A guide to energy saving in the home

An introduction to insulating your home

Insulating your home can save you money and help the environment

energy saving trust®

Here to help everyone save energy in the home.

Why insulate your home?

When it's cold outside, a well insulated, draught proofed house keeps warmth inside where you need it – helping to heat your home more efficiently. This means lower bills, less waste and, for the environment, less carbon dioxide (CO_2): one of the biggest causes of climate change.

Insulation can also help prevent condensation on walls and ceilings, and give your home a more even temperature, all year round.

So, when it comes to insulation and draught proofing, the real question is: why not?

This guide is packed with useful information on insulation and draught proofing. As you'll see, the better insulated your home is, the less energy you need to keep it warm – and the more money you'll save in the long run.

In fact, insulation is so cost effective that it will soon be paying for itself over and over again, with payback starting much quicker than you might imagine. Insulating unfilled cavity walls now typically pays for itself in around 2 years, while topping up your loft insulation to the recommended depth of 270mm typically pays for itself within 6 years.

How does insulation work?

Heat loss occurs because heat naturally flows from hot objects or areas to colder ones. During winter, when your house is warmer than the air outside, heat will flow out of the house through poorly insulated solid surfaces such as walls, roofs and windows.

Properly installed insulation will create a barrier between the inside and outside of your home that will reduce the amount of heat being lost and keep more of it inside your home. This will help save you money on your heating bills, because your heating system won't have to keep switching on to replace the lost heat and keep your rooms at a comfortable temperature.

But won't it take a long time – and make a lot of mess?

No, insulating your home doesn't have to mean turning it upside down.

It can take professional installers just a few hours to install cavity wall or loft insulation – with no mess and little fuss. And if you're a competent DIY-er, you could even install loft insulation yourself.

What about draught proofing?

Draught proofing works by blocking any gaps around windows, doors, walls and floors where warm air can escape from the room or the house. With fewer draughts, you'll need less energy to keep your home warm – so draught proofing measures could save you around £25 a year on your heating bills. In most cases, draught proofing can be managed with ease by a competent DIY-er.

The better insulated your home is, the less energy you need to keep it warm – and the more money you'll save in the long run.

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or call **0800 512 012**

Loft insulation

As energy costs rise, it's never been more important to think about insulating your loft, or topping up existing insulation. Loft insulation will effectively reduce heat loss for at least 40 years – and will pay for itself many times over in that period.

*Image courtesy of National Insulation Association (NIA)

Can your loft be insulated?

If your home has an accessible loft with no damp or condensation problems, then it should be a perfect candidate for loft insulation. And even if your loft is insulated already, this insulation might need topping up. The recommended depth of loft insulation is at least 270mm of mineral wool. Installing 270mm of insulation in a loft with no insulation will save around 800kg of CO_2 and around £150 on heating bills a year. If there was already 50mm of insulation and you topped this up to 270mm, the saving would be around 230kg of CO_2 and around £45 per year.

Any problems with damp or condensation should be sorted out by an expert in advance of the insulation being installed. As insulation helps stop heat from escaping, it will actually make your loft space cooler, which could make existing damp or condensation problems in the loft worse. If unsure, contact a registered installer for advice.

How are lofts insulated?

There are three main types of loft insulation:

- Quilts – mineral wool and natural wool.
- Blown insulation – mineral wool and cellulose.
- Insulation boards – expanded/extruded polystyrene (EPS/EXPS) and foam products (PUR/PIR).

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Can you do it yourself?

While blown insulation should only be installed by an installer with specialist equipment (see page 20 for more information), insulation quilts and boards are suitable for competent DIY-ers to work with. Protective clothing, gloves and masks should always be worn when working with loft insulation.

Typically, quilts are laid down between the joists – the horizontal beams that make up the 'floor' of the loft – then another layer of insulation is 'cross-laid' to cover the joists.

*Image courtesy of NIA

Remember: this needs to be done to a high standard to avoid unnecessary wastage of heat, so always consult a DIY manual first. It is also important to make sure that the loft is adequately ventilated, to avoid problems arising with condensation. If you don't feel sufficiently confident that you can do it yourself, please call an installer.

