energy saving trust

Smarter home. Greener home.

Guide to green renovation

A room-by-room guide
with all you need to know

Contents

Your room-by-room guide to green renovation

Planning a home upgrade? Looking to live a greener life? By making low carbon choices as part of your renovation project you can shrink your carbon footprint while saving both energy and money.

There are lots of good reasons why people choose to upgrade their home. You might want to create more space, or to boost the market value of your property. Whatever your motivation, energy efficiency is a factor you can't afford to ignore – especially today.

As energy prices remain high, choosing energy efficient options when you're having work done to your house is a smart move – you'll benefit from lower fuel bills in the long run, as well as doing your bit for the climate emergency.

Whether you're considering insulation, solar panels or a brand-new heating system, we've got you covered with expert advice that's always free and impartial.

Looking for a quick fix? By replacing your remaining lightbulbs with energy efficient LEDs you could cut your carbon dioxide emissions by up to 40kg per year, and save money on your bills.

Professional draught proofing of windows, doors, floors and skirting boards will cut your household carbon emissions by 215kg each year. If your budget doesn't stretch that far, heavy, lined curtains are a cost-effective way to keep more heat in the house, thus saving money.

At the other end of the budget scale, a heat pump is an attractive, longer-term sustainable heating option. The most common heat pump type for homes – an air source heat pump – currently costs between £7,000 and £13,000 to install. The payoff comes over time in lower running costs and fewer emissions. Replacing your old gas boiler with an air source heat pump will slash your carbon output by up to a whopping 2,800kg each year.

By putting energy efficiency first, you'll be taking key steps towards future-proofing your home in a fast-changing world. The money you spend on improvements is an investment. By making energy efficient choices today you'll watch your bills come down tomorrow. You'll also be protecting your home against future regulations, helping you get ahead of the game.

Changes you make could boost your Energy Performance Certificate (EPC) rating – a real bonus if you're planning to sell your property one day, or looking to let it before then. Against a backdrop of rapidly rising prices, buyers and renters (not to mention estate agents) are increasingly viewing EPC ratings as an important measure of a home's worth.

By making low carbon choices you'll also be safeguarding your home against any future phase-out of current energy systems – something we'll all have to keep an eye on within the context of efforts to hit net zero carbon emissions by 2050.

To sum up – making sustainable choices when you renovate your home can help you reduce your carbon footprint and challenge the climate emergency. And it's often better for your wallet, too.

Take a tour of our virtual house for a room-by-room guide to greener renovation, featuring top tips and insights from Energy Saving Trust's energy expert Joanna O'Loan.

Joanna says, 'Our door is always open. Come on in. In uncertain times, being proactive about your renovation plans can help give you a sense of control. By taking even simple steps on your journey towards a greener lifestyle you'll be making a positive difference. And that's a good feeling!'

> “In uncertain times, being proactive about your renovation plans can help give you a sense of control. And that's a good feeling.”
>
> **Joanna O'Loan**
> **Energy saving expert**
> Energy Saving Trust

01

Living room and bedroom

If you're renovating or redecorating your living room or bedroom, making smarter choices when it comes to technology and lighting can help you save energy and money.

We've got lots of tips on getting the best from energy-efficient lighting in your living room. A priority for many of us in this important room is to achieve the 'warm white' colour temperature we're used to, in contrast to the cooler task lighting usually chosen in the kitchen or office. You can do this by fitting 2,700 Kelvin LED bulbs, which are similar to the old tungsten lights.

Getting creative with circuitry and dimmers helps you set the tone in your principal living space. You can design your room to make the most of natural daylight, and fit a control system to help you control low energy lighting when you need it, allowing you to recall your favourite configuration at the touch of a button and match your lighting to your mood.

Advanced controls can also help you save energy by adjusting local light levels to suit a particular task or activity. If you're reading a book, for example, you'll want a certain level of light around you. If you're sitting on the sofa watching TV, a warm glow will do the job.

Incorporating table or floor lamps can help you position lighting in areas you need it. This minimises the number of bulbs needed, helping you use less energy.

How do you create that all-important 'cosy' ambiance in your bedroom using low-energy products? Check out our helpful tips on getting the most from energy efficient lighting in the bedroom.

