



Energy Tutorial: Building Fabric

# Loft, cavity wall and solid wall insulation

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Making sure our homes are not losing heat is one of the most cost effective ways to reduce energy use and therefore reduce carbon emissions and energy bills. Here are some of the available options.

## LOFT INSULATION

Homes with loft insulation of 10cm or less should definitely consider topping it up to at least 27cm – the current minimum requirement for new build properties. Doing so can save 1 tonne of CO<sub>2</sub> per year and reduce heating bills by a fifth. Best of all, the materials are inexpensive and can usually be installed quickly and with minimal disruption – all of which makes loft insulation a great area for community groups to look at.

Figure 1 below shows the difference between an insulated and an uninsulated house in terms of the amount of heat typically lost from different parts of the building; the exact figures vary from building to building.

Figure 1: Heat loss comparison



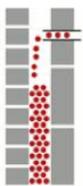
Source: NEF

## How much could you save?

The table below shows typical savings from installing loft insulation. These are estimates based on insulating a gas-heated, semi-detached home with three bedrooms.

	Loft top-up (0 – 60 mm pre-existing) to 270mm	Loft top-up (60+ mm pre-existing) to 270mm
<b>Annual saving per year (£)</b>	Around £145	Around £40
<b>Installed cost (£)</b>	Free for a standard insulation	Around £150
<b>Installed payback</b>	If free N/A	Around 3 to 4 years
<b>DIY cost</b>	£50 - £350	£50 - £350
<b>DIY payback</b>	Up to 3 years	1 to 9 years
<b>CO<sub>2</sub> saving per year</b>	Around 730kg	Around 210kg

## CAVITY WALL INSULATION



Cavity Walls

Most homes built in or after the 1930s have cavity walls (an inner and outer wall with a gap in between). You can usually spot cavity walls as they're relatively thick - around 30cm, compared to about 23cm for a typical solid wall.

The pattern of the brickwork can also be a useful clue. As Figure 2 shows, with cavity walls, each brick is equally wide, whereas with solid walls many bricks will be placed sideways on and appear half as wide.

Figure 2: Typical brick patterns



Cavity Wall

Solid Wall

For homes with cavity walls, making sure the cavity is full of insulating material is usually a no brainer. Filling an empty cavity can lead to huge energy savings for a fairly small initial outlay (often grants enable work to be fully funded, with nothing for the householder to pay!) and it is a quick job that causes minimal disruption. Holes are drilled in the building's external wall and insulation material is injected into the cavity.

### ACTIVITY

If you aren't sure whether your cavity walls have already been insulated, look for small circular marks left by the drilling process, particularly under windows on the ground floor, or get a local insulation company to come and take a look. The mark will look like this:

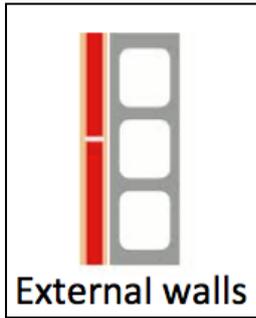


## SOLID WALL INSULATION

Around a third of the UK's homes were built before 1930 and have solid rather than cavity walls. It is usually more costly and labour intensive to insulate this kind of wall, but for some homeowners it will be the most effective step they could take to reduce their home's carbon footprint. Solid wall insulation can be applied on the inside or the outside of the walls.



There are two ways to insulate a solid wall internally – by fitting rigid insulation boards to the wall, or by building a stud wall filled in with mineral wool fibre. Stud wall insulation is thicker than rigid insulation boards, so it will reduce the size of your room more. But a stud wall is strong enough to hold heavy fittings such as kitchen units, radiators or wash basins. Insulation boards need fixings that go through them and into the wall behind.



External wall insulation involves paying someone to add a thick layer of insulating render (up to 10cm deep) to the outside walls. This can be very pricy if done in isolation, though if the walls need repair anyway the marginal cost may be as low as £1800 for a medium sized home. Of course, exterior insulation will drastically change the look of a building which may rule it out for properties located in conservation areas due to planning restrictions. The final finish can be flat (wet render), pebble-dashed or, for an extra cost, clad in wood, brick slip, clay or aluminium.

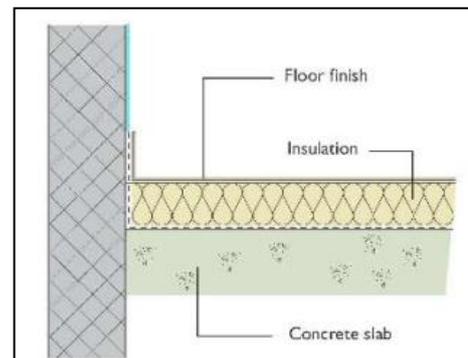
The following table shows typical savings and costs for internal and external wall insulation.

Type of solid wall insulation	Saving per year	Guide total cost including installation	Carbon dioxide saved per year
Internal	Around £445	£5,500 to £8,500	1.8 tonnes
External	Around £475	£9,400 to £13,000	1.9 tonnes

## OTHER TYPES OF INSULATION

### Floor insulation

Some homes lose as much heat to the ground as they do through the windows. For houses with wooden floors on the ground level insulating is simple: some boards are temporarily taken up and the insulation is rolled or blown between the joists.



Things are trickier for homes with solid floors. Sheets of insulating material are placed on the underlying concrete with chipboard and a finishing layer on top. The floor will be raised which will mean shortening doors and raising skirting boards. Insulating a concrete floor will increase the speed at which rooms warm up after the heating is switched on.

### FURTHER RESOURCES AND INFORMATION

- More information about insulating your home from the National Energy Foundation can be found here <http://www.nef.org.uk/knowledge-hub/view/insulating-your-home> and here <http://www.nef.org.uk/knowledge-hub/view/solid-wall-insulation>
- More information about insulation from YouGen: <http://www.yougen.co.uk/energy-saving/Insulation/>
- More information about insulation from the Energy Saving Trust: <http://www.energysavingtrust.org.uk/domestic/home-insulation>