



# Achieving Water Efficiency in the Public Sector Through Social Norms

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Water efficiency campaigns in England and Wales currently focus on private domestic customers and private businesses and usually focus on either the implementation of technological devices, financial incentives or educational programs for school children. This brief research report focuses on the public sector (schools, hospital, universities, local government), an underexplored area for investigating the role of social norms in facilitating water saving. It takes the approach that the public sector provides so far untapped potential for water savings and asks how water saving behavior can be changed. Based on a review of academic, grey literature, documents and a workshop with stakeholders from water companies, regulators and public sector organizations, nine key themes are presented and discussed. The themes, which can also be understood as recommendations, emphasize that water saving behavior is influenced not just by individual decisions, but social and psychological drivers such as social norms, values or group behavior. For example, water saving competitions among different departments, embedding water into the bigger environmental story or the question of who delivers the water saving message may contribute to changing water saving behavior at the workplace<sup>1</sup>. The public sector is well placed to implement water efficiency programs involving social norms and could act as role model for other sectors.

**Keywords:** water scarcity, drought, water efficiency, social norms, public sector, United Kingdom

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## INTRODUCTION

Water efficiency is a cornerstone of water resources management and public water supply. Yet, typical water efficiency campaigns are aimed at private domestic customers and private businesses. In addition, existing water efficiency campaigns focus on two key drivers of water saving behavior: technological devices such as water meters and financial incentives but leave unexplored the potential of social norms to create behavioral commitments to water saving. This brief research report focusses on the role of social norms for encouraging water saving behavior in the English and Welsh public sector. As yet there have been few studies on water efficiency in the public sector (schools, hospitals, universities, local government). For example, Fidar et al. (2016), Hassell and Thornton (2014) or Bremner and Jordan (2012). Cotton et al. (2016) focus on energy saving but the study included questions on water saving as well. It is the purpose of this article to provide concrete recommendations for water efficiency campaigns in the public sector. Public sector organizations provide significant untapped potential for water saving by virtue of their size and/

<sup>1</sup>I use the term “workplace” very loosely. Hence, I consider school children and university students attending school or lectures, seminars etc. as being at their “workplace.”

or their nature as public organizations, thereby contributing to overall water savings. It was not possible within this research to estimate the scope of potential water savings by the whole public sector (see also under *Current State of Water Efficiency and the Public Sector in the UK*). However, one English water supplier, Essex and Suffolk Water, could show how beneficial water efficiency could be to borough, district and county councils, not just in terms of water savings, but also monetary savings. A water saving initiative carried out across five councils in their supply area 10 years ago saved 34,000 L of water per day (Essex and Suffolk Water, 2014, 230). Given that there are 333 councils in England alone, this points to the potential water savings. Furthermore, the total water consumption of the English health and social care sector in 2017, 2.3 million cubic meters, was similar to that of a country such as Estonia (Public Health England and NHS, 2018, 12), which again emphasizes the importance of the public sector in terms of water consumption but also potential savings.

This research is placed in the wider context of drought and water scarcity in the UK and the need to make substantial water savings in the future. “Drought is a recurring feature of the UK climate.” (Marsh et al., 2007, p. 88) The UK experienced a dry spell in summer of 2018 and recent drought events were between 2010 and 2012, 2004–2006 and 2003 (Met Office, 2012, 2013, 2016). The UK Climate Change Risk Assessment 2017 attributes a “medium magnitude now” but a “high magnitude in future” for the “risk of water shortages in the public water supply, and for agriculture, energy generation and industry, with impacts on freshwater ecology” (Committee on Climate Change Risk Assessment, 2016). The overall assessment is that more action is needed in this area.

