
- Is localised, community empowerment important? To what extent do people feel the need to change things or make decisions?
- Water is a local/regional commodity. On a wider scale, what are the local water issues from the customer perspective and how do these differ from region to region?

There is a healthy range of water research and studies currently conducted by institutions and organisations around the UK. This is good but more applied, multi-disciplinary studies that tests what is known to create new knowledge, innovation or solutions and to create long term step change in how water is perceived and used are needed, and should be encouraged by funding bodies.

Systems thinking, research projects, trials and evaluations should also apply holistic viewpoints, and take into account social aspects such as household, community nuances and other socio-cultural drivers. As a society, there is the need to try to understand what the value of water really is without falling into the trap of using monetary variables to determine value. Access to water is considered a social right by most. However, it has been suggested that if that is the case, the targeted pricing of water (through a comprehensive and fair tariff system) may bring the perception of equity and transparency and encourage the long term efficient use of water.

Considering this and other issues that arose during the meeting, questions for further research are suggested as follows:

1. Community and users

- What factors at the household/community level affect or influence people's perceptions and use of water?
- What are the key motivational drivers for change of behaviour?
- Why do some people use more after water efficiency interventions?
- Some people have the right attitude but still would not change their behaviour. Can attitudes and opinions be linked to behaviour?
- How does 'storing water' affect the supply and demand equation?
- Do the recycling and reuse of water lead to direct water savings or does it simply displace potable water use?
- To put the end to speculation, to what extent does the price of water (at the tap) influence the adoption of technology and willingness to make the necessary behaviour change?

2. Building and technology

- Does a cost effective solution lead to long term changes and savings in water usage?
- Is there excessive pessimism with regards to water recycling and reuse and is there the need for a balanced, objective review of the concept rather than of specific systems e.g. rainwater and greywater systems?
- Should an objective approach be taken when considering the risks, costs and benefits of water recycling and reuse which will in turn minimise over-engineering and make technologies more affordable and accessible?
- Can the type and age of the building be associated with certain types of water use profiles and should technological solutions be targeted to suit?
- Does water metering lead to reductions in water usage?
- Should water efficient methods be mandatory or voluntary?
- Is the hierarchy of water as simple as it is presented or should variations be factored in depending on the context?

Studies are planned to explore some these issues. Results from the network's community study will be published on the website when they become available.

Summary

The main points that arose at the meeting are as follows:

- Technology should not be deployed for technology sake. A whole systems approach is necessary to ensure the effectiveness of water efficiency policy and measures.
- It is vital that social engagement is part of any water efficiency policy or regulation to ensure that the message filters through.
- Increasing community resilience influences ownership of issues which in turn could increase the willingness to respond through behaviour change. It provides a logical basis for implementing community wide schemes including water efficiency measures.
- Water efficiency strategies should not only focus on making people change. People who are willing to make changes should be empowered to do so.
- Continuous and consistent awareness water efficiency messages will help improve the visibility of water. The right people should present the right message to increase effectiveness and trust in the message.
- Connectivity between all the various bodies involved in energy, water, transport etc should be improved. Joined up thinking and a joined up message will be beneficial for customers.
- With regards to buildings and technology, more information regarding existing buildings and retrofit programmes for water efficiency is required to fill the gaps in knowledge. More studies are required to supplement those from water companies and other existing sources.
- A cost benefit analysis toolkit for water efficient systems would be useful especially for existing buildings. Retrofitting can result in some users being less water efficient so consumer behaviour and social expectations must be considered.
- Comprehensive and objective legislative and regulatory guidelines for water recycling and reuse (not necessarily specific systems) are needed and more independent studies on this subject are needed.
- Even though metering every home may not result in substantially less water usage, it will be beneficial for plugging some of the evidence gaps if metering is systematically implemented to support this objective. This is in addition to existing benefits of metering such as improving awareness of water consumption.
- There is no shortage of technology and solution, however the initiative is left to building providers and manufacturers to learn and apply. Incentives and other tools can be used to stimulate market forces to increase the permeation of innovation and the uptake of technologies.
- Different tariffs and rebates for water efficient buildings and households, to support those that are water efficient and motivate those that are not. This also actively demonstrates fairness, making it more visible to customers.

From the deliberations of this meeting, the following actions will be taken:

- A user-friendly portal to signpost everything 'water efficiency' will be beneficial.
- An applied study to explore some social aspects of water consumption, technologies and behaviour change will be conducted.

For enquiries regarding this report, contact:

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