

Flushed away

Lisa Farnsworth, Director of Stormsaver Ltd and a member of the UK Rainwater Management Association, says water use needs to be part of the climate change conversation

Businesses and consumers are increasingly starting to ask the right questions in relation to the sustainability of the goods and services they buy. Nowhere does this apply more sharply than in the design and construction of new commercial buildings and homes.

With businesses starting to pursue individual net-zero carbon agendas, and homeowners wanting more affordable energy bills, there is a growing array of techniques and technologies available to help reach both goals. The challenge for building designers and engineers is to understand where these technologies fit into their projects, and how to integrate them cost-effectively.

Taking homes as an example, in a Home Builders Federation survey undertaken before the ongoing rise in energy prices, 73% of respondents said they are worried about the energy performance of their current homes, and 24% said energy performance would be crucial to their next home-buying decision. With environmental credentials already playing a key role in business brand values, and running costs always high on management agendas, we can be certain that business managers will have a similar mindset.

None of this will be news to engineers that have been involved in landmark

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commercial projects both nationally and around the world. However, more locally it has been left to a few forward-thinking regional housebuilders to take up the challenge.

One example is by designing and building new homes that require no central heating – a huge opportunity to save space and water heating costs, which for some projects amounted to as little as £1 per day at the time of completion. This was achieved by using and successfully integrating an array of environmental technologies.

As with most things environmental, a triple bottom-line approach needs to be taken when designing and engineering new buildings to higher standards. At

every stage of the design and build process, decisions need to be taken not solely from a financial perspective but also need to consider what is good for homeowners and the environment. The key to getting this equation right is the technical advice that only engineers can provide.

Climate change impacts

Some of the changes to environmental build standards for new homes and commercial developments are likely to flow from a recently completed Department for Environment, Food and Rural Affairs (DEFRA) consultation. This took a comprehensive look at the effects climate change will cause to the environment, with the aim of setting targets for the government to manage them. Once the targets are set, practical actions to deliver them will follow.

A good example of the approach being taken concerns the management of public water supplies, the availability of which is being threatened by a growing population and diminishing sources as a result of climate change; this latter aspect is well illustrated by the changes in growing conditions already being experienced by farmers, particularly throughout England south of the Humber estuary.

According to the DEFRA consultation, as the population grows, the threat to public water supplies needs to be tackled by a range of measures – for example, by reducing per capita daily water consumption to 110 litres from its current level of around 150 litres.

Once the government agrees a new target consumption level along these lines, it will need to introduce practical measures to implement it. As it will not be easy to change existing building stock to reduce the mains water consumed daily, it's reasonable to assume that new build homes and commercial developments will need to account for most of the savings.

Around 50% of the potable water delivered to a home through public water supplies is used for non-potable purposes, such as for flushing lavatories and washing machines. This 50% can just as easily be provided by well-established water re-use technologies, such as

rainwater harvesting and greywater recycling. This ratio of potable to non-potable water consumption is even more slanted in most commercial buildings, where there is likely to be a strong bias towards the flushing of toilets rather than other uses, for example.

Less of a drain


Rainwater harvesting systems are simple to install when a building is being built or refurbished. Water falling on the roof, which would otherwise be channelled to soakaways or a storm drain, is diverted instead to an underground storage tank used exclusively to supply toilet cisterns, washing machines and outside taps.

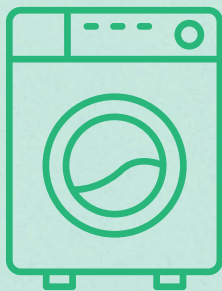
These are served via separate non-potable pipework, with systems sized to match their collection and usage potential. This potential is largely dictated by roof area and occupancy, the latter determining how much non-potable water is likely to be used. Commercial buildings and larger detached houses might typically have their own independent system, whereas smaller terraced homes might share a larger communal system.

Where there is a mismatch between the available collection roof area and the occupants' potential demand for non-potable water – for example, in a hotel or student accommodation – then a greywater recycling system might be preferred. These systems collect and cleanse bath and shower water for non-potable re-use. There is generally an excellent match between the water used for bathing and that needed for flushing toilets in such buildings.

Money saver

If that all sounds as if it will add to a project's cost, this is where triple bottom line thinking enters the equation. If considered as a straightforward add-on, water re-use is an added cost. However, taking rainwater harvesting as an example: if it is engineered into the overall development design from the outset and is fully integrated with the site sustainable drainage requirements, over time it results in considerable savings.

Moreover, including water re-use can make the difference in obtaining planning permission in a water-stressed area. Better still from an environmental perspective, a recent study commissioned by Waterwise concluded that re-use systems such as rainwater harvesting also lower the carbon footprint of overall water usage, thus also contributing to a net zero agenda. 



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