Similar to the living room, it's worth considering floor and table lamps to create a softer, subtler atmosphere in your bedroom. To get this look in an energy efficient way, design your lighting to use the minimum number of bulbs, make sure switches are easy to access, and always choose low energy bulbs.

01

Get clever with your circuitry if you want to adjust the mood. Even a ceiling light becomes far more flexible and versatile when you fit a dimmer switch. If your budget stretches to it, why not consider a control system that allows you to set the scene at the touch of a button or smartphone? If you're guilty of leaving lights on when you don't need them, being able to control your lights from your smartphone means you can check this even when you're not at home.

Be smart when choosing tech

With home working now the norm, many of us are sitting in front of a computer for hours at a time, often in the living room or a bedroom. Bear in mind that a laptop typically uses 85% less electricity than a desktop PC, saving you money on your energy bills.

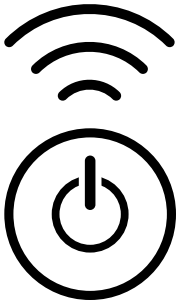
Joanna says, 'Part of upgrading or updating your home is about making life easier for yourself. If your living room or bedroom is doubling up as a new home office, for example, it might mean budgeting for an extension lead with a switch that allows you to power everything off at once.'

Lastly, a word about your TV. New room, new TV? Large TVs in particular are power-hungry. The larger the screen the more energy consumed, regardless of overall energy rating. Having chosen the smallest TV that still suits your needs, the best way to save energy and money is to lower the brightness setting where possible, and to switch the TV off completely when not in use.

If you use streaming services, consider choosing a TV which has these services built in. It'll use less energy to watch streaming services direct from the TV, rather than powering another device like a games console.

Top tip

Don't leave your games consoles on standby. Switch them off completely when they're not in use – overnight, for example. On the other hand, be wary of switching off your router. Suppliers have been known to downgrade domestic broadband speeds when they see a hub is regularly disconnected.



02

Kitchen

Thinking about a new kitchen as part of your green renovation? If you're planning new appliances as part of your kitchen upgrade, we have advice on how to choose the most energy efficient option.

Energy efficiency in home appliances has improved dramatically in recent years. If it's time to replace your older appliances, opting for today's more energy efficient versions will ensure your new kitchen starts life with high-performance products that cut your fuel bills and your carbon dioxide (CO_2) emissions.

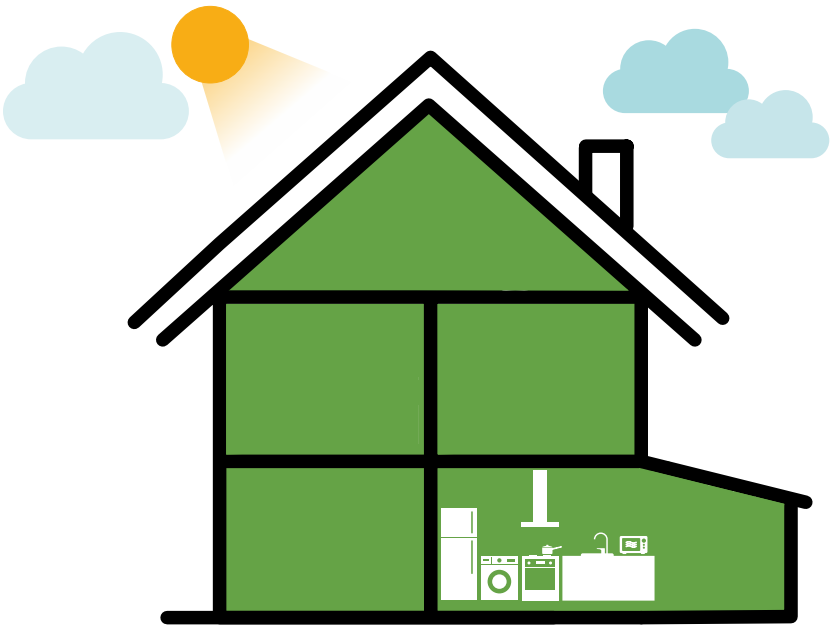
Why not carry out your own energy audit to discover how well your existing appliances perform? A plug-in energy meter and a thermometer are all you need. A fridge, for example, should operate at 3-5°C. You can use an inexpensive energy meter to check the energy consumption of any kitchen appliance that plugs into a socket.

