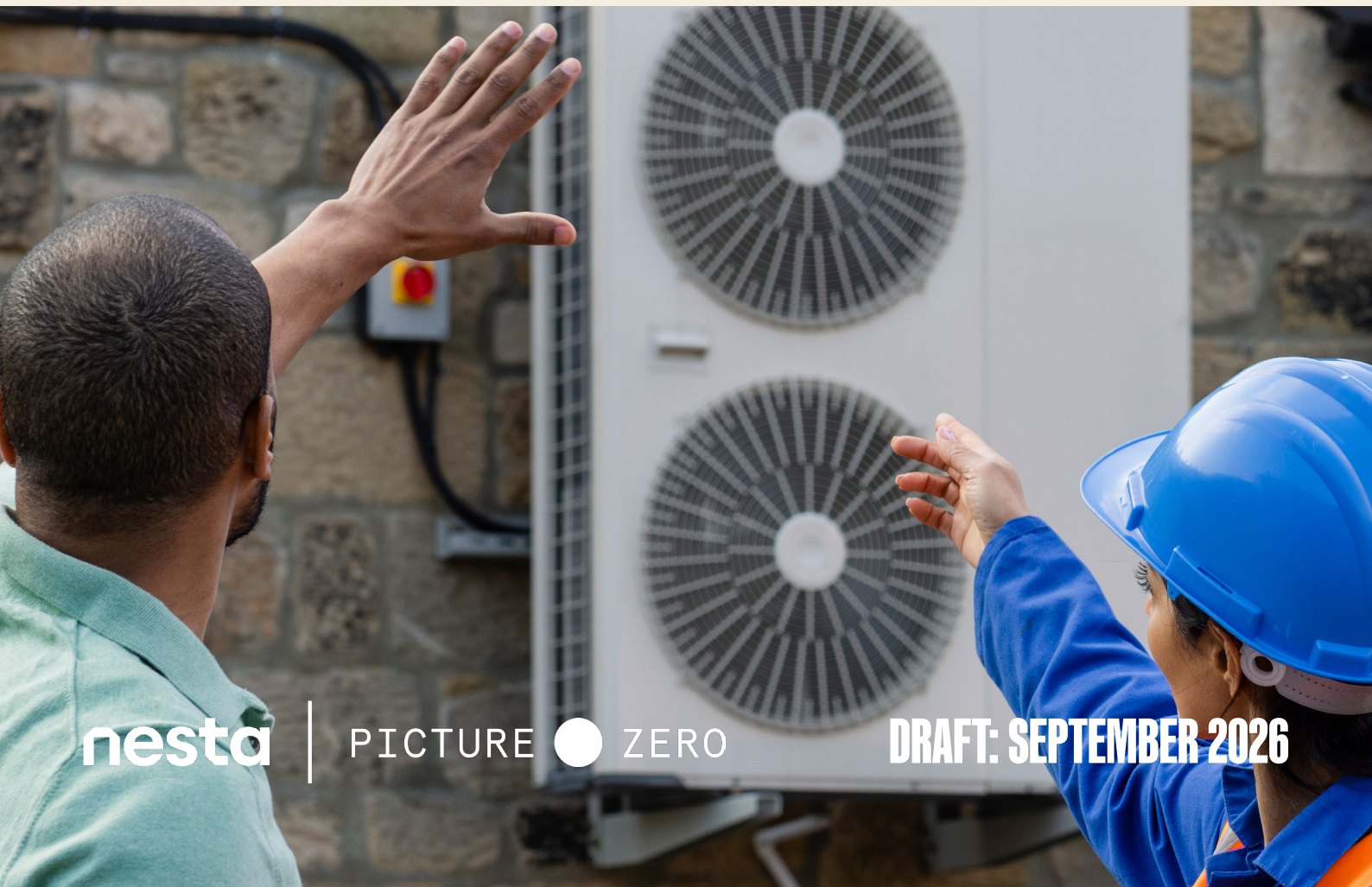




ENERGY EFFICIENT HOME IMPROVEMENTS: FUTURE-PROOFING YOUR HOME

A guide for the TV producers of DIY and home renovation shows.



nesta

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With practical and actionable advice for a variety of budgets and property types, this guide is designed to help you support your contributors in making choices that will optimise their home's energy efficiency and lower their energy bills in the process.

