Retrofitting: A guide for home owners and tenants

Measures you can take to make your home warmer, more comfortable and cheaper to run, as well as better for the environment.

BuildingFutures

SUSTAINABILITY EAST
incorporating Climate East

Contents

Produced by

BioRegional
solutions for sustainability
www.bioregional.com

Association for the Conservation of Energy

1 What is retrofitting?

This module has been designed to advise you as a homeowner or tenant on how to retrofit your home so it uses less energy and water and is more resilient to climate change impacts, such as overheating during summer months. After reading it you will understand what retrofitting is and how it will benefit you.

The module guides you through the whole retrofit process, from identifying which retrofit solutions would be suitable for your home, to how much they might cost, what you need to do before installing the solutions, what funding is available and what permissions you might need to do the work.

The Retrofit database, available on the Building Futures website, is there to help you find companies who provide the retrofit services you will need.

The Retrofit Resource, consisting of the module and database, has been developed with funds and assistance from the Climate Change Skills Fund, which has been managed by Sustainability East on behalf of Improvement East.

Thousands of people in Hertfordshire have already started retrofitting their properties, with many people taking advantage of schemes which provide measures for free (see the **funding** section for more information).

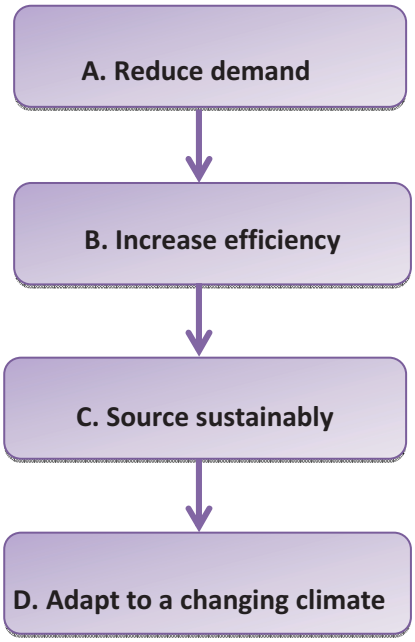
What does retrofitting involve?

'Retrofitting' means making changes to your home that enable you to use less energy and water, and make your home more comfortable. This includes using more sustainable sources of energy and water, and future-proofing your home against predicted changes in the climate, such as overheating and more severe storms.

When thinking about retrofitting your home, it is also important to make use of sustainable materials (such as insulation made of recycled materials) and consider how to dispose of any waste you generate in a sustainable way (e.g. reuse, recycle) More guidance on sustainable materials and managing waste is available in the Materials and Waste modules.

The ABCs of retrofitting

Successful retrofits follow a simple hierarchy for sustainable energy and water use and adapting your home to climate change impacts. There are many ways to improve the performance of your home; these are detailed in **Section 5**. To help to decide where to start, use the following flow chart:



A. Reduce demand

The first thing you should do is try to reduce your energy and water demand by doing free and easy things, like switching off lights when leaving the room, turning off the tap when brushing your teeth, and hanging your washing outside or on a clothes horse to dry instead of using the tumble drier. If your home is already warm and comfortable, you could try turning down the thermostat by 1°C - you probably won't notice a difference, but you will notice a 10 % reduction in your energy bill!

B. Increase efficiency

Once you have started to reduce your energy and water demand you can then take steps to make your home more energy and water efficient. These can range from easy DIY tasks like draught-proofing to jobs that require a professional, such as installing cavity wall insulation. See the box on page 8 for a list of basic and more affordable solutions. More expensive solutions can give you bigger savings. For example replacing an old gas boiler (rated D or below) with an A-rated boiler could save you at least £100 a year on your gas bill![i]

An explanation of appliance ratings can be found in **Section 5.**

C. Source sustainably

By this stage you could have reduced the energy consumption of your house by up to 60% and water consumption by almost 50%[iii]. If you think you could make even more savings, or want to use more sustainable ways of generating energy and supplying water, you could start using renewable energy solutions, harvest rainwater or recycle your waste water.

D. Adaptation

By this stage, many of the retrofit solutions you may have taken up will already have made your home more resilient to climate change. However, you might want or need to do more to prevent overheating during the summer or to reduce the threat of flooding. **Section 5** contains a range of solutions which are available to do this such as installing window shutters for shading.

E. Monitoring

Once you have implemented some retrofit solutions, make sure you carry on monitoring your utility bills. This allows you to see how much you are saving and helps you to identify further opportunities to make savings.

