

## Home Works

◀ As well as considerations of warmth, there are the cold financial facts to mull over. In his old home, Clarke's utility bills went from £5,000 a year to £1,500 after he carried out energy efficiency renovations, and the property's saleability increased substantially. "I know it added value because I got £200,000 more than any other house on the street," he says. "I had future-proofed that house, so the new owners didn't have to do anything. It was leaking like a sieve when I bought it, but by the end it was the best house on the street — and without a doubt the greenest."

His advice to clients who consult him at his architecture practice, George Clarke + Partners, is to get the basics right. Before shelling out for expensive features (solar panels, double-glazed windows) Clarke recommends starting with draught-proofing and insulation — of which he is a big fan.

"Insulation is the cheapest and easiest thing to do with the shortest payback time. It's just fantastic. I go way beyond Building Regulations in the homes I work on — I stick it in the loft and in the floors of all the rooms. You don't have to, but I do it because it stops heat crossing from one room to the next. When it's really hot at the top of the house but downstairs in the kitchen and living room it's freezing, it's because the heat is escaping. Insulation would stop that. And if your boiler is ten years old, you should probably upgrade it — on the whole we don't; we wait until it's literally absolutely knackered. The ridiculous thing about that is if your boiler is ten years old, the parts are inefficient, which is costing you more money and more heat."

"All the houses on my street were built in 1910-1915. I'd say only 5 out of the 100-135 houses there have double glazing, which is ridiculous really. People have been banging on about double glazing for the past 30 years. It's mad; we are just wasting so much."

In ten years' time does Clarke think he'll be walking down his street to find most people have double glazing? "That's the aim," he smiles.

### George Clarke: the basics

- Check windows are fully sealed. There is no point having a double-glazed home with a gap around it letting in air.
- Don't forget to draught-proof keyholes. Some old homes have huge keyholes, which let air whistle through.
- Insulate, then insulate some more. Consider insulating not just your roof but between the floors as well.
- Change your shower heads. The newer, more energy-efficient shower heads, which start at £20, combine water and air, giving you a more powerful shower that uses less water — and so requires less gas to heat it.



TIMES PHOTOGRAPHER, SUSANNAH IRELAND

## 'We have no gas or oil bills'

Jerry Harrall designed his house, in Long Sutton on the Norfolk-Lincolnshire border, using passive solar principles — aligning it to the path of the sun to use free energy to heat it and provide most lighting in daytime. The five-bedroom house is earth-sheltered, thoroughly insulated and uses natural ventilation; the temperature inside varies by only 3C throughout the year.

Harrall, an architect, his wife, Kay, and their three children moved in to the property in 2001, after a build of almost four years that provided material for his doctoral research into sustainable dwellings. The house won the RICS Sustainable Building of the Year in 2005.

Despite having no gas connection, boiler or radiators, Harrall says the back-up underfloor electric heating was turned on only twice this winter, despite record cold temperatures. "We have no gas or oil bills and no ongoing system maintenance or replacing of old parts," he adds. And besides the savings and environmental feel-good factor, he says living in a house that is flooded with natural light makes you happier.

Harrall, who is 52, says that he has had an innate sense of environmental responsibility since childhood and it was natural for him to pursue a fossil-fuel-free agenda when he started his architectural practice, SEArch Architects, after an unconventional training: he left school with no GCSEs and worked for seven years as a plasterer before returning to his studies.

The Harralls had the advantage of building their home from scratch, and the result is a home unlike any typical semi-detached or terraced house. However, Harrall says that the same basic principles can make a tremendous difference when applied to existing properties.

In fact, Harrall is the brains behind the Greening the Box initiative, introduced by his practice and adopted by Wherry Housing Association in partnership with Broadland District Council, to show that existing dwellings can be adapted for "the inevitable low-carbon future". It spent £66,000 making changes to a 200-year-old semi-detached house in Ringland, Norfolk — covering it with external insulation, increasing south-facing glazed areas and boosting the thermal mass of floors and walls — that have cut its running costs by 80 per cent.

The Harralls' home in Long Sutton is on the market with The Modern House estate agency for £299,000 (020-7704 3504). They hope to build a smaller home near by based on the same principles, or apply the concepts to a "typical three-bed builder's box".



## The smarter way to warm your nest

Thermostats may be necessary, useful and save you hundreds of pounds a year on heating bills, but one thing they most definitely are not is attractive. But that is set to change later this year with the UK launch of a revolutionary new thermostat from a team including two former big players at Apple. The Nest Learning Thermostat has the same sort of sleek, intuitive design as the iPod and iPhone — *Wired* magazine even says it is "sexy".

When it is launched in the UK, Nest is expected to be included within the Green Deal. In the US it is in its second version, which, like the iPhone 2, is thinner and more powerful than the original. The unit itself is a small cylinder in brushed steel with a multicoloured display.

To get started, you simply rotate the outer ring to adjust the temperature. The display turns blue when cooling and red when heating, and you push it to open the menu for more options.

It is possible to programme Nest from the start but you don't have to. The thermostat learns from your behaviours and preferences, creating a customised heating and cooling schedule. It picks up your routine in a week and starts to work automatically to save energy. Nevertheless, the unit will keep refining its schedule over time. You

can connect Nest to your home's wi-fi and the system also has apps for Apple and Android, which means you can monitor and control your heating from your phone, tablet or laptop on the go, or simply from bed if you're feeling too lazy — or frozen — to get up.

Heating and cooling costs account for about half the average household energy bill. The programmable thermostat was developed in the 1970s to help people conserve energy, but studies suggest one in nine owners rarely or never sets a programme because the devices are too baffling.