Don't forget to check the product label of any new buys you might be considering. Appliances are tested for how much energy they consume during typical use. This gives them a rating on a new scale of A to G, where A represents the most efficient product in its class, and G the least efficient. This simpler scale replaces the previous energy ratings, which included labels up to A+++.

Joanna says, 'It's not just about the A to G rating of your appliances. Two different sized appliances with the same energy rating might use different amounts of electricity, so it's important to choose the smallest size that suits you. Go for the appliance with the best energy rating for the size you need.'

Fridges and freezers in particular work around the clock, so it's no surprise that some of the biggest savings can be made here. It's also worth considering the energy rating of washing machines, tumble dryers and dishwashers.

You could also consider replacing your old kitchen light bulbs with energy efficient LEDs. Today, you can get specialist LEDs for cooker hoods and fridges. This simple step will also help you make savings right around the home. If you replaced all your remaining light bulbs with LEDs you could save up to 40kg each year in carbon emissions – that's equivalent to the CO_2 emitted by your car when you drive about 140 miles.



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It's also worth thinking about your hot water needs. Have you considered solar thermal, or an air source or ground source heat pump, for example, to meet your hot water needs in the most hard-working room in the house?

Make simple savings

Check out our two-part guide to energy efficiency in the kitchen. Part one of the guide presents simple, everyday steps we can all take to save energy and money. Our tips can help you change your habits, for example by using 'eco' programmes on appliances where possible, and washing clothes at 30 degrees to save 10kg of CO_2 each year. If you run your washing machine and dishwasher only when full, you'll save money by reducing the total number of loads each week.

You can also save energy by turning appliances off standby. Typically anything which can be remotely activated or has a digital clock will use some standby, which can be a drain on your energy use if it doesn't need to be on. If you're having work done in your kitchen, ask your electrician to place new sockets and switches where you can reach them, so you can easily turn things off at the wall. Don't switch off your fridge or freezer, or modems or routers as this may disrupt the programming.

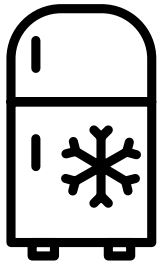
Last but not least, the second part of our guide on how to run an energy efficient kitchen extends to top cooking tips. A microwave is a more cost effective and energy efficient way to heat up smaller amounts of food compared to a gas or electric hob, because it just heats up your food, rather than the pan and the air around it. Boil water in a kettle before transferring to a pan on the stove, and only ever boil as much water as you need.

Keep the lid on your pan. Turn the heat off shortly before your meal is fully cooked. Electric hobs, in particular, take time to cool down, and your food will continue to cook in the pot – just make sure it's fully cooked through before serving.

Prepare your food in larger batches to save energy. Finally, do bear in mind that slow cookers and pressure cookers cost less to run compared to hob alternatives. These humble appliances can play a useful role in your updated or upgraded kitchen as part of a greener lifestyle.

Top tip

Keep the interior of your fridge as uncluttered as you reasonably can so that air circulates around the contents. For freezers, it's the thermodynamic opposite – pack as much as you like in there!



03

Extension or conservatory

Home extensions are an attractive idea. Not only do they add space and value, they often improve the look and balance of a house. But a bigger home means extra space to heat – it's likely to have an impact on your energy costs and your carbon dioxide (CO_2) emissions.

Creating a successful home extension today is all about achieving the spacious, comfortable room you want while adding long-term energy efficiency improvements. We've got lots of useful tips on turning a home extension into an energy saving opportunity.

Don't forget – building regulations stipulate you have to include certain energy saving measures in your extension. New walls and floors will need to be well insulated, plus your loft if you have one. You can also opt for low energy lighting where possible, and fit thermostatic valves to new radiators.

As a homeowner, it's your responsibility to comply with regulations, so it makes sense to confirm with your builders at the start that they'll include all necessary calculations.

Whether you want to shrink your carbon footprint as part of a greener lifestyle, to boost the comfort of your home, or lower your heating bills, planning an extension or conservatory could be the ideal time to think about wider options for improving a home's overall energy efficiency.

While the builders are in, for example, you might want to consider fitting insulation throughout your home.