To find a registered installer in your area visit the National Insulation Association website **nationalinsulationassociation.org.uk**

If the loft is going to be used for storage then you can insulate between the joists and use board backed with further insulation over the top – or raise the level of the floor and insulate to the recommended depth. You can also insulate between the rafters of a pitched roof using boards backed with insulation if you want the loft space to be warm, for example, if you want to use it as a living space.

If you are in doubt about the best method, call us on **0800 512 012** or see page 20 for a list of registered installers.

Can you insulate a flat roof?

You can – from the outside and the inside.

Insulating the outside of a flat roof involves laying boards backed with insulation material either on top of or under the roof's existing waterproof layer. Flat roofs can also be insulated from the inside using insulation-backed boards.

These jobs should always be left to professionals, so contact us on **0800 512 012** for more information or see page 20 for a list of registered installers.

Energy Saving Recommended

There's a wide variety of brands and products on the market. To find the best loft insulation for you, look for the Energy Saving Recommended logo. Loft insulation products which carry the logo have met strict criteria, which are set by an independent panel and reviewed each year. This criteria ensures they adhere to applicable British Standards and appropriate quality control processes. These products are also designed to make it easy to comply with Building Regulations.

For a full list of Energy Saving Recommended loft insulation products visit **energysavingtrust.org.uk/compare**

Could you get help with insulation costs?

You could indeed. There are lots of grants and offers available to help pay for loft insulation. To see what's on offer in your area, visit our grants and offers database at **energysavingtrust.org.uk/gid** or call **0800 512 012**.

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Certification mark

Don't forget your pipes

Always insulate your pipes, water tank and loft hatch, too. Insulating between the joists of your loft will keep your house warmer but make the roof space above colder. Without their own insulation, pipes and tanks are more likely to freeze and an un-insulated loft hatch could let cold draughts into your house.

Don't lay insulation underneath the water tank; again, this can lead to the water freezing.

A registered installer will be able to help with all of these details. Alternatively, call us on **0800 512 012** for free advice.

Remember...

Insulating your loft with quilts can be a straightforward job for either a registered installer or a competent DIY-er – but blown insulation MUST be installed by a professional.

✱ Find out more about loft insulation at **energysavingtrust.org.uk/loftinsulation**

What could you save?*

	New loft insulation (270mm thick)	Topped up loft insulation (from 50mm to 270mm)
Total cost of professional installation**	Around £250	Around £250
Saving per year	Around £150	Around £45
Pays for itself in	Around 2 years	Around 6 years
Total cost of DIY installation	£250–£350	£200–£300
Pays for itself in	2–3 years	5–7 years
CO_2 saved per year	Around 800kg	Around 230kg

* Estimated figures for a gas-heated, semi-detached home with three bedrooms and gas cost of 3.80p/kWh.
** Cost of professional installation includes a 50% government subsidy available to all householders through energy suppliers under the Carbon Emissions Reduction Target (CERT).

Installing loft insulation could save you around £150 on your heating bill

Cavity wall insulation

Cavity wall insulation is a fantastic way to significantly reduce the amount of energy you need to heat your home and could save you around £115 a year on your fuel bills.

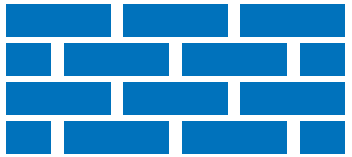
*Image courtesy of NIA

Generally speaking, your home will be suitable for cavity wall insulation if its external walls are unfilled cavity walls – and their cavities are at least 50mm wide. The masonry or brickwork of your property also needs to be in good condition, and any problems with damp must be sorted out first by a specialist builder.

Does your home have cavity walls?

If your home was built from 1920 onwards, the chances are that its external walls are 'cavity walls': made of two layers with a small gap or 'cavity' between them. In simple terms, cavity wall insulation means filling that gap.

The easiest way to tell a cavity wall from a solid wall is from the pattern of the bricks on the outside of your house. If your home has cavity walls, the bricks will normally have a regular pattern like this.



Cavity wall

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If the brickwork has been covered, you can also tell a cavity wall by measuring its width. Go to a window or door on one of your external walls, and take a measurement there. If the wall is more than 260mm deep then it probably has a cavity; a narrower wall (around 220mm thick) suggests that it's solid.

If you have cavity walls, but your home was built in the last 15 years, there's a good chance that the cavity walls are already insulated. The only way to be absolutely sure of whether your home has unfilled cavity walls is to ask a registered installer to assess your property. Call us on **0800 512 012** and we can put you in touch with registered installers in your local area, who will assess your home free of charge.

