

Water



How to deal with our most valuable, and potentially deadliest, resource (Part 2 of 2)

Water is a scarce resource, not only in the Middle East but in many densely urbanised areas around the world. Given our ever-growing thirst for water as countries develop, it is essential to learn about how to make best use of this essential resource that is often viewed as a simple and readily available commodity.

People perceive water in very interesting and often incorrect ways. For example, it is commonly thought that England is a very rainy country and therefore has an abundance of water. However, the south of England has as little rainfall as some parts of Sub-Saharan Africa. In 2004, bottled water in Lebanon could apparently be sold to the Gulf for a higher price than oil.

Agriculture tends to be the largest user of treated water; however houses and buildings are very large consumers too. The most important aspect of conserving water resources is to minimise consumption in the first place. Thankfully, a vast range of water conservation fittings and appliances—ranging from simple to highly complex—is nowadays available for usage within buildings.

Most taps (even existing ones) can easily be fitted with aerators which add air to the

water, thereby maintaining the pressure and volume of the water - the two main elements to maintain users' satisfaction levels - while reducing the actual flow of water. In commercial applications, push taps can be used or even infrared sensors. It is however important to specify good quality infrared sensors as cheaper versions tend to break quite quickly.

Showers work in very similar ways to taps, with aerating shower heads being highly effective. Water can also be limited in the pipework by using restrictors that restrict the flow before reaching the shower head. Generally speaking, with high quality shower heads, 6-9 litres per minute is the minimum amount of water that is typically accepted by users. Standard size baths of 1,700mm can also have a large impact on water usage: Best practice baths are ergonomically fitted to a human's body shape and consume less than 150 litres per bath.



That being said, the largest water consuming fixture in any household is in fact the WC. It therefore makes sense to look at reducing municipally treated water that is just flushed away. At a minimum, toilets should be dual flush of 4 / 6 litres, while others exist on the market for a simple mono flush of 4 litres. Best practice dual flush WCs are 2.5 / 4 litres; they require modifications to the pan in order to ensure good working order. Look out for the Waterwise logo or you can access their website www.waterwise.org.uk or <http://www.eca-water.gov.uk/>

Care should also be taken when specifying white goods. There are indeed significant differences in water consumption of washing machines, washer dryers, and dishwashers. Best practice washing machines and dishwashers will use 49 litres and 13 litres respectively.

Another main element to consider is reducing or eliminating the potential for any leaks. Two different strategies can be employed either together or alone in non-domestic buildings. Firstly, water can be automatically shut off to toilet blocks when not in use by coupling a solenoid valve with a PIR sensor, which could also control the lighting in the toilet area. This will have the effect of cutting all water supply to the toilet block thereby preventing leaky toilets or taps from wasting water. Secondly, leak detection systems can be installed: They

will monitor water consumption based on regular patterns and notify the building manager of any potential leak based on irregular or unlikely usage, for example a high water use over holidays or weekdays can be an indication of a leak.

Finally, once low water fixtures and appliances have been fitted, and every effort has been made to reduce the potential for leaks, then rainwater collection and greywater can be considered. Rainwater systems are generally quite straightforward where rainwater undergoes a simple mechanical treatment system to remove leaves, dirt, and other debris. The cleaned water is then stored in a large tank, generally under or on the ground due to the weight. As rainfall is, by its very nature, intermittent typically large tanks are required. For example a 4-bedroom house in the UK would have a 3,500 litre tank. As rainfall is even more seasonal in Lebanon, it would be likely that a much larger tank is required to store water for the dryer summer months. Generally speaking, rainwater is used for non-potable applications, such as toilet flushing, sinks, laundry, and even showers in some cases. One distinct advantage for using rainwater for laundry in areas of hard water is that clothes tend to be softer and appliances don't get damaged because of limescale! Rainwater collection could also prove very valuable for irrigation purposes, and simple to implement.

Greywater recycling takes used shower and hand basin water, treats it to remove soap and hair particles, and stores it in a tank. Most often greywater is only used for toilet flushing and watering external areas (as long as it is not consumable fruits and vegetables). There are some very simple greywater systems that are small enough to fit in the partition of internal walls, but most tend to be on the larger scale. The best types of buildings for greywater will be student residences and hotels where there will be both a large supply of greywater due to the showers coupled with a high demand for flushing toilets. Greywater has also the advantage of only requiring minimal storage volumes, as supply and demand should be closely matched. Keep in mind however that greywater and rainwater systems, like any systems, will require a certain amount of maintenance and will inevitably lead to more complicated detailing. For example, pipework may be duplicated in instances although not necessarily in well designed applications.

There is indeed great scope to reduce water consumption and waste in houses and buildings, with a variety of solutions suitable to different buildings and applications. Nonetheless, in order for those measures to prove effective, it is important to consider the satisfaction of the end users as well as educating people on how to lessen water consumption without reducing their quality of life ■