Sharing some of the costs and hassle with your extension work can help make wider insulation installation more financially attractive, while potentially yielding fuel bill savings of £420 each year if you top up your loft insulation and insulate your cavity walls, depending on your home type.

Adding external wall insulation throughout can give your home a unified look, and a good render will make it weatherproof for years.

Increasing your overall floor space may mean you need to upgrade your heating system. With the transition from fossil fuels gathering pace, now might be the time to look at whether renewable heat is right for you.

03

By electrifying the heating in your home you're increasingly turning your back on oil and gas. Alternatively, if you're upgrading a boiler, aim for the most energy efficient model.

As a minimum, installing a thermostat, programmer and thermostatic radiator valves can save you over £180 per year on fuel bills while making your room cosier or more comfortable. And try to keep bulky furniture items away from your radiators – that way they'll do their work more effectively.

Another factor to consider is how air migrates between your main building and an extension. Some extensions, such as conservatories, won't be heated, so it's vital to ensure sound draught-proofing between heated and non-heated areas.

Again, this is an opportunity to think beyond the extension to consider draught-proofing throughout the house – a great way to cut your fuel bills. Your extension must have doors and windows that meet minimum heat loss standards. Choose the best energy performers you can afford. Top-rated double glazing here might save you £235 each year compared to single glazing.

Even the best glazing loses heat more quickly than an uninsulated cavity wall. This means that all conservatories are thermally inefficient – we recommend you don't heat them at all. An unheated conservatory can actually cut overall heat loss by acting as an insulating buffer outside the house.

Joanna says, 'Make sure the door to your conservatory is the high-performance variety so that you can seal off your cold conservatory in winter. For other types of extension, consider extending your existing heating system to include the new space.'

LED lighting comes in a range of fittings and colours to add the finishing touches to your extension. LED bulbs are a lot cheaper now compared to when they were first introduced, as the technology has become more popular. In an average home, replacing all bulbs with LED equivalents would slash your lighting bill by 69%. You can find out which LEDs perform best by visiting the ToptenUK website.

An extension is a major investment, but it provides a great opportunity to make a range of energy efficient improvements across the home. If you can't take all the possible steps, taking a few will make a positive difference when it comes to your comfort levels, fuel bills and carbon footprint.

Top tip

In a conservatory, consider choosing a tiled or other solid roof option instead of a glazed roof. Although a solid roof can be more expensive, it can make the room more usable as it's easier to regulate temperature, meaning you'll avoid overheating in summer and lower your heat loss in the winter.

04

Bathroom

When most of us think of the bathroom we might not think of it as a part of the house that uses lots of energy. But did you know that the water we use in the bathroom, and elsewhere, contributes to our energy expenditure and our household carbon emissions?

Using less water in the bathroom will not only lower your water bills (if you're on a meter) – it can also reduce your fuel bills and your impact on the environment. By saving water you save carbon – that's because of upstream and downstream impacts within the water supply chain.

If you're planning a bathroom makeover, or you're looking to make improvements to your existing set-up, there are lots of simple, inexpensive steps you can take to save energy and money in the bathroom as part of a more sustainable lifestyle.

Why not start with the shower?
It can be tempting to opt for a luxury, waterfall style shower, but there are water efficient options available which can feel just as luxurious. Some water efficient showers aerate the flow of water, using less water while replicating the rinse feeling. You can also get showerheads that restrict water volume, giving you a more pressurised, massaging shower.

Showers alone account for 18% of a household's water consumption, so choosing a water efficient option will cost you less to run. If a typical household of 2-3 people swapped their old, inefficient shower head for a water efficient version, they could save over £45 on their gas bills and more than £25 on their water bills (if metered) each year. That's a welcome saving of £70.

By shortening the time you spend showering you cut the total volume of water that goes down the drain. You'll also save money on the energy you use to heat the water. Try limiting your shower time to just four minutes. That way, a typical household of 2-3 individuals could save over £95 each year on their energy bills, and a further £60 or more on their water bills (if metered).

Are you a bath or a shower person? Although some of us like a long, hot soak in the tub, swapping just one bath a week for a four-minute shower could save you over £20 each year on fuel bills, plus and extra £11 or more on your water bills.