Typically, an installer will perform a simple test involving drilling a small hole in your external wall. This will allow the installer to check whether you have cavity walls, whether there is any insulation already present and whether there is any evidence of damp problems. For more information on installers, see page 20.

How are cavity walls insulated?

The process is very straightforward – an installer will drill small holes around 22mm in size at intervals of around 1m to 1.5m from the outside of your home. With specially designed equipment, insulation is then blown into the cavity by the installer.

*Image courtesy of NIA

Once all the insulation is in, the installer fills the holes in the brickwork to match your existing mortar.

What could you save?*

Total cost of cavity wall insulation**	Around £250 – including installation
Saving per year	Around £115
Pays for itself in	Around 2 years
CO_2 saved per year	Around 610kg

* Estimated figures for a gas-heated, semi-detached home with three bedrooms and a gas price of 3.80p/kWh.
** Cost of installation includes a 50% government subsidy available to all householders through energy suppliers under the Carbon Emissions Reduction Target (CERT).

What is cavity wall insulation made of?

Cavity wall insulation can be made out of mineral wool, beads or granules, or foamed insulants.

All three types available in the UK are manufactured according to British standards and verified by the British Board of Agrément (BBA). Your installer will know and choose the most suitable type of insulation for your home.

Could you get help with insulation costs?

You could indeed. There are lots of grants and offers available to help pay for cavity wall insulation. To see what's on offer in your area, visit our grants and offers database at **energysavingtrust.org.uk/gid** or call **0800 512 012**.

Did you know...?
If every UK household that is suitable for cavity wall insulation installed it, we could save around £690 million and nearly 4 million tonnes of CO_2 every year.

Remember...
Cavity wall insulation is NOT a job you can do yourself, and must always be carried out by a registered installer. See page 20 for more on how to find an installer.

Cavity wall insulation could save you around £115 a year

✱ Find out more about cavity wall insulation at **energysavingtrust.org.uk/insulation**

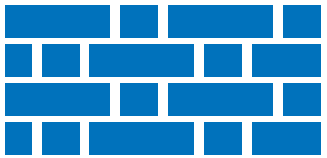
Solid wall insulation

Insulating your solid walls will make your home warmer and more comfortable, and greatly reduce your heating bills at the same time. Solid walls can be insulated in two different ways: with internal insulation (from the inside) or external insulation (from the outside).

Does your home have solid walls?

If you live in a house built before the 1920s, its walls are likely to be solid, with no cavity. Up to twice as much heat can be lost through an un-insulated solid wall as through an un-insulated cavity wall.

The easiest way to tell a solid wall from a cavity wall is from the pattern of the bricks on the outside of your house. If your home has solid walls, the bricks will normally have an alternating pattern like this.



Solid brick wall

If you're unsure, call us for advice on **0800 512 012** or contact one of the registered installers listed on page 20.

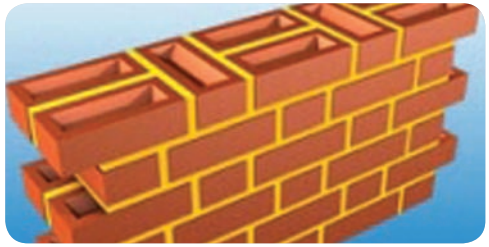
Internal or external insulation – which is best for your solid walls?

The most cost-effective way to insulate your solid walls is to do it when you are carrying out other repair or refurbishment work to your walls.

If you are re-plastering your internal walls, or changing major fittings in your bathroom or kitchen, these are perfect opportunities to consider installing internal wall insulation. Internal wall insulation can be carried out a room at a time, will not change the outside appearance of your home and can be installed by very experienced DIYers. It will however slightly reduce the size of the room and the installation process may disrupt room use – remember also that skirting boards and electrical fittings will need to be removed and reattached to the new wall surface.

If you are repairing or renovating external walls, especially if you need to have scaffolding, this is an ideal time to consider installing external wall insulation. External wall insulation can be installed without disrupting the household, increases the life expectancy of a property by protecting brickwork and provides extensive insulation without reducing living space. You may however need planning permission as it will change the outside appearance of your home.

All homes are different; a registered installer can help you decide, or you can call us on **0800 512 012** for free, impartial advice.