According to its manufacturers in Silicon Valley, Nest uses sensors, algorithms, machine learning and cloud computing to get round this: "Nest learns behaviours and preferences and adjusts the temperature up or down accordingly,

making you comfortable when you're home and saving energy while you're away. Nest also provides people with tips and information to help them make energy-saving choices."

The company will not give any indications of UK pricing, but the thermostat costs \$249 (about £160) in the US. It is expected that Nest will be available as part of the Government's Green Deal scheme, which means you won't have to pay for it up front but will be able to get finance, with repayments that should be no more than the savings you make.



# How to retrofit an old home

Many owners of period properties want to improve the energy efficiency of their homes and reduce fuel bills but fear they may ruin the historic character and devalue the

building. Previously, energy-saving measures such as solar panels and double glazing were visually intrusive. But technology has finally caught up and it is now meeting aesthetic demand. "While owners of listed and historic properties can feel constrained by the inherited fabric of old buildings, they should be encouraged to realise that there are a number of significant energy-saving measures that can be considered that do not compromise their intrinsic qualities and character," says Jeremy Blake, a partner at Purcell architects. So whatever your property, it is possible to make your home greener, more sustainable and cheaper to run. Here is what you need to know.

### Take a holistic approach

"Think of the building as a whole," says Roger Hunt, the co-author of the *Old House Eco Handbook*. "If you rush in and change the odd thing, you may create problems further down the line." For example, draught-proofing or adding insulation could inadvertently make the property damp. And fix any existing damp problems before you start to retrofit. "Thinking long-term will save you from having to redo the job later, which is a waste of money and materials," Hunt says.

### Revamp your heating system

If you think your heating system is not up to scratch then consider an overhaul. "Most heating systems will need to be replaced every 20 to 30 years, so plan ahead," says Jonathan Garlick, of the Society for the Protection of Ancient Buildings. "Make sure it is in an easily accessible location so you don't have to destroy part of the building when you want to replace it." Log-burning and wood-pellet stoves are a more efficient way of heating a room than open fires. They are more environmentally friendly, as wood is a renewable product, can help lower fuel bills and are not draughty. But the capital cost is high (up to £1,500), they will only heat one room, and you will have to pay for installation and fuel.



### Get to know the building

"It is a good idea to live in the building for at least a year before you plan a retrofit," says Garlick. "It will help you to understand the building and how it reacts to different climatic conditions throughout the seasons."

### Get some tests done

Buildings lose most of their heat through gaps around doors and cracks in floors, walls and ceilings, as well as through the fabric of the building itself. You can get a thermal image survey of the façade, which will show heat loss, uninsulated areas and air leakage. Garlick suggests getting an airtightness test at the same time. This assessment will give a measurement of leakages within the property and pinpoint draughts.

### Create a greener roof

You can now buy solar tiles (for heating water and generating electricity) that form part of your roof rather than stand proud, so they are not as visually intrusive. Make sure your roof is able to

take the additional weight, and remember that you will also need to fit cables and pipes.

### Draught-proofing

Homes can lose 15 to 20 per cent of their heat as a result of draughts, according to English Heritage. A lot of cold air comes through floorboards but it can be easily blocked with foam or plastic strips, or try Hunt's method: "Buy string to match the size of the gap, paint with wood stain in a shade to match the floor boards and push into the gaps. It's a messy process but it is the cheapest and best way of doing it." Fix draught excluders to doors and covers on keyholes, and make sure your letterbox shuts properly. However, do remember



that by reducing draughts you may also reduce ventilation, so make sure that you have a good extractor fan in both the bathroom and kitchen.

### Small changes can make a big difference

There are plenty of things you can do to lower your energy costs that are cheap, take little effort and cause no damage to the building. Keep in the heat by hanging curtains across the back of the front door and the bottom of the stairs. Put up heavy curtains and blinds across windows, and use shutters if you have them. "Close them before it gets dark to hold in the heat," Hunt says. "The more layers you have, the warmer your house will be." Fit a chimney balloon to stop warm air escaping and cold air being drawn through your fireplace. Swap incandescent light bulbs for LED lights; they are pricier than compact fluorescent bulbs (which replaced the incandescent bulbs) but last much longer. "LED bulbs are now available on dimming circuits and for light fittings such as chandeliers," Blake says.

### Water consumption

If you have decided to install a new kitchen or bathroom, look for products that use less water,



such as low-flush lavatories and taps with aerators. You can also make savings just by buying a more efficient shower head.

### Think about insulation carefully

Insulation is one of the most effective ways of reducing heat loss but it is important to make sure it is the correct option for your property. Insulating the loft is easy and has no detrimental effect on the fabric of the building. Tread with caution when insulating walls and floors. If you have solid walls (most homes built pre-1919 have solid walls) it is important to remember that they

need to remain breathable rather than airtight. Limecrete, a relatively new material, is a great alternative for older properties as it is breathable and can create a solid surface. "Any masonry repairs must be undertaken with lime mortar that is breathable and enables rapid evaporation through the mortar joints, as well as thermal movement," Blake says. "Cement mortar negates this process and the brickwork suffers."

### Make repairs

Period windows are valuable assets, so resist the temptation to replace them even if they are draughty and rotten. "Think of original windows as antiques — you wouldn't throw out an antique chair if it was in bad repair," Hunt says. "It is more sustainable to repair a timber frame, because it could last a further 800 years." Draught-proofing costs £220. To draught-proof and fit double glazing would be £750. Secondary glazing can be fitted over the original windows and is much cheaper than replacing them. They help prevent condensation and can be removed in summer.

### Planning permission

Always check whether you need planning permission before you start work. Remember that buildings are listed inside and out.