04

If you're upgrading your bath, size matters. While deep baths can look nice, they often take a lot of hot water to fill and sometimes aren't as comfortable to be in. Try out different options and go for the smallest tub you're comfortable in. Some baths are even designed with contoured internal panels, to add the feeling of depth without needing as much hot water.

Waiting a long time for your water to heat up? This wastes water and could be a sign you need to top up the insulation on your hot water pipes. This will reduce heat loss and could save you having to wait for hot water.

Incorporating an extractor fan into your new bathroom is a great way to reduce the risk of condensation by taking moisture heavy air out of the room. Choosing a fan on a timer means this won't be on for longer than it needs to be – you'll need an electrician to do the installation.

Also consider adding a towel rail which is big enough for all your family's towels. This will allow towels to dry between uses, meaning you won't need to wash them as frequently. If your towels are hung properly with good air circulation, you can also reduce the risk of damp smells.

Save water, save energy

Time now to turn off that tap! A running tap can get through more than ten litres of water a minute, so turn it off while brushing your teeth, shaving, or washing your face. And try to use cold water if you don't really need hot. Heating water for use in our homes accounts for about 22% of a typical gas-heated household's energy bills.

Ever considered fitting a tap aerator? These modest gadgets, which attach to the spout of your tap, reduce the volume of water flowing through the tap without affecting the wash or rinse experience. By fitting a tap aerator you could save over £30 each year on your energy bills, plus an additional £13 or more if you're on a water meter.

Joanna says, 'Not everyone has a water meter, so they won't save on their bills using these tips. But we can all help the environment by fitting, say, a tap aerator which uses less water.'

If you're getting a new toilet, look for a highly efficient (HET) or ultra-low flush (ULF) option – both are designed to minimise water use. Older toilets often have large cisterns, so fitting a cistern displacement device is another simple way to save precious water. Pop this inexpensive item into your toilet cistern – whenever you flush, the device inflates, saving you around 1-2 litres of water every time.

Renovation is also a good time to fix any leaks in your bathroom. Leaks from dripping showers, taps or even toilets contribute to huge volumes of water waste over time. A leaky loo could be wasting 215 litres of water a day!

Finally, if you're considering new lighting as part of your bathroom upgrade, choose LEDs. In fact, right across an average household, replacing existing incandescent and halogen light bulbs with energy efficient LEDs could save over £65 each year.

Top tip

When you replace your shower head, opt for the smallest size that suits. And do think about your shower routine. Get wet, turn off the water, soap up, rinse off – that's the drill if you want to save!

05

Heating & hot water

In a typical household, over half the money spent on fuel bills goes on heating and hot water. An efficient heating system which runs on a low carbon fuel, and you can control easily, is one of the best ways to reduce your energy bills and your carbon dioxide (CO_2) emissions.

If we're to reach the government's net zero carbon emissions target, we'll need to cut the carbon emissions from heating our homes by a colossal 95% over the next few years.

To put this into perspective, the average household generated 2,690kg of CO_2 from heating rooms and hot water in 2020. By 2050 we need to lower this to just 140kg per UK household.

Major changes to how we heat our homes lie ahead if we're to meet these important targets. In the meantime, there are lots of steps you can take right now to make your heating system more energy efficient, saving money on your fuel bills as well as shrinking your carbon footprint.

Because heating and hot water account for so much of your fuel bill, an efficient heating system is the key to saving both money and energy. If it's time to change your boiler, or you're thinking ahead to when it needs to be replaced, now might be the time to switch to a low carbon emission heating system.

Don't forget – fossil fuel heating systems are set to be phased out over time, beginning with a ban on gas and oil boilers in new properties from 2025. Meanwhile, more and more existing homes are making the switch to a renewable heating system.

Our guide to boilers covers boiler types and fuel types, and includes information on the likely cost of replacing a gas or oil boiler. It also offers practical advice on how to modify your existing central heating system to make it more efficient.

Our advice extends to electric heating, including storage heaters and underfloor heating. Although electricity is becoming an increasingly low carbon form of heating as more renewable sources like wind and solar power come on stream, it remains relatively expensive – something to bear in mind.

05

Talking of renewables – biomass is an alternative energy resource generated by burning wood and other organic matter. Is it right for you? Although biomass releases CO_2 when burned, the amounts are lower than with oil or gas systems. Our guide answers your key questions on biomass. Boiler or stove? Pellets or logs? Where will the flue go? Do I need planning permission?