This guide will cover:

- Future-proofing home improvements
- Upfront costs
- Grants
- Practical considerations
- Potential savings
- And resources to find out more

WHY?

Based on scientific evidence, the UK government has committed to cutting greenhouse gas emissions in order to mitigate the effects of climate change, and home heating is a key part of this [strategy](#). Recent announcements include:

- The [Warm Homes Plan](#), announced in January 2026, emphasises low carbon technologies being one of the quickest and best ways to cut the cost of living permanently. The intent is to provide access to solar panels, batteries and heat pumps for every household in Britain, regardless of their circumstances, with funding from grants, loans and means-tested approaches.
- The [Future Home Standard](#), announced in March 2026, requires all newly built homes to produce at least 75% lower carbon emissions than those built using standards from 2013. This effectively mandates heat pumps and solar PV in every new home, as gas and oil boilers would not be compliant with the new standard.

The Warm Homes Plan and advice from the UK Government's independent climate advisors, The [Climate Change Committee](#), suggest that homes will gradually become less reliant on fossil fuels in the future, with electricity being used to heat and power them instead. This tracks with the increased uptake of low-carbon technologies like heat pumps being used to replace gas or oil fueled boilers. Currently, gas is cheaper than electricity, but that could also change due to geo-politics and UK legislation.

For home owners making improvements, it's worth getting ahead. Particularly when it comes to knowing what might be needed to optimise energy use, reduce bills and/ or become more energy independent. Not just now, but in years to come. Because ultimately, optimising our energy use will make our homes smarter, cheaper, cleaner, healthier and greener places to live.

HOW BEST CAN WE IMPROVE ENERGY EFFICIENCY AND FUTURE PROOF OUR HOMES?

REPLACING A BOILER? GET A HEAT PUMP!

The [Climate Change Committee's Seventh Carbon Budget](#) identifies heat pumps as one of the key technologies expected to replace fossil-fuel heating systems in many UK homes over the coming decades. .

A heat pump draws naturally occurring heat from the air, ground or water outside, transferring it inside. Heat pumps are powered by electricity and, highly efficient, typically achieving 300–400% (producing three to four units of heat for every unit of electricity they consume), compared to the 90–94% efficiency of a top gas boiler. This would [reduce household emissions by up to 70%](#) compared with a gas boiler.

Heat pumps can be expensive to install, but there are government grants available to help. [The Social Housing Fund and Local Grants introduced by the Warm Homes Plan](#) can provide tailored upgrade packages to low-income homes and the [Boiler Upgrade Scheme](#) offers a grant of up to £7,500 for any homeowner replacing a fossil fuel heating system. Households that are unable to cover the total cost of installation using the Boiler Upgrade Scheme will be able to access new low or zero interest loans provided by the [Warm Homes Fund](#). Find out more about [energy storage](#), [smart meters](#) and [heat pumps](#).





BUT BEFORE YOU DO...

If a gas boiler needs replacing, before going ahead, it's always worth finding out if the current one can be repaired.

Gas boilers usually last 10–15 years and replacement parts are widely available. No one wants to be without heating or hot water, so planning ahead and repairing instead of replacing can buy home owners time to research potential heat pump options.

It's also worth planning ahead – heat pumps take about 3–5 days to install, so if you know your boiler is aging, it's worth looking at heat pump options in advance. They are not the best for an 'emergency' boiler replacement.

FITTING SOLAR PANELS

Installing solar panels as part of renovation works can help a home to become more energy independent and can save those living there between 50 – 70% on their electricity bills. The electricity generated by the panels can be used to power the home and, if there is surplus, can be stored in batteries or even sold back to the grid, which reduces costs further. While the upfront costs can be expensive, your contributors can take the sting out of cost by accessing low or zero interest loans from the [Warm Homes Fund](#).