2 What are the benefits?

Retrofitting your home offers many benefits to you, the rest of Hertfordshire and the UK, including:

Save money

Average energy bills are around £177 higher than they were three years ago and this trend is set to continue. Ofgem predict that energy bills will rise 60% between 2009 and 2016[ii] as energy supplies become more volatile. Retrofitting your home could save you up to £1,000 a year on your energy bills[iii]. Just installing loft and cavity wall insulation could save you around £300 a year[iv].

Using renewable energy technologies, such as solar panels, not only reduces your fuel costs, but could make you money thanks to Government incentive schemes such as the 'Feed in Tariff' and the 'Renewable Heat Incentive'. See the **funding section** for more details. There are also a number of Government grants available to help you pay for retrofit solutions, so you start to see the financial benefits of your retrofit quicker.

Create a warmer, more comfortable home

If you feel that it is impossible to keep your home at a comfortable temperature then installing insulation will help keep the heat in. Blocking draughts and replacing old windows will also keep you cosy.

Make your home easier to sell or rent out

Under Government legislation, you are now required to provide an Energy Performance Certificate (EPC), which shows how energy efficient it is, when selling or renting out your home, so it is now very clear to see how well your house performs. This may influence the decision of a potential buyer or tenant – 52% of people recently surveyed said they would pay more for an energy efficient home[v].

Reduce your energy and water consumption

There is significant scope to improve our homes to make them more resource efficient. In the UK around a third of the heat used to heat a typical house is lost straight away through the roof, walls and windows[vi]. This not only wastes energy but also money. When it comes to water consumption, the average UK home performs equally badly. The average person uses 150 litres a day[vii] when it is possible to halve this amount without any reduction in living standards[viii]. This is particularly important in Hertfordshire, where water consumption is 16 %

higher than the national average yet it is one of the driest counties in the UK![ix] Using less mains water and making use of alternative supplies (e.g. rainwater) also saves on the energy used to treat and heat water.

Do your bit to reduce climate change

The energy used in our homes (electricity, heating and hot water) accounts for a third of energy used in the UK[x]. Reducing the amount of energy and water we use in our homes will help reduce future climate change and its impacts on future generations.

I am a tenant/live in a flat. Can I retrofit my home?

Yes! There are many simple solutions which wouldn't require permission from your landlord and can be carried out in flats, such as:

- **Draught-proofing**
- **Thermal films for windows**
- **Energy efficient light bulbs.**
- **Radiator panels**
- **Lag hot water pipes**
- **Hot water tank jacket**
- **A-rated appliances**

Adapt to the changing climate

Whilst we may succeed in reducing our contribution to climate change, our climate is still expected to change. In the UK it is expected that our weather will become more extreme. This means that we may experience more severe storms and heat waves. There are retrofitting solutions which help your home stay cool in the summer and reduce the risk of flooding.

Case study: a full retrofit

A 1930's terraced house in Sutton has been thoroughly retrofitted with many of the solutions detailed in this section.

Electricity and hot water are now provided by solar photovoltaic and solar thermal panels on the roof. The external solid walls have been insulated, a new boiler put in and draught-proofing and under floor insulation have been fitted. This will save the residents 80% on their fuel bills.

For more examples of homes which have already been retrofitted, please visit www.superhomes.org.uk or www.retrofitforthefuture.org.

3 How to plan your retrofit

This section provides you with a step by step guide to planning and carrying out your retrofit. We recommend you read this section before considering the various solutions in **Section 5**, and then refer back to this section when choosing your solutions.

Not sure what to do first?

1. Lag your **hot water cylinder.**
2. Switch from incandescent to **energy saving light bulbs**.
3. Insulate your **loft.**
4. Install heating controls, such as a **room thermostat** and **controls for the radiators.**
5. **Lag** any hot water pipework which runs along external walls and floors.
6. **Draught-proof** the home.
7. Switch to **A-rated appliances** if your current appliances are D rated or lower.
8. If you have an old gas boiler, D rated or lower, get an upgrade, since new **A-rated boilers** work much more efficiently.
9. Convert your **taps and shower head(s)** to use less water.
10. If you have a garden, install a **water butt** to collect rain for watering the plants.
11. Get your water company to fit a **water meter** for free. Metered water can often be cheaper than paying standard water rates.

The 12 steps to retrofitting

With the ABCs of retrofitting in mind, follow the 12 steps in the flow chart on the following page to help you plan and implement your retrofit.