A solar water heating system, which uses the sun's heat to warm your water, is another renewable solution you might want to consider. Although a solar system provides about 90% of your summer needs, this drops to around 20% in winter, so you'll need to top up with your conventional system. On the other hand, sunshine is free! Our guide will help you decide if solar is right for your home.

No green upgrade plan would be complete without a close look at heat pumps. These low carbon heating systems capture energy efficiently from outside your home and then transfer it inside. It's likely that millions of heat pumps will have to be installed in UK homes to meet net zero targets.

Our in-depth guide gives you all the information you need to make an informed decision about whether to install an air source or ground source heat pump. We also focus on how to ensure a heat pump runs efficiently – vital if your new heat pump is to outperform your old boiler.

Sitting beside traditional boilers and today's heat pumps is a third option – hydrogen-ready boilers. If the government went all out to develop the necessary infrastructure over the next ten years, this technology would still only reach 20% of UK households. The hydrogen option is likely to be more expensive than traditional gas. Heat pumps, on the other hand, are already comparable with gas.

Get in control of your heating

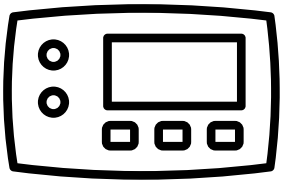
As energy costs continue to rise steeply, it's more important than ever to enjoy maximum control over your current heating arrangements. Our guide to controlling your central heating system looks at how to set your thermostat, how to make the most of your timer, and how to use radiator valves.

Joanna says, 'Control over your heating is everything. There's lots of noise around upgrading your system right now, many homes would benefit hugely by fitting a thermostat, and using their radiator valves.'

Don't forget – innovative smart controls that connect to the internet are another option, allowing you to adjust your settings remotely or in ways that match your lifestyle and routine better. It's all part of making your home as comfortable as possible with an eye on saving energy and money.

Top tip

Have your room thermostat set to the lowest comfortable temperature, ensuring it's warm enough for any more vulnerable occupants in the home. Turn down your radiator valves in rooms you're less often in, like bedrooms, hallways and kitchens and use your programmer to time your heating to only be on when you need it.



06

Insulation

Looking to curb your carbon emissions while keeping energy bills as low as possible? By installing insulation or draught-proofing you'll reduce heat loss from your house, saving money while making your home environment more comfortable.

Even small fixes around the house can add up to significant savings in this context when it comes to your fuel bills and carbon dioxide (CO_2) emissions. Simple steps – like insulating your hot water tank or lagging your pipes – can make a big difference.

Did you know that up to a third of the heat lost from uninsulated homes escapes through the walls? That's why it's so important to consider wall insulation when you're planning your green renovation makeover. In fact, walls, floors and roofs are among the key areas to think about here. We've got all three covered.

By properly insulating cavity walls you'll save both energy and money. Our comprehensive guide to cavity wall insulation explains how to work out which type of walls you have, and describes what a specialist installation company will do to upgrade your home. The guidance also looks at the costs and savings associated with this type of wall insulation.

Our solid wall insulation guide explains what you need to consider in order to upgrade in this area, summarising the costs, savings and benefits associated with this type of insulation, and outlining the financial support that may be available to you.

Our expert guide to floor insulation tells you everything you need to know, depending on the type of floors you have. In a newer house, the ground floor tends to be made of concrete. Older homes are more likely to have suspended timber floors. Whatever type of floor your house has, our guide will help you save money and energy while making your home more comfortable to live in.

Installed correctly, loft insulation should pay for itself many times over in terms of money saved by minimising heat loss from your home. Naturally, that also means it's a good way to avoid wasting energy and to shrink your carbon footprint.

06

Our helpful guide talks you through the dos and don'ts, from choosing materials to managing ventilation, depending on how you aim to use your loft.

If you plan to use your converted loft as a dayroom or extra bedroom, for example, you should have the rafters insulated with a rigid insulation material by a professional installer, rather than insulating the floor with layers of mineral wool.

Eliminating draughts is one of the cheapest and most effective ways to save energy and money – in any type of home. Our guide to draught-proofing your home looks at how much you might save, and whether to go DIY or professional. Our experts assess draughts from every angle, covering windows, doors, chimneys and skirting boards, while highlighting the importance of ventilation.