Find out more about [solar panel battery storage](#) and [solar panels](#).



ADDING A BATTERY

Installing a battery can help you optimise your solar panels or electricity tariff. A battery enables you to store the excess electricity that your solar panels produce. Storing for later use is typically cheaper than selling your surplus to the grid and then buying it back when needed. Batteries can still be useful when you don't have solar panels. When coupled with a time-of-use tariff, you can buy and store electricity from the grid when prices are low, and then use it or sell it when prices are high. Batteries work best when coupled with solar panels and assets with high electrical demand like EVs or heat pumps.





GETTING AN EV

Roughly 78% of the UK population has access to a private vehicle so if your contributor is looking to upgrade now or in the future, an EV could be a sensible choice. Electric vehicles are cheaper to run, with a full charge costing about £23 (if charging at home), while driving 220 miles in a petrol or diesel car will cost around £41 in fuel. The battery in an EV can even be used to store electricity, which can in turn be used to power the appliances in a home.

AND REMEMBER...

Heat pumps require hot water tanks, so it's important to hold on to spaces like airing cupboards or utility rooms during a renovation, as they're the perfect places to store these if/when a homeowner decides to install a heat pump.



INSULATING WALLS, FLOORS AND ROOFS

About a third of all the heat lost in an uninsulated home escapes through the walls. If a contributor is embarking on a full scale renovation then it's a good time to consider internal wall insulation before a new coat of plaster, or new skirting or cornicing is installed. This can help maintain a consistent temperature throughout both winter and summer.

Adding insulation to your loft isn't very disruptive and can further improve a home's energy efficiency. A home renovation is also a great opportunity to add underfloor insulation too, a little more disruptive, but it can vastly improve energy efficiency. Insulation measures can be pricey, but eligible low-income households can access funding and support via the [Warm Homes Plan's Local Grants and Social Housing Fund](#).

Ultimately, insulation is helpful in any home, regardless of its heating system, but pragmatism is important. The insulation upgrade options for many UK homes have high upfront costs relative to the bill savings they can enable; it's worth noting too that the benefits of adding insulation diminish with the more that's added. For example, all homes should have 120mm of insulation in their lofts, which would result in bill savings of ~25% of the total gas bill, but a subsequent top up to 270mm of insulation would only accrue an additional ~2% saving.

UPGRADING A HEATING SYSTEM

When considering **underfloor heating** remember, water based underfloor heating systems are much cheaper to run with a gas boiler or a heat pump, compared to electric systems.

Replacing radiators? Larger ones to optimise heat. Do encourage your contributors to check with a plumber about getting radiators (and pipes) that work with a 'flow temperature' of 55 degrees or cooler (that's the temperature of the water going round a home's radiators) as this will prepare the home for a possible heat pump in the future.



REPLACING GAS FIRES

Nothing is cosier than sitting by a roaring fire but in a home renovation, gas fires should be avoided if possible. Long term UK decarbonisation strategies aim to reduce our reliance on fossil fuels such as gas for heating, so an **electrically powered fireplace** could be a smart longer-term move.



SWITCHING TO AN INDUCTION HOB

Chances are that your contributors will be looking to upgrade their kitchens, and this provides an opportunity to swap out the gas hob for an **induction** one. Not only are induction hobs more energy efficient than gas, they're also much safer, easier to clean and better for our health – while gas hobs have been found to release harmful, polluting gasses into our homes (even when not in use). Find out more about [energy saving in the kitchen](#).

If and when your contributors get a heat pump, they can then disconnect their gas supply and [save approximately £119 a year](#) on daily standing charges! About the cost of a fancy new pan to plonk on that shiny new induction hob.



