MAY 2019

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HEARST

New-builds are usually thought of as warm, fuel-efficient and ecofriendly, while period homes are seen as cold, draughty and expensive to heat. But now there's a way of renovating older homes to make them as efficient as their younger neighbours – so much so, they don't even need central heating

Thanks to an innovative retrofitting system, this Victorian home and its neighbour now meet stringent ecofriendly standards

In the fashionable Manchester suburb of Chorlton are a pair of smart semi-detached Victorian villas that many people would regard as dream homes. With five bedrooms, lovely period features such as plaster cornicing, stained-glass windows and refurbished chandeliers, as well as converted basements, they're extremely covetable.

But now they have even more to recommend them, as they can be classified as Europe's first Passivhaus EnerPhit Plus homes, and have been cleverly designed and re-fitted to reduce energy use to the point where they don't actually need central heating. Along with innovative low-maintenance features – such as super-tough, crack-resistant graphene paint and external cladding that is 'pre-fossilised' to guard against rot – this zero-energy approach will contribute to individual household savings of up to £5,000 a year.

One hundred pallets of insulation, largely made from recycled newspapers, help to maintain a year-round even temperature. In addition, an in-built Mechanical Ventilation Heat Recovery system (MVHR) includes a thermostatically controlled rooflight with an automatic rain sensor to provide passive cooling. Water from the sinks directly flushes the loo and outside a Sustainable Urban Drainage System (SUDS) made from recycled car tyres not only relieves stress on the drains but also keeps the drive weed-free.

'Period semi-detached properties represent a huge portion of the UK's housing stock, yet they're one of the trickiest formats to upgrade,' says Kit Knowles, whose specialist eco-consultancy, Ecospheric, undertook this ambitious retrofit. 'One of the most difficult elements was deciding how to approach the front facade. With double-storey bays, brick detailing, stained glass and curved top windows, they're a beautiful example of Victorian architecture. The glazing requirements alone were complex.'

Another challenge was replacing the internal skins of brick with timber structures to support the insulation, and then finishing them with organic lime plaster to allow the walls to breathe. As was fitting Photovoltaic (PV) panels on the roofs to power lighting and appliances and heat the hot water tanks – the first in the world with a thermocline (which 'floats' hot water on top of cold) control. However, as the homes generate more power than they use, their new owners will enjoy an added bonus – they will be able to sell the excess electricity back to the National Grid. ▶

Thanks to a high-spec retrofit, a pair of Victorian villas in Manchester (see previous page) now benefit from the highest standards of warmth and insulation, while retaining beautiful period details

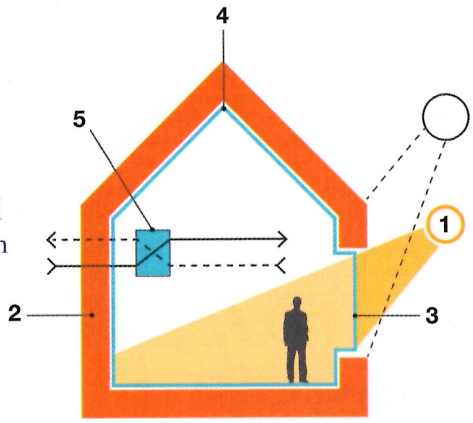
RETRO-FITTING

The principle of retrofitting is to upgrade an existing home to make it more energy efficient.

- For maximum benefit, you need to consider the performance of the entire property. For that reason, a full house renovation is the ideal time for a complete retrofit as walls and ceilings may be coming down, floors lifted and doors and windows replaced, so new insulation, ventilation, energy sources and lighting can be easily installed.
- Adding an extension or converting the loft can offer a good retrofitting opportunity as you have to rethink how your entire home operates. This may mean an overhaul of the heating system, perhaps with the addition of a new boiler, such as a condensing model, or a low-carbon air or ground-source heat pump.
- A number of improvements, such as adding internal wall insulation or external thermally efficient render and insulating boards, can be undertaken as stand-alone projects.

HOW ENERPHIT WORKS

Usually applied to new-build homes, the stringent Passivhaus standard relies on creating a balance between airtightness, indoor air quality and thermal comfort. Kit Knowles at Ecospheric explains: 'In a new build, it's usual to find a timber structure infilled with insulation and finished with a continuous membrane on the inside that enables the property to remain virtually airtight, whereas in a retrofit you commonly have a brick wall supporting a timber roof and floor structure. Therefore, it's inherently difficult to make them airtight and insulate them, and they often form considerable thermal bridges or cold spots.' Enerphit is a standard devised to apply to low-energy retrofit projects where the existing architecture and conservation issues mean that meeting the Passivhaus standard isn't feasible.



Passivhaus principles

1 Solar orientation
2 High insulation performance
3 High-performance windows
4 Airtight enclosure
5 Balanced ventilation with heat recovery

FIND OUT MORE...

- **The Passivhaus Trust** is the official source of Passivhaus and EnerPhit standards (passivhaustrust.org)
- **Greenspec** is an online resource providing the latest news on sustainable home-related products and professional services and is useful for research (greenspec.co.uk)
- **The Energy Saving Trust** has the lowdown on all aspects of home energy efficiency (energysavingtrust.org.uk)
- A government-backed guide **What does it cost to retrofit homes?** includes project costs, with advice on how to upgrade your home's energy efficiency. Find it at *https://www.gov.uk/government/publications/domestic-cost-assumptions-what-does-it-cost-to-retrofit-homes*

5 WAYS TO IMPROVE YOUR ECO CREDENTIALS

Insulate efficiently
Most homes have some insulation in the loft, but not all have the 270mm depth recommended. Topping up from 120mm to 270mm should cost about £240, but with savings of up to £12 per year, it eventually will pay for itself.

Upgrade the thermostat and timer
An efficient thermostat and timer ensure the heating only comes on when you need it – in other words, when your home dips below a certain temperature. This can save an average of £55 a year. Your room thermostat should be set between 18°C and 21°C.

Down with draughts
There are lots of simple DIY products to tackle this. Draught-proofing a chimney alone can save around £15 a year.

Invest in a new boiler
If your boiler was installed before 2004, it may be an inefficient non-condensing model. Condensing boilers are more energy efficient. For instance, if you have a G-rated boiler with some heating controls, by upgrading to an A-rated one with a full set of heating controls you could save about £200 a year. Seek advice from a reputable heating engineer on the most efficient system for your home.

Look at your windows
Most homes now have double-glazing. It may be worth upgrading to triple but not always. It pays to take professional advice.

WORDS JAYNE DOWLE **PHOTOGRAPHS** RICKMCCULLAGH.CO.UK. *5 WAYS TO IMPROVE YOUR ECO CREDENTIALS*, SOURCE: THE ENERGY SAVING TRUST. ALL SAVINGS ARE BASED ON A TYPICAL THREE-BEDROOM GAS-HEATED HOME, WITH A GAS PRICE OF 3.63P/KWH. ILLUSTRATION © COPYRIGHT RICHARD PEDRANTI ARCHITECT, PC 2019