The research presented here has its limitations and is based on a brief 6 months research project. In the following sections the main concepts of water efficiency and social norms are briefly introduced and discussed. Next, the Methods section outlines the research that was based on a literature and document review plus the input of key stakeholders during a workshop. Based on this, nine key themes and recommendations for successful water efficiency campaigns in the public sector are presented and discussed. Nonetheless, this research contributes to the discussion about water efficiency, which usually focusses on private households. Hence, the research presented here is preliminary and should be the start of further empirical research on the issue, which for example could go into more detail about how water is used in group contexts and the experiences and results of water saving campaigns in universities, schools, hospitals or other public buildings. This way, it could also help starting a discussion about the simplistic and reductionist relationship English and Welsh water companies have with their “customers” (Grecksch, 2021).

## Current State of Water Efficiency and the Public Sector in the UK

Water efficiency in the English and Welsh public sector is an underexplored gap. Current approaches to water efficiency focus on private domestic customers, i.e., either single or multiple occupancy households, or private businesses (Grecksch, 2018).

This relates for example to building design standards in the UK, which require newly built homes to include water efficient appliances such as low flow taps, waterless urinals etc. to achieve the required 125 L per person per day maximum consumption (HM Government, 2015). Given that public water supply to private customers makes up the largest share of public water supply use, this focus is justified (Lawson et al., 2018, 9). However, more than five million people are employed in the UK’s public sector (UK Office for National Statistics Public Sector Employment, 2018, 38). This includes government departments at central level, local government, the National Health Service (NHS), state schools and universities. For instance, a recent report on both virtual and actual water use in the Health and Social Care sector in England suggests that food production, preparation and consumption is with 28.7% the single largest area of water use by the sector (Public Health England and NHS, 2018). Apart from that, exact numbers for public sector water use are hard to establish since water companies use different methodologies to present data about non-household water consumption. Estimates range from 6 to 29 per cent of the total water use recorded by individual water companies (Grecksch and Lange, 2019, 12).

## Organizational Learning, Social Norms and Behavior Change

Understanding and changing behavior in relation to water use can be part of wider organizational learning processes that may be of significant benefit to organizations beyond the specific context of being resource efficient. Organizational learning is discussed in particular by two academic disciplines, business management and social psychology. Business management literature defines social learning as more than the sum of individual learning, as a collective process. Organizational learning is about collective learning processes and is based on knowledge exchange among its members (Argyris and Schön, 1978). Social psychology emphasizes behavior change as a result of knowledge change through learning. Here, social learning can be understood a process of change on a society level that is based on newly acquired knowledge, a change in predominant value structures, or of social norms which results in practical outcomes (Luks and Siebenhüner, 2007).

Three types of organizational learning can be distinguished (Argyris and Schön, 1978; Pahl-Wostl, 2009): *Single-loop learning*, where people, organizations or groups modify their actions according to the difference between expected and reached outcomes (“re-moving symptoms”). *Double-loop learning*: in addition to single-loop learning, double-loop learning corrects or changes the underlying causes behind the problematic action. And *Triple-loop learning* reflects on how we learn in the first place: “learning how to learn.” In practical terms, a single-loop learning process with regard to water efficiency would involve installing water saving devices, without user patterns changing. A double-loop learning process would trigger a behavioral change, i.e., altered user patterns (for example: turning off the tap while washing the dishes in the office kitchen). Triple-loop learning would then reflect upon the learning process, i.e., why people were open to particular

learning opportunities in the previous steps thereby improving the internal organizational learning process.

For the purposes of water efficiency campaigns and strategies with public sector organizations, double-loop learning seems the more interesting type of learning as it could lead to incremental or radical changes. Hence, an emphasis of the themes and recommendation discussed in the results section will be on the role of social norms–value commitments that shape water use behavior. The inclusion of a social norm in a message can be a way to encourage citizens, or in this case employees, to carry out a wide range of socially desirable acts. An example for a social norm is the message one can find in almost every hotel room about the re-use of towels. This research considers social norms as the missing link between technical and economical drivers of water behavior and actual water behavior change.