EMBRACING NATURE

Biodiverse gardens or window boxes not only look great, they contribute to a diverse ecosystem which act as natural carbon sinks. Planting a wide variety of plant species in any outdoor space can help support our planet whilst also providing food and shelter for a vast range of wildlife. Take a look at [ideas for how to get started](#).

And if while we're thinking about the garden, it is worth considering where a heat pump might go in the future, as these often sit near the back of the house and require a roughly 1m X 1.5m space for the outdoor unit, with a 1.5m clearance in front. While many properties won't require planning permission to install a heat pump, it's always worth checking with your local planning authority as some restrictions may still be in place. For example, if you live in a conservation area.

WHAT OTHER STEPS CAN WE TAKE TO IMPROVE ENERGY EFFICIENCY IN OUR HOMES?

Use a smart meter

Smart meters give you real time information on your energy use, allowing you to better manage your usage so you can save money and reduce emissions.

Use energy saving lightbulbs

Replacing the bulbs in your home with LED lights could reduce your CO2 emissions by up to 50kg and could save up to £50 a year.

Switch to a 'time of use' tariff

Smart 'Time of use' tariffs offer lower off-peak rates and can reduce your bills, as well as saving up to 0.03 tonnes of CO2 per year.

Use renewable energy

By using a renewable energy supplier, you are helping to reduce our reliance on fossil fuels and lowering CO2 emissions.

GETTING REAL: COSTS, PRACTICALITIES AND SAVINGS

There are extensive Government plans underway, working across the private and public sectors, to make Britain more energy secure with clean, electrical power by 2030. This promises to unlock £40 billion of investment a year and reindustrialise Britain with thousands of skilled jobs across the country.

But what are the costs and carbon savings of future-proofing our homes today?

The table below outlines energy saving measures that could be taken for a 3 bedroom semi-detached house, along with typical costs, bill savings and carbon emissions reductions:

Measure	Carbon saving (kg CO ₂ e/y)	Typical Cost (£)	Level of disruption	Energy bill savings per year (% of bill)*	Source
Ground source heat pump	3000 (from A rated gas boiler)	~£28,000 (exc. £7.5k grant)	High	Similar energy bills, can be significantly lowered by using a special heat pump tariff	EST
Air source heat pump	1900 (from A rated gas boiler)	~£14,000 (exc. £7.5k grant)	Medium		EST
Electric vehicle	1410 (switching from conventional car)	~£30,000	Low	Up to 75% cheaper to run than petrol	Nesta / OVO
Solar panels	1000	~£7,000	Medium	~50-70% elec. bill	EST
External wall insulation	900	~£11,000	High	~38% of gas bill	EST
Internal wall insulation	900	~£7,500	High	~38% of gas bill	EST
Cavity wall insulation	650	~£2,700	Medium	~29% of gas bill	EST

Measure	Carbon saving (kg CO2e/y)	Typical Cost (£)	Level of disruption	Energy bill savings per year (% of bill)*	Source
Roof/loft insulation (0 to 270 mm)	600	~£900	Low	~27% of gas bill	EST
Battery storage	390 (heat pump home, using special tariff)	~£9,500 (inc. labour)	Low	~16% electricity bill	Nesta
Double glazing	380	~£7,500	Medium	~16% of gas bill	EST
Turn down thermostat 1c	330	~£0	Low	~10% of gas bill	CAR
Turn down boiler flow temp to 60c	200	~£0	Low	~8% of gas bill	CAR
Floor insulation	190	~£4,700	High	~8% of gas bill	EST
Energy efficient shower head	170	~£20	Low	~7% of gas bill	CAR
Draught proofing	150	~£250	Low	~6% of gas bill	EST
Smart thermostat	130	~£200	Low	~5% of gas bill	CAR
Roof/loft insulation top up (120mm to 270mm)	55	~£750	Low	~2% of gas bill	EST
Turn appliances off at the socket	40	£0	Low	~7% of electricity bill	EST