Typical brick formation for solid walls

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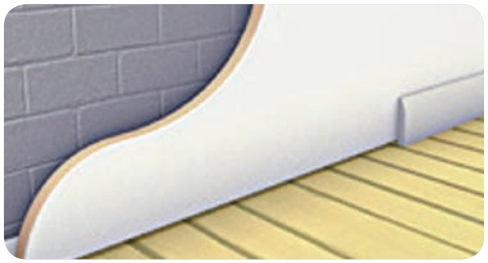
How is a solid wall insulated from the inside?



There are two main ways to insulate a solid wall internally: the first is to put up boards backed with an insulating material, and the second is to build a metal or wooden frame against the wall and fill it with mineral wool fibre before boarding over it (known as building a "stud wall").

A layer of insulation material is fixed to the walls with mechanical fixings and adhesive, then covered with a special type of render (plasterwork) or cladding – depending on the finish you prefer.

How is a solid wall insulated from the outside?

As they will cover the whole of the outside of your property, any of these finishes are likely to change its appearance – and will cover existing brickwork. So, you must ask your local council whether you need planning permission.

Solid wall insulation is not recommended for homes with structurally unsound outer walls that can not be repaired.

Did you know...?
One in four homes in the UK have solid walls. If you are carrying out renovation or repair work to your walls, think about taking the opportunity to insulate them – and you could reduce your heating bills by around £400 a year.

What could you save?*

Type of solid wall insulation	Saving per year	CO_2 saved per year
Internal	Around £380	Around 2,000kg
External	Around £400	Around 2,100kg

* Estimated figures for a gas-heated, semi-detached home with three bedrooms and a gas price of 3.80p/kWh.

✱ Find out more about solid wall insulation at **energysavingtrust.org.uk/solidwall**

Floor insulation

Ever stepped from your bed still half asleep only to leap back in again as soon as your feet touch the icy cold floor?

How does floor insulation work?

Timber floors can be insulated by lifting the floorboards and laying rigid insulation boards or quilts supported by netting between the joists. The process will be made easier if there is access from below, for example, from a cellar.

Underfloor insulation can restrict airflow so it is very important to ensure that there is adequate ventilation of the underfloor area to avoid the buildup of condensation.

The most common way of insulating solid floors is to lay a new insulated floor above the existing solid floor. Usually this is a layer of insulation board overlaid with chipboard. This will raise the floor level, so the skirting boards will need to be refitted and the door will have to be trimmed to the new level.

How is it installed?

Not all home insulation work has to be carried out by a professional. It may work out cheaper to do the smaller jobs yourself with materials from your local DIY store.

What could you save?*

	Saving per year	DIY cost	DIY payback	CO_2 saved per year
Floor insulation	Around £50	Around £100	Around 2 years	Around 270kg

* Estimated figures for a gas-heated, semi-detached home with three bedrooms and a gas price of 3.80p/kWh.

Draught proofing

Draught proofing is one of the most inexpensive and effective energy efficiency measures you can carry out – no matter how big or small your home.

What's the difference between ventilation and draughts?

For a comfortable and healthy atmosphere in your home, air should be able to circulate around the rooms and slowly be exchanged with fresh air from outside.

Specially fitted vents and fans allow the right amount of air to flow in and out of your house; it's the unwanted gaps in a building that can allow cold air to come in and valuable warm air to escape. In short, draughts are unwanted, unnecessary ventilation.

Where are unwanted draughts likely to happen?

Most homes are likely to have unwanted cracks and gaps in their construction that allow warm air out and cold air in. You'll know exactly where they are when the wind is blowing air through them into your home.

Typical sources of draughts can be gaps between or around floorboards, around windows or doors, pipe-work, windows, loft hatches, electrical fittings, at ceiling-to-wall joints – or any passage from heated parts of a property through to outside or an unheated part of your home.

Save around £25 a year on your heating bills through simple draught proofing

How do you draught proof unwanted gaps?

The good news for competent DIY-ers is that draught proofing can be a relatively simple job that you'll be able to carry out yourself.

In some cases, however – especially in older properties – it can be a more complex and expensive task that's better left to a professional.

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Draught proofing options

Here is a guide to some of the materials or items that can be used to draught proof different areas of your home; most of these can be bought cheaply from good DIY or hardware stores, and should come with detailed instructions.

