

By Sumit Agarwal

By Sing Tien Foo

27 Mar 2018 06:34AM
(Updated: 27 Mar 2018 06:40AM)

★ Commentary | Singapore

Commentary: Beyond price hikes and conservation campaigns, saving water through smart showers

Conserving water is a national imperative – and how much water you consume while showering can be reduced by as much as almost 20 per cent through powerful nudges, say two experts from the NUS Business School.



File photo of a shower. (Photo: Wikimedia Commons / DO'NEIL)

SINGAPORE: Water is an important and scarce resource to Singapore.

In order to be less dependent on imported water, the country turned to technology such as desalination.

However, the cost of maintaining and upgrading the country's water supply infrastructure eventually led to the Government increasing water prices in July last year.

This has shown to be effective. Minister for the Environment and Water Resources Masagos Zulkifli recently revealed the 2017 price hike contributed to a drop in daily water use from an average 148 litres a day in 2016 to 143 litres for each member of a household.

For decades, water conservation has been a constant message for Singaporeans. But apart from price hikes and water conservation campaigns, are there other ways to sway behaviour at the point of consumption – especially when you take a shower?

Nudge theory and behavioural insights suggest this may be so.

The National University of Singapore (NUS) Business School and Department of Real Estate (DRE) collaborated with PUB to lead an international research team involving us, Davin Wang from NUS, Lorenz Goette from University of Bonn, Thorsten Staake from University of Bamberg and Verena Tiefenback from Swiss Federal Institute of Technology to study how households' shower water usage behaviour can be improved for water conservation.

In Singapore, showers account for a staggering 30 per cent of an average family's monthly water consumption. If households can change their behaviour during showers, that can yield substantial savings.

SMART SHOWERS

In Switzerland, researchers found one way to change behaviour is to furnish real-time feedback to users during showers on how well they were conserving water. So they equipped some households with smart shower devices that provide real-time feedback on water temperature, volume used and how well water consumption goals have been met.

The researchers found with such devices, households reduced their water usage by 22 per cent.

Would a similar intervention work in Singapore? To answer this question, some 500 households in HDB flats were fitted with a smart shower device where data regarding water consumption was recorded, giving us information about 300,000 showers over a four-month period.

They were divided into seven groups. Five groups of households were given different water conservation targets and feedback regarding the volume used.



File photo of water dripping from a shower head. (Photo: AFP/Justin Sullivan/Getty Images)

Water conservation targets of 10, 15, 20, 25 or 35 litres per shower were given out. The 10- and 15-litre targets corresponded to ambitious targets, the 20- and 25-litre targets were moderately attainable, while the 35-litre target was considered an easy one.

Households with targets set were encouraged to try keeping their water consumption below these designated levels. During showers, besides showing the volume used, the smart meter also gave feedback on how they were performing vis-a-vis their targets.

A sixth group of households received only water temperature information with no target or feedback, while the last group received real-time feedback on water volume when showering with no feedback on how well they were conserving water.

ASTOUNDING SAVINGS

We know a priori that on average, Singaporeans use almost 20 litres of water in a single shower that takes about five minutes.

But with some simple feedback, the savings were quite astounding. When feedback was given regarding water usage, water consumption went down on average by about 10 per cent per shower, saving each person two litres daily.

But this saving varied by the targets set.

Those who received target and volume feedback reduced their consumption the most. Households that had a moderate volume target of 15 litres set saved the most of 3.9 litres less water during a shower, resulting in a saving of about 19 per cent - somewhat similar to the 22 per cent observed in the Swiss study.

Households that had an ambitious target of 10 litres set also saved water, with 2.9 litres saved on average during a shower. This lower amount of water saved is likely in part due to the fact that showering in Singapore's humid weather probably necessitates a minimum threshold of water.



File photo of tap water. (Photo: AFP/Yoshihazu Tsuno)

SETTING TARGETS, MONITORING PERFORMANCE

Our study concludes that getting households to set targets and giving them feedback on their performance not only promote awareness of the need for water conservation but also result in them using less water.

Just as in the case of individuals where goal-setting and feedback are keys to performance, households behave similarly when it comes to water conservation.

Households are also like individuals in that the targets set must be within reach to motivate households to strive hard to attain them. When a target is too ambitious (below 10 litres) or too easily attainable (above 30 litres), it becomes less effective in encouraging households to save water.

With appropriate targets and feedback, households can be persuaded to be more water efficient. Their behaviour can be modified within a short span of time, and hopefully, over time, attitudes towards water conservation will also change for a more sustainable lifestyle.

The monthly utility statement that households receive shows how they performed on two distinct types of utilities – water and electricity – relative to the neighbourhood and national averages. Such feedback, though not in real time, has a social comparison dimension that may encourage water conservation practices, complementing the immediate feedback concerning one's personal water usage.

Both these practices help to curb water wastage by keeping users informed – one via social comparison by knowing how one fares relative to others and the other through knowing how much water one is using.

The PUB statement also provides feedback such as “Well done. You have consumed less in all your utilities in the recent two months as compared to the previous two months”, much like what was furnished in our study.

One caveat however, is that while real-time feedback is ideal as we've shown in our study, this may not be feasible for the time being because these smart devices are not cheap.

But we can imagine a system where one day, households can link their spike in water consumption to specific activities such as car washing, and accordingly make conscious efforts to reduce the frequency or modify the way in which such water-consuming activities are carried out.

Given the speed with which the Internet of Things are benefitting households beyond our imagination, the future of getting granular real-time feedback on not only water but also utility consumption is in sight.

Sumit Agarwal is Visiting Professor at National University of Singapore (NUS) Business School and Sing Tien Foo is Dean's Chair Associate Professor at the Department of Real Estate. More about this study can be found in Kiasunomics: Stories of Singaporean Economic Behaviours co-authored with Ang Swee Hoon and Sing Tien Foo, all at NUS.

Source: CNA/sl