Measure	Carbon saving (kg CO ₂ e/y)	Typical Cost (£)	Level of disruption	Energy bill savings per year (% of bill)*	Source
LED light bulbs	30	~£3-12 per bulb	Low	~5% of electricity bill	EST
Induction hob	30 (from gas hob)	~£750	Low	Slightly higher bills	Nesta
Time of use tariff	20	£0	Low	Depends on using energy at right time and whether an EV or electric heating is present	Nesta
Wash laundry at lower temp	20	£0	Low	~4% of electricity bill	EST

*Assuming 2,700 kwh of Electricity used per year, 11,500 kwh of Gas used per year ([Ofgem](#))

**Savings based on electricity price of 24.5p/kWh and gas price of 6.29p/kWh ([EST](#))

WANT TO FIND OUT MORE?



READ

Advice + recommendations

- For those planning on getting a heat pump, [Nesta's Get a Heat Pump](#) website is a great source of additional information. Your contributors could even visit a heat pump and put their questions to heat pump owners in-person, via [Nesta's Visit a Heat Pump Scheme](#).
- The Microgeneration Certification Scheme (MCS) is an industry-led scheme that certifies the quality and reliability of renewable energy technologies, products and installation companies. If a contributor is looking to install a heat pump, solar panels or battery storage, they can find an accredited contractor by searching the [MCS directory](#).
- The Energy Saving Trust is a great source of information when it comes to reducing energy usage in the home. Take a look at their [blog about energy saving upgrades](#) to consider during a home renovation.
- [Citizens Advice](#) are able to provide energy efficiency advice or provide support in the case of a mishap.

Funding + government grants

- New low – and zero-interest consumer loans have been made available in the [Warm Homes Plan](#) to help meet the upfront cost of heat pumps, solar panels, batteries, and some other low carbon technologies.
- Low-income households can access tailored home upgrade packages to install solar, batteries, heat pumps, and suitable insulation. These measures will be available to those living in social housing or rented accommodation, as well as homeowners.
- And for those looking to install a heat pump, the [Boiler Upgrade Scheme](#) could be for them with the government offering funding of up to £7,500 for an air source or ground source heat pump to householders in England or Wales. Air-to-air heat pumps (similar to aircon) and zero emission boilers can access a smaller £2,500 grant to help cover the upfront installation cost. In Scotland, you can apply for the [Home Energy Scotland grant](#) which offers up to £7,500 towards heat pump installation, plus an additional £1,500 if you live in a rural area.



- The BBC series [What They Really Mean For You](#) explores the changes coming to our homes and what it will take to get us there.
- Watch Channel 5's documentary, [Solar Panels: Are They Really Worth It?](#) where presenter Alexis Conran investigates the pros and cons of buying solar panels for our homes. You can also watch further episodes, which explores topics like [smart meters](#) and [heat pumps](#).
- Check out this episode of [ITV's Save Money: My Beautiful Green Home](#), which aims to demystify all things 'green' when it comes to building and renovations.
- In Kevin McCloud's inspiring series, [Kevin McCloud's Man Made Home](#), Kevin builds his own beach home in Somerset, recycling and repurposing all sorts of different materials, and even setting up a solar powered hot water shower made from an old telephone box.
- Watch [Guy Martin's House Without Bills](#) which broadcast on Channel 4 on 9th February 2026, and outlines ways to make a home more energy efficient.

*The residential buildings sector is currently the second highest-emitting sector in the UK economy, accounting for 12% of UK emissions in 2023. For this reason, the UK's independent [Climate Change Committee assesses](#) that increasing heating efficiency and replacing fossil fuels (such as gas and oil) with renewable energy will be necessary in almost all homes, estimating around half of homes in the UK should be using a heat pump by 2040 if we are to reach net zero greenhouse gas emissions by 2050, ultimately contributing to a more sustainable future for everyone.

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FURTHER INFORMATION:

For a more expansive guide on Greener Homes and home decarbonisation content, take a look at our Greener Homes handbook.

ANY QUESTIONS CONTACT:

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