According to Lede and Meleady (2019) social norms serve as cues that help people make sense of social situations in terms of how people are expected to behave. They motivate action by providing information about what is likely to be effective and adaptive. Posner (2002, 34) describes social norms as “the behavioral regularities that occur in equilibrium when people use signals to show that they belong to the good type.” It is important to note the distinction between two types of social norms. First, descriptive social norms represent beliefs about what people do, or in other words, the typical patterns of social activities and choices (Larson and Brumand, 2014) For example, a water bill may contain a comparative number, i.e., how a customer’s water use compares to the average water use in the postcode area. Second, injunctive social norms, which convey a more prescriptive message. This is less frequently used, but can feature in interventions or an account of environmental outcomes and involve judging the un/desirability of specific actions.

The embedding into organizational learning, social norms and behavior change was chosen based on the author’s background and familiarity with the literature. There are of course other approaches that go beyond behavior change, oriented around social or socio-technical practices rather than psychological concepts of social norms. For example, Strengers et al. (2015, 2) emphasize that by focusing on social practices, “the result is a perspective that focuses on the practices that sustain and implicate people in environmentally damaging and inequitable ways of life.”

## METHODS

The results presented in this article rest on two main pillars. First, an extensive academic and grey literature review that included topics such as water efficiency, water use behavior, the use of behavior change methods, social norms and resource efficiency strategies in the public and private sector, for instance energy saving initiatives. The latter was included in the search, since a scoping exercise of the literature revealed a number of journal articles dealing with energy efficiency and behavior change. The aim was to get vital insights from this discussion. The academic literature review was non-systematic and based on searches using Web of Science, a meta-search engine for peer reviewed academic

journal articles that allows detailed keyword search. The following search terms, reflecting the key research interests, were used: “water efficiency AND public sector,” “water AND social norms” and “energy saving AND public sector.” The first two search terms were oriented toward the focus of this research, the third search term was selected to reflect that more research has been carried out on energy savings in the public sector as identified by the scoping exercise described above. The initial search period were the years 2008–2018 but cross-referencing from identified studies lead to the inclusion of earlier studies on the issue as well. In total, 30 academic publications, 32 documents or reports and 23 Water Resources Management Plans (WRMPs) were analyzed and an overview can be found in the **Supplementary Material**. The grey literature, i.e., studies, or reports from policy-makers and environmental management professionals, included documents from key actors in the UK drought and water scarcity governance space (Lange and Cook, 2015). This included: Waterwise—a UK non-governmental organization concerned with water efficiency, Ofwat—the economic regulator of the privatized water supply system in England and Wales, the UK Department for the Environment, Food and Rural Affairs (Defra), the English Environment Agency (EA) and other regulatory bodies, for example Natural Resources Wales (NRW), as well as English and Welsh water companies’ Water Resources Management Plans (WRMP) for the years 2014–2019 and some draft WRMPs for the next planning period. WRMPs, updated every 5 years, outline how English and Welsh water companies meet supply and demand over a period of 25 years and include information about water efficiency measures. The grey literature and documents were identified from the different organizations’ websites or previous research carried out by the author in the English and Welsh water sector (Grecksch, 2021). In order to gather ideas and data about water efficiency and the public sector from sources as widely as possible a scoping exercise was undertaken to look at water efficiency campaigns in California, Australia and South Africa, countries which are more experienced with drought and water scarcity. A full account is available in Grecksch and Lange (2019), however, since the results, as in the UK, showed that little is done in direct relation to the public sector, it is not further discussed here.

This research was part of the “Engaging diverse stakeholders and publics with the outputs from the UK Drought and Water Scarcity Programme” project ([www.aboutdrought.info](http://www.aboutdrought.info)). Hence, it was an aim of the research presented here to actively engage with stakeholders and co-develop knowledge. Based on the results of academic and grey literature review, a so-called primer document was drafted (see **Supplementary Material**). The idea behind a primer is to provide an accessible document for stakeholders and the public, i.e., concepts and results are presented in a light manner, avoiding terminology and making use of visuals. To add the aforementioned element of co-development, a small workshop was organized with participants from a

regulatory body (EA), a water company and a public sector organization (university) in January 2019.<sup>2</sup> Two further stakeholders, one from a regulatory body, the other an environmental public health specialist, who could not make it to the workshop, provided written comments. The workshop intensively discussed all aspects of the primer document, confirmed the findings from the literature and document review, and delivered useful recommendations from the participants that also influenced the formulation of the nine recommendations below. Hence, the workshop fulfilled the intention to get detailed comments and insights from the different stakeholders and to subsequently include the feedback into the final version of the primer (Grecksch and Lange, 2019). This, it was hypothesized, also helps to increase the legitimacy of the document.

