

Prevent Scale To Reduce Energy Bills

While Government-designed initiatives such as the recent “Green Deal” scheme tend to focus on large-scale, potentially expensive ways for homeowners to improve the energy efficiency of their properties, there are simpler, lower-cost options that could increase efficiency and help reduce energy bills too.

For example, reducing scale deposits in water systems.

Damage to a boiler for example, caused by the high calcium and magnesium content of the water, impacts on both its lifespan and energy efficiency. Lowering the efficiency of water-heating appliances will only exaggerate the impact of rising energy prices. It will also increase the carbon footprint of the residential housing sector – which accounts for 13% of our annual CO₂ emissions (source: Energy & Climate Intelligence Unit).

What causes limescale?

Broadly, the central, south and eastern areas (around 60%) of England have “hard” water with a high mineral count absorbed from the predominantly chalk and limestone bedrock. Where the bedrock is impermeable, for example, granite, minerals are not absorbed and the water is deemed “soft”.

What are the dominant effects?

Limescale is not known to have any harmful effects on human health, but scale clogs pipes and heat exchangers when deposited on the inside surfaces as calcium and magnesium compounds.

The resulting build-up of scale reduces the efficiency of a heating system. The deposits impair the transfer of heat into water, reducing the heating efficiency and allowing the metal boiler components to overheat, which can in turn lead to the boiler failing.

What is the impact on energy efficiency?

The impact on energy consumption and household bills of scale build-up should not be underestimated. Space and water heating consumes around 80% of the average UK household’s total annual energy consumption – around 15,600 kWh (medium usage), costing £1,950. A high proportion of this involves heating water to use directly.

The Carbon Trust calculates that every millimetre of scale (around one year’s deposit) on a boiler’s element will increase its energy consumption by 7%.

While Part L of the Building Regulations focuses on lowering the rate of limescale reduction in new homes where calcium levels are higher than 200ppm, what are the solutions for homes built before 2006, when the new Regs came into effect?

Managing scale reduction in existing housing stock

Common ways of treating hard water and lowering scale deposits include water softeners that introduce salt to the water as it flows into the property, removing the hard minerals from the water and thus ‘softening’ the water. They are typically bulky, costing around £400 to buy and many leading boiler manufacturers do not approve the use of salt-softened water in their appliances.

Other systems on the market create electric fields generated in coils of wire on the supply pipe which can apparently alter the structure of the calcium preventing it from building up. But, despite their popularity, there are questions as to their effectiveness.

Introducing phosphate into the water, as is the case with Combimate, is another long-standing and popular solution. Minute quantities of a polyphosphate compound keep the minerals in the water in suspension rather than allowing them to form scale deposits. They cost around £140 per unit, and are both very easy to install and require simple annual maintenance.