Draught-prone area/gap	Draught proofing options
Around standard windows	Draught strips, made of foam, metal or plastic
Around sliding sash windows	Brush-type excluders
Outside doors	Brush or hinged-flap draught excluders, fitted along the bottom of the doors
Letterboxes	Letterbox covers, normally in the form of a flap that hang over the letterbox, or brushes
Keyholes	Keyhole covers
Unused chimneys	Caps over the chimney pots or chimney balloons: inflatable cushions that block up the chimney
Floorboards and skirting boards	Flexible fillers, decorators' caulk or mastic type products
Large gaps in the building	Expanding (polyurethane) foam
Redundant extractor fan outlets	These should be blocked up and may need to be filled with additional block work
Cracks in walls	Cement or a hard setting filler
Loft hatches	Strips of draught excluding material, fitted around the edges of the frame

Look for the kitemark

Correctly fitted draught proofing should last between 10 and 20 years. To make sure you're buying very best quality products, look for draught proofing with a kitemark that indicates they are certified to British Standard 7836.

What could you save?*

The cost of draught proofing will depend on how many areas you need to draught-proof and whether you need professional installation. Costs and savings will be reduced if you have double glazing as one of the most common sources of draughts is around the frames of single glazed windows. When professionally installed around all doors and windows draught proofing can cost around £200, but this can be reduced to around £100 if you fit it yourself.

	Professional installation	DIY
Cost (draught proofing around all windows and doors)	Around £200	Around £100
Saving per year – draught proofing around windows and doors	Around £25	Around £25
Pays for itself in	Around 8 yrs	Around 4 yrs
CO_2 saved per year	Around 130kg	Around 130kg
Additional saving per year from blocking gaps around floorboards and skirting	Around £20	Around £20

* Estimated figures for a gas-heated, semi-detached home with three bedrooms and a gas price of 3.80p/kWh.

Did you know…?
If every household in the UK draught proofed its home as well as possible, collectively we could save nearly £200 million on heating bills every year. The energy saved every year would be enough to heat over 260,000 homes.

Remember…
Never block or draught proof purpose built vents that serve appliances with a flue, like boilers or fires. It is also recommended not to interfere with air vents and air bricks, trickle vents on windows and potentially kitchen or bathroom windows where moisture can tend to build up.

✱ To find out more about draught proofing visit **energysavingtrust.org.uk/draughtproofing**

Finding an installer

Please make sure you always use a registered installer.
By this we mean your installer should be a member of at least one of the relevant organisations listed below and has signed up to an appropriate code of professional practice.

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Type of insulation	Organisation	Contact details	Advice
Draught proofing	National Insulation Association (NIA) Draught Proofing Advisory Association	nationalinsulationassociation.org.uk Tel: 08451 636 363 dpaa-association.org.uk Tel: 01428 654 011	Make sure the installer has signed up to a code of professional practice such as those provided by the NIA.
Cavity wall	National Insulation Association Cavity Insulation Guarantee Agency (CIGA) The British Rigid Urethane Foam Manufacturers Association (BRUFMA)	nationalinsulationassociation.org.uk Tel: 08451 636 363 ciga.co.uk Tel: 01525 853 300 brufma.co.uk Tel: 01457 855 884	Make sure the installer has signed up to a code of professional practice such as those provided by the NIA. Also, make sure that any installation is guaranteed by the CIGA for 25 years.
Solid wall	Insulated Render and Cladding Association (INCA) British Board of Agrément (BBA) National Insulation Association The British Rigid Urethane Foam Manufacturers Association (BRUFMA)	inca-ltd.org.uk Tel: 01428 654 011 bbacerts.co.uk Tel: 01923 665 300 nationalinsulationassociation.org.uk Tel: 08451 636 363 brufma.co.uk Tel: 01457 855 884	Make sure the installer has signed up to a code of professional practice, such as those provided by INCA.
Loft	National Insulation Association The British Rigid Urethane Foam Manufacturers Association (BRUFMA)	nationalinsulationassociation.org.uk Tel: 08451 636 363 brufma.co.uk Tel: 01457 855 884	Make sure the installer has signed up to the NIA Code of Professional Practice. This guarantees that they have insurance cover and follows strict customer care and health and safety guidelines.

Insulation makes Steven feel warm all over

"Insulation pays for itself quickly…and gives you the warm, fuzzy feeling inside that you've taken another step towards saving the planet and your children's future."