The analysis of the academic and grey literature and the discussion during the workshop produced an understanding of water efficiency in the public sector and it included the identification of key themes that emerged from reading the literature, documents, WRMPs and the workshop discussions. Themes are recurring ideas, issues or statements expressed in the data, however, often not directly. Hence, identifying themes can help to uncover further dimensions and facets of in this case water efficiency in the public sector. The identified themes have in the next step been 'translated' into the nine themes or recommendations as discussed in the next section.

## RESULTS

This section presents the results of the academic and grey literature review and the stakeholder workshop. It starts with a brief outline of current water efficiency and behavior change activities by English and Welsh water companies. The main part of this section then introduces and discusses the key themes, as identified by the literature, documents and the workshop. As mentioned before these key themes can also be read as recommendations for water efficiency campaigns with the public sector.

### Water Efficiency and the UK's Public Sector

So far only a few of the approximately 25 water companies explicitly aim water efficiency campaigns at the public sector. Examples of water companies that mention these activities in their 2014/2015 Water Resources Management Plans are Thames Water (2014), Dee Valley Water (2013), Essex and Suffolk Water (2014), Welsh Water (2014) and Severn Trent Water (2014). Sutton & East Surrey Water concludes that a large part of its non-household consumption is associated with the general population and includes schools, healthcare etc. (SES Water, 2018, 50). The UK Department for Environment, Food and Rural Affairs (Defra)'s 25 Year Environment Plan only sets household water reductions as

a goal without specifying an actual target (HM Government, 2018, 70). The UK National Infrastructure Commission (2018) also focusses on technological fixes and metering to increase water efficiency. For government owned and occupied buildings, the Greening Government Commitments (Defra, 2014) encourages all government units to embed sustainability, which includes water saving, without further specifying how this could be done. The Water Resources Management Plan (WRMP) Guideline (Environment Agency and Natural Resources Wales, 2016) prescribes what water companies have to include in their WRMPs, which are strategic documents outlining how a water company will meet supply and demand (see also Method section). Regarding water efficiency, however, the text is very general and only includes for example increased customer metering as a measure to promote water efficiency. Ofwat, the economic regulator for the water companies in England and Wales published a report in 2007 encouraging schools and hospitals to carry out self-audits and to involve key stakeholders in spreading the water efficiency message e.g. local Members of Parliament, trade bodies, and local authorities (Ofwat, 2007). An environmental public health specialist who commented on the draft primer document mentioned that there is an appetite for public sector interventions especially if they encourage employees or tenants to adopt services at home too (email communication with the author).

### Behavior Change and English and Welsh Water Companies

Lewis (2017) discusses four barriers to behavior change with reference to English and Welsh water companies: first, entrenched attitudes within organizations. Second, water companies are traditionally focused on changing infrastructure not customer behavior, also in light of the fact that revenue is generated by selling water to customers. Third, some water companies do not see it as their responsibility to educate people about water consumption; and fourth, there may be limited knowledge and skills about behavior change and its success. Waterwise (2017) sees a water-saving culture as the goal in order to accomplish wide scale water efficiency. This includes the need for water efficiency to become the norm across all activities throughout everybody's lives. The Year one report on their water efficiency strategy (Waterwise, 2018) highlights "the importance of people and communities for water efficiency as behavior change and greater customer engagement and participation are linked to water efficiency."