Talking of doors and windows – we've got information on both in the context of your green upgrade project. Our windows guide covers double-glazed and triple-glazed options, and explains the main energy ratings for windows. It also offers useful advice on finding a reputable installer for your new or replacement windows, and includes a section on building regulations in conservation areas. We also cover doors and conservatories, including content on rectifying damp and condensation issues.

Finally, beware of cold spots when you insulate. Keeping favoured parts of your home warm while leaving others cold encourages mould. An overall 'envelope' of insulation is best.

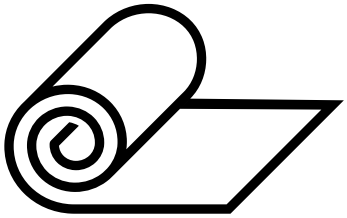
Joanna says, 'Lofts are usually easier to tackle than walls when it comes to insulation, but there's more to be saved by insulating walls.

The most important thing is to consider your whole house and work out which insulation options will be right for you. For a mid-terrace house, for instance, external wall insulation may come up against planning obstacles.'

Looking for the inside story on insulation? Our energy saving champion, retired engineer Peter Tuson, paints a first-hand picture of how to insulate your home and save money. Peter's advice covers cladding water cylinders, insulating doors and windows, and lagging radiators in his 1950s house. But there's something for all of us in his personal take on home insulation.

Top tip

Aim for at least 270-300mm mineral wool for your loft floor – one layer between the joists and another layer at right angles above them. If you plan to use the space for storing boxes, board it. Leaving a gap between the board and insulating material to avoid compressing the insulating material.



07

Solar panels

Solar panels – also known as photovoltaics (PV) – allow you to generate your own renewable, low carbon electricity using energy from the sun. With electricity prices rising sharply, solar could be an attractive option to include in your green renovation toolkit.

A solar panel consists of many cells made from layers of semi-conducting material such as silicon. These cells don't need direct sunlight to do their job – they work even on cloudy days. The stronger the sunshine, however, the more electricity generated.

Each panel within a solar PV system generates around 355W of energy in strong sunlight. A typical system has about 10-12 panels, and generates direct current (DC) electricity. An inverter is installed with the system to covert DC to alternating current (AC) electricity. AC electricity is the type used by your appliances, sockets, lighting and the grid.

Space is a key consideration when it comes to solar. The average system size is around 3.5kWp, which will take up about 25m2 of roof area, although it's not unusual to see systems starting at 2kWp which will take up about 9m2. Your system size can be adapted to the space you have available

Nearby buildings, trees or chimneys could shade your roof, with a negative impact on performance. A south-facing roof is ideal for maximum electrical output. We don't recommend north-facing roofs for solar. Although a system that faces east or west will yield 15-20% less energy than one facing south, this could still cover a good amount of your energy consumption and may even have some benefits if you use more electricity in the morning or late afternoon.

Solar PV panels are considered 'permitted' developments, which means they don't normally need planning permission. However, exceptions apply – it's best to check with your local planning office.

Our solar energy calculator will show you the advantages of a solar PV system, based on your home and occupancy. Benefits include shrinking your carbon footprint and cutting your fuel bills.

07

Sunlight is free, of course, so you'll see your electricity costs come down as soon as your system is up and running. And because solar electricity is a low carbon, renewable energy resource, a typical solar PV system could save around 0.78 tonne of carbon each year, depending on where you live in the UK.

Getting the most from your solar system

With any domestic solar PV system there will be times when the amount of electricity you generate exceeds what you can use or store. If you have a battery, you may be able to store some of this electricity to use another time, or you can export any surplus electricity you generate at home to the grid for others to use. If you apply for a Smart Export Guarantee tariff, you could be paid for the electricity you export to the grid.

The cost of installing a solar PV system depends on multiple factors, with a typical domestic set-up costing around £5,500. This cost can be higher if you opt for solar tiles, which involve removing your current roof, whereas panels that sit on top of your roof are usually the cheapest option.

To help you consider solar in the context of other energy options, our guide includes a section on what type of renewable energy is right for me. Here, you'll find guidance on heat pumps, biomass, and other energy sources, including hydroelectricity.