These are the enthusiastic words of energy conscious consumer Steven Jones, who has not only insulated his home's cavity walls, but also his loft.

Steven lives in a two-bedroom terraced house built in 1980. Like many householders, he decided to have cavity wall insulation installed to reduce his heating bills and improve his home's energy efficiency. Subsidised as part of a local grant scheme, the installation cost Steven £280. Steven said: "Before insulation, we shuddered every time the gas bill arrived."

After an online search, Steven found a local company to insulate his cavity walls. He said: "They did the 45-minute survey within a week, then within a week or so after that they came to install the insulation."

Steven said: "It took around three hours to complete the job, and there were no problems. The house is painted cream on the outside, and the installers not only filled in the holes they'd drilled, but also came back a few days later to paint over them when the filler had dried. Excellent service."

The next step for Steven was to insulate his loft. He carried out this job himself, using natural sheep's wool.

So, what differences has all this insulation made? Steven said: "Since insulating my home we've cut a third off our gas bill even though the price of gas has gone up. I set my thermostat to 19°C and since insulating, the house takes much less time to warm up to this temperature and stays more consistently warm.

"I've also noticed that the house is cooler in the summer, so there's no need for fans when it's hot outside.

"Insulating your home is much easier than people think – quick and easy to do, with no hassle – and there are a lot more grants and offers now that can help. It pays for itself quickly, it will improve your Energy Performance Certificate rating to make your home more saleable – and it will reduce your carbon footprint."

"Since insulating our home, we've cut a third off our heating bills"

Where can you go for more advice?

Call us on **0800 512 012** for free, impartial, tailored advice on saving energy at home.

Our experts will help you find out which measures are practical for your home, explain any technical issues and can put you in touch with local, registered installers.

We'll even tell you about any grants and offers available to help with your planned home energy improvements. So, it pays to call freephone **0800 512 012**.

More energy saving ideas

There are plenty of other things you can do around the home to help you save energy.

- Use Energy Saving Recommended appliances. These will save money and cut CO_2 emissions.
- Switch your appliances off; don't leave them on standby or on charge and save around £33 per year.
- Washing your clothes at 30°C instead of at higher temperatures uses around 40% less electricity.
- You could save up to a quarter off your heating bill by replacing your old boiler with a new A-rated condensing boiler and a full set of heating controls.
- Top up the insulation around your hot water tank to at least 75mm with a BS Kitemarked insulating jacket: it could save you around £35 a year.
- Fit Energy Saving Recommended light bulbs. Just one energy saving bulb could save you on average £2.50 a year or around £6 a year for brighter bulbs, or those used for more than a few hours a day.
- Turn your thermostat down by 1˚C – it could cut your heating bills by up to 10% and save you around £55 per year and 280kg of CO_2. The recommended temperature should be around 18–21˚C, so try keeping it at the lowest level that you feel comfortable at.
- A third of the food we buy in the UK ends up being thrown away so keeping your fridge, freezer and cupboard stocked with long shelf life basics means you'll always have ingredients at hand to make the most of fresh food.
- Soak, don't sprinkle. Giving your plants' roots a good soaking once or twice a week in dry weather is much better than lightly watering them every day because most of that water just evaporates away. Do remember, though, that new seedlings do need regular watering until they are established.

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About the Energy Saving Trust

The Energy Saving Trust is one of the UK's leading organisations set up to address the damaging effects of climate change. We aim to cut emissions of carbon dioxide (CO_2) – the main greenhouse gas causing climate change – by promoting the sustainable and efficient use of energy.

We are an independent, non profit making organisation that provides free, impartial information and advice. Our network of advice centres across the UK are specifically designed to help people take action to save energy.

The costs and paybacks shown are approximate, are provided for illustrative purposes only and are based on a gas heated semi-detached house with three bedrooms. Insulation and heating savings assume a gas heated three bedroom semi-detached house and a gas cost of 3.80p/kWh.

Appliance and lighting savings assume an electricity cost of 12.96p/kWh and take into account the 'heat replacement effect'.

Full details of our energy saving assumptions can be found at energysavingtrust.org.uk/energy_saving_assumptions.

At time of print, all savings data are correct. However, financial savings will change as energy prices rise or fall. Please refer to our website for the most recent measure costs and savings

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