The approximately 25 English and Welsh water companies refer to the potential of social norms to change behavior, however, the number of water companies actively engaging in it is low. Essex and Suffolk Water (2014) are engaged in using social norms theory and behavior change. At least three of their water efficiency initiatives apply it, but the focus is not on the public sector (ibid.). Other water companies are more cautious, saying that "we cannot accurately quantify behavioral change activity although we acknowledge that this is possibly the single most important driver of water efficiency." (semcorp Bournemouth Water, 2015) The Environment Agency (2018) stated that "the water industry must innovate

<sup>2</sup>The workshop adhered to the required ethical standards and approvals as set out by the author's institution. Workshop participants were informed about their rights, data protection measures and were asked to provide written consent

and change behaviors in order to reduce demand and cut down on wastage.” An Ofwat report (Lawson et al., 2018, 34) also suggests that prioritizing research into behavior change for influencing consumer choice of products and changing water use practices in one of the first steps to deliver deep reductions in household demand.

A recent assessment by Defra (Orr et al., 2018) generated evidence about what approaches to water efficiency and behavior change have been used so far in the UK, however, the focus was on private households. The authors note only one study (Ross, 2015) that examined water saving and behavior change. Accordingly, customers who received behavior change information coupled with a water saving device increased their water saving to 7 L per property per day. This was a water saving that was by 38% higher than the water savings achieved by those household customers who did not receive the behavior change information, and only received the water saving device.

## Nine Themes and Recommendations for Water Efficiency Campaigns With the Public Sector

This section outlines and discusses nine themes and recommendations for conceptualising water efficiency campaigns with the public sector. The development of the nine recommendations and the discussion are based on the results of the literature and document review and taken into account are also the discussions during the stakeholder workshop, which confirmed most of the findings from the literature review. The general view among the stakeholders was that water efficiency campaigns with the public sector are a viable and necessary option. These nine recommendations are hopefully the basis for the discussion about widening the scope of water efficiency campaigns in England and Wales and beyond.

### Understanding Why and How Water is Valued

It is important to explore what values water users hold towards water and why or why not they engage in water efficient behavior. Sharma and Jha (2017) highlight that the value systems of people in different cultures are influenced by society, religion and wider belief systems, which determine the reasons why people engage in sustainable consumption behavior. Apart from values a range of other factors can influence consumer decisions in relation to water too, for example, whether people perceive water as a scarce resource (Sofoulis, 2005; Hoolohan and Browne, 2016). For example, Simpkins (2018) discusses how an event such as the 2018 Cape Town “Day Zero” threat can increase the value of water. According to Corral-Verdugo et al. (2008), motivation plays an important role for conserving a resource such as water. Sofoulis (2005) emphasizes that changing consumption patterns mean changing habits and routines. More efficient water use may thus first require the de-routinising of habits and learning new ones. Ajia (2020, 212) points out that there needs to be more granularity in the understanding of the public with regard to water efficiency.

### Narratives and Stories

The ancient philosopher Plato said that those who tell the stories rule the world. Hence, telling a story or shaping a narrative matter. It is therefore important to tell the bigger story, i.e., water efficiency should be linked to the wider environmental story that includes, for example, the management of a river catchment, or includes the water-energy-food nexus (Foden et al., 2019). The story must also resonate with existing audiences’ values and could be built around a local community or organizational communities, such as a school. The idea here is to put water efficiency into context—and to make an explicit case for why it is necessary. One such important individual and social context is the energy-water saving nexus. Waterwise UK, for instance, notes that hot water use in the home accounts for around 5% of UK carbon emissions, which represents a key opportunity for promoting water efficiency as well as reducing fuel poverty (Waterwise, 2018, 7).