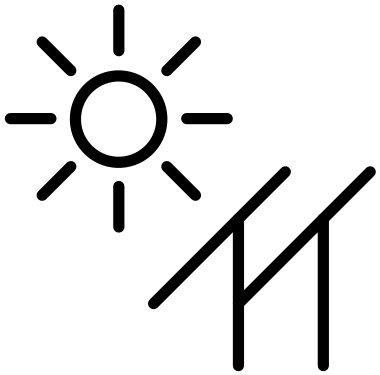
Your solar electricity could help power your heat pump. Heat pumps use electricity to pump heat energy from the outside, in.

Joanna says, 'If you already have solar, think about running your appliances during the day when your system is actually generating. If you're eligible for the Smart Export Guarantee (SEG), shop around to find the export tariff with the best rate and conditions for you. Remember that with SEG export tariffs, you don't have to also buy electricity from the provider you're exporting to.'

We've also got the inside story on why solar panels and electric vehicles make ideal partners. Find out why our head of service delivery Matt Fraser thinks this perfect pairing represents the future for anyone looking to live a greener life.

Top tip

Think about home battery storage for your excess solar energy as an alternative to exporting your surpluses. With today's soaring energy prices, every unit you don't buy from a supplier (ie because you've generated it yourself) is worth around seven times more in household savings.



Next steps

Renovating your home can be an expensive business. While embracing energy efficiency will pay off long term, you'll want to explore all the financial support options you can access today.

A wide range of financial assistance is available to help make your home more energy efficient, or to help you benefit from renewable technologies.

For example, support may be in place to help you make energy efficient upgrades such as fitting insulation or installing a new heating system. Types and levels of support often vary from nation to nation, whether you're focused on keeping warm for less or prioritising carbon savings.

If anyone in your household is receiving benefits, start by asking your energy supplier if they can help. Your supplier should be able to tell you what help is available through the Energy Company Obligation (ECO). The scheme – available in England, Scotland and Wales – obliges suppliers to install energy efficient measures in the homes of those who need them most.

Your local authority should also be able to direct you to helpful initiatives in your area. The UK Government's website has advice on saving energy and guidance on financial support.

If you live in Scotland you can visit Home Energy Scotland for free and impartial advice, including information on grants and loans available to make energy efficient home improvements. You could qualify for an interest-free loan of up to £17,500 to install home renewables, including heat pumps.

There's a wide range of support available to Scottish residents, including those struggling to heat their home. Find out more about grants and loans available in Scotland.

The Welsh Government's warm homes Nest scheme offers free advice on saving energy, energy tariffs, money management and benefit entitlement.

In Northern Ireland, the NISEP programme, managed by Energy Saving Trust, provides grants for making energy saving improvements to your home in areas including heating and insulation. Find out more about NISEP, including how to apply.

From April 2023, the UK Government's new ECO+ scheme will provide funding for insulation to a wider range of people than previous versions of the ECO scheme. This will include those on the lowest incomes, and those living in the least energy efficient homes in lower council tax bands.

The Boiler Upgrade Scheme is a UK Government initiative that encourages more people who live in England and Wales to install low carbon heating systems, including air source or ground source heat pumps, and biomass boilers. Swapping your old boiler for a more energy efficient model is a credible interim option if you're weighing up the switch to, say, a heat pump.

There are plenty of things to consider – from checking local planning stipulations to finding a good installer – before you fit a renewables system to your home.

Choosing the right installer

When it comes to choosing a reputable installer for home renewables, we recommend you find a fitter and a system that are accredited through the Microgeneration Certification Scheme (MCS). To locate an accredited installer in your area, use the search tool on the MCS website.

In Scotland, you can search for information and customer reviews on MCS installers by visiting the Renewables Installer Finder.

You can use the Gas Safe Register to find an installer for any gas work, and the Competent Persons Register to find qualified tradespeople for other work. It's always worth getting three quotes for any work, and checking for customer reviews.

Joanna says, 'Financial assistance available across the country can be a game-changer when it comes to realising your upgrade plans. It makes sense to explore all the support options open to you before you embark on your green renovation journey.'

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>
> **Joanna O'Loan**
> **Energy saving expert**
> Energy Saving Trust