### Framing

How social norms and behavior change are framed and communicated is an important factor for successful strategies (Byerly et al., 2018). Framing can be understood in two ways. First, it refers to how information is shaped and contextualized within a familiar frame of reference and meaning. Second, it concerns the effect of framing on members of the public. Audiences may adopt the frames of reference offered by journalists or a messenger and see the world in a similar way (McQuail, 2005, 555). Hence, the context in which decisions are made and who conveys the message or who suggests the behavior change, i.e. water companies, regulators or intermediaries, is important (Byerly et al., 2018; Whiting et al., 2019). Also, water use is of a very personal nature and people may or may not want to talk about it (Browne, 2016). Everyone has different attitudes and values when it comes to washing, showering, toilet use etc. Hence, communication in relation to this must be adapted so as not to be felt as too personal and intrusive.

### Setting Realistic Targets

There is a limit to water conservation as we need, for example water to wash or to wash clothes. People may need water for religious reasons and some people simply do not care about efficient water use. There may also be unintended rebound effects, i.e., a water-saving shower head may lead to longer showers. Steg (2008) and Mills and Schleich (2012) report that only campaigns focusing on direct and specific targets, such as actual consumption data are likely to promote conservation behaviors. Similarly, Ek and Söderholm (2010) show that campaigns that provide specific information tend to outperform those that provide generic information. Siero et al. (1996) suggest that the higher the performance goal, and the more precise the goal has been formulated, the better the performance will be.

### Competition

Competitions can leverage the power of social norms. Perceptions and beliefs about how members of a group think

and behave relative to others have been found to be a significant incentive to participate in a competition. In other words, people like to know where they stand compared to others and they like to be told that they are good. Siero et al. (1996) focus on comparative feedback, which involves receiving information about the performance of other groups, i.e., another department within the same company with regard to saving resources. Drawing attention to the existence of another group with whom a group can compare itself makes the behavior of one's own group more salient and receiving information about the performance of other groups can lead to competitive feelings and an improved performance (ibid., p. 236).

Petersen et al. (2015) conducted a large study about electricity and water saving on US college and university campuses. They found that the impact of financial and other incentives and knowledge is often overestimated, while people's perceptions of what other people are doing, i.e., social norms, is underestimated: "The emphasis on achieving behavioral change in colleges and universities also recognizes the undergraduate experience as a seminal and transformative period during which future decision-makers develop knowledge and habits that inform the personal, professional and political choices that they make throughout the rest of their lives." Vine and Jones (2016) refer to structured competitions, one form of social comparison, as a potentially powerful mechanism for leveraging the power of social norms.

Useful to consider might also be the opposite, cooperation or collaboration to achieve a common goal and save or conserve water. Likewise, social media and apps could support both competition and cooperation by providing for example up to date information on water use.

## Reference Groups

Reference groups are people close to us, e.g., work colleagues or friends and family. Our behavior orientates itself to the behavior of reference groups, also through group think. In other words, we tend to adapt our behavior according to what is the norm within a reference group. Herein lies a significant potential for water efficiency campaigns in the public sector. Work teams or units are important reference groups and could help to influence water-saving behavior.

Goldstein et al. (2008, 476) use social norms in their study about the reuse of hotel towels and conclude that another well-established factor affecting norm adherence is the extent to which individuals identify with the reference group: "In experiment 2, we examined whether the towel reuse norm of hotel guests' immediate surroundings (i.e. the provincial norm for their particular room) motivates participation in the conservation program to a greater extent than the norm of guests' less immediate surroundings (i.e., the global norm for the whole hotel)." In other words, if the message was "other people who used this room, reused their towels" people were more likely to reuse towels than in the case of the more general message of "other hotel guests reused their towels."

## Align Structural and Behavioral Change Measures

Installing water saving devices or new plumbing and harnessing social norms to change behavior can go together. The studies by

Goldstein et al. (2008), Ek and Söderholm (2010), Steg (2008) and Mills and Schleich (2012) suggest this to be a successful strategy. Fidar et al. (2016, 823) analysis showed that low flow taps have greater mean water consumption per use than conventional taps, however, more interesting, they also conclude that water consumption is more influenced by user behavior rather than the technology: "(...), this study confirmed the less predictable and rather complex use behaviour is the most significant variable in forecasting the water use of the taps, particularly in commercial (non-residential) buildings." Rocarro et al. (2011) present a study where the objective was to verify and compare water conservation in residential and public (schools and sport centers) buildings located in Sicily (Italy) by implementing high-efficiency plumbing fixtures (structural measures) and educational programs (non-structural measures). The results show that structural measures led to relevant water savings, while non-structural measures only added a negligible effect. Other potential structural constraints may need to be taken into account as well (Mondejar-Jimenez et al., 2011). For example, water saving behavior may be guided by the fact whether a property is rented or owned (Russell and Fielding, 2010). Homeowners have direct control over their homes and are in a better position to undertake retrofitting of efficient devices. Private tenants on the other hand have less control over the installation of water efficient devices (ibid.).

## Building Water Saving Messages on Energy Saving Campaigns

A big factor discouraging people from water-saving behavior is the fact that they have less control over water infrastructure as, for example, compared to energy. Switching off a light is easy but most of the water infrastructure is actually hidden. The study by Petersen et al. (2015) revealed that changing the water behavior of others was seen as more personal and intrusive, i.e. suggesting to someone to switch off a light or turn down the heating was seen as less intrusive by study respondents compared to telling others to close the tap while brushing teeth or taking a shorter shower. One solution is to use a strategy that sends messages with different levels of appeal to self- and collective self-efficacy. For example, a message that targets shorter showers could primarily appeal to the fact that it saves energy instead of focusing on the water-saving aspect that comes with it. Hassel and Thornton (2014, 115), in their study on rainwater harvesting in UK schools, highlight that there are likely more cost-effective ways to save water than the installation of rainwater harvesting. According to the authors an easily achievable measure would be to curtail hot water use behavior.

## Data and Evaluation

Having a good data basis and regularly evaluating the effects of water efficiency campaigns that involve social norms are a precondition for successful water efficiency strategies and campaigns. Limited data or general statements in WRMPs make it difficult to assess the current situation regarding water efficiency strategies and campaigns, especially with regard to social norms and the public sector. Water companies could elicit information about the value customers attribute to water from their customer focus groups and regularly undertake evaluation studies about the effectiveness of water efficiency campaigns and strategies (Orr et al., 2018, 7). In addition, data from

using water at workplaces is required to get a more detailed picture of water uses within organizations.

## DISCUSSION

Current water efficiency campaigns and strategies in England and Wales focus on individual households and private businesses. The main tools currently used in England and Wales by water companies are water saving devices and messages to reduce bills. But water saving behaviour is influenced not just by individual decisions, but social and psychological drivers such as social norms, values, group behaviour and external factors (culture, family behaviour, infrastructure and regulations).

This research suggests that there is an opportunity for the public sector to act as a role model for other (private) sectors. A large majority of the workforce, students and school pupils spend their days at workplaces where they use water after using the toilet, for washing hands, in the office kitchen, water is used in the canteen, and for showering, the latter in particular if there is an increase in cycling to work. The study by Goldstein et al. (2008) about the use of hotels towels (see *Reference Groups*) can easily be transferred to the public sector since the identification with reference groups (same class, course etc.) plays an important role in schools and universities. Second, there is an opportunity for the public sector to carry out a multiplier function. If water saving behaviour is implemented at workplaces, this behaviour may also be applied at home, but also vice versa (Darnton and Horne, 2013, 6). People who engage privately in water saving behaviour may have an influence upon their peers in larger organisations in which they may work. Public sector organisations are well placed to start water saving behaviour initiatives themselves, with or without the support of water companies, and, for example as a competition among departments, year groups in schools, halls of residence in universities (Petersen et al., 2015) or in the context of staff engagement weeks, or by including water efficient appliances in their procurement activities. And there is scope for water companies and the public sector to increase their cooperation on this issue.

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## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

## AUTHOR CONTRIBUTIONS

KG conceptualised and wrote the article.

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## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fenvs.2021.575583/full#supplementary-material>

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