Your 12 step retrofit plan

Step 1 Identify why you want to retrofit	Step 2 Identify your home's unique properties	Step 3 Calculate your energy and water costs	Step 4 Identify which measures you could do for free	Step 5 Decide which other measures to install	Step 6 Plan and combine your retrofit with other works
• Concerned about your energy and water bills? • Want to reduce your environmental impact? • Difficult to keep your home cool in the summer? • At risk of surface flooding?	• Consider the age and construction type, the type of heating system and how old it is. • Do you have a south facing roof? If so how big is it? • Do you have a large garden or driveway?	• What are your annual energy and water costs? • When are you using the most energy (e.g. winter to keep warm, summer to keep cool?) • Which area is in most need of attention?	• See the list in **Section 5** for free or cheap things you can do. • Depending upon your circumstances, you could be eligible for free retrofit measures. See **Section 4** for info.	• With the ABCs of retrofitting in mind, consider which measures are most suitable for your home - see **Section 5** for details. • Read our suggested approaches on **page 4.**	• Plan the order of retrofit works and combine with other work you're doing to save time; minimise disruption, costs and waste; and to ensure any retrofit measures will work effectively.

Step 7 Sustainable materials and waste disposal	Step 8 Investigate your financing options	Step 9 Get quotes	Step 10 Get planning or building control consent	Step 11 Choose an installer	Step 12 Start work, enjoy lower energy bills, maintain
• Use the most sustainable materials you can; see the Materials module for info. • Arrange to reduce, reuse and recycle construction waste created; see the Waste module for info.	• Get detailed costs for each retrofit measure • Are there any grants or subsidies available? • Would energy bills savings be greater than the interest accrued on your savings?	• Use the Retrofit database to find professionally accredited installers. • Get at least three quotes. • Understand the level of quality necessary for a good job.	• Do you need planning permission or listed building consent before doing the work? • Most retrofit measures require Building Regulations Approval once installed.	• Consider previous work they've done and other services they offer • What guarantees can they offer? • Don't pay for the whole job up front.	• Monitor your energy and water savings through your bills or energy monitors. • If necessary, ensure proper maintenance.

Step 1 Identify why you want to retrofit

What is your main motivation for retrofitting? If you want to reduce your heating bills, then you may choose to prioritise retrofit solutions which lower your heat consumption. Likewise, if you want to reduce your electricity bills then you may prioritise solutions which lower your electricity consumption. Or your primary objective may be to make your home more comfortable, so you may choose to focus on solutions which achieve this.

Step 2 Identify your home's unique properties

The things you need to identify are:

- The age of the property and whether it is listed or in a Conservation Area,
- Whether it has a loft and/ or areas of flat roof
- Whether it has **solid** or **cavity walls**
- What type of **windows** and **doors** it has
- Whether you have **suspended** or **solid floors**
- What type of **heating** and **hot water system** you have and how old it is
- Orientation of your roof and how big it is
- Other potential opportunities for renewable energy and water, such as large sunny gardens or driveways for a **ground source heat pump** or plenty of storage space to accommodate a **biomass heating** system.

You could also get a professional to survey your home to identify what retrofit solutions you could install. Use the Retrofit **database** to find an energy surveyor.

Step 3 Calculate your energy and water costs

Knowing what your electricity and fuel bills are per year puts you in a good position to identify what savings you could make and how long it would take to get your money back on your retrofit investment. You can do this by adding up the electricity and fuel bills for the last 12 months. If you don't have all your old bills you can ask your energy company to send you a statement for the year.

Knowing what your total annual bills are also helps you to prioritise what you should tackle first. For example, if your heating bill is much larger than your electricity bill, then you may want to focus on solutions to reduce this first, rather than solutions which will reduce your electricity bill.

Step 4 Identify which measures you could do for free

There are lots of things you can do for free which will reduce your energy and water consumption, a full list of these can be seen in Section 5.

Step 5 Decide which other measures to install

With the ABCs of retrofitting in mind, start to consider the other solutions you could take up. **Section 5** provides details of many of the possible solutions that you could choose.

You need to consider which solutions are appropriate for your home and for you. That is why knowing the properties of your home and how you use your home is important. For example if you live in a flat then changing your heating system may not be as easy or cost effective as insulating and draught proofing.

The box on **page 5** provides a list of retrofit solutions that you should start with as they provide the greatest energy bill savings relative to their cost. None of these solutions require planning permission or permission from your Freeholder, but some require Building Regulation Approval. Many of the installers of these measures can arrange this for you.

Off the gas grid?

It may be worthwhile thinking about biomass boilers or heat pumps early on, since they are likely to be a very cost effective alternative to oil or electric heating.

Once you have completed the easy solutions listed in the pop-out box the next thing to think about is insulating your walls and floors. If your home was built after the 1920s it is likely that you have cavity walls (see **Section 5** for information on how to identify this). If the cavity has not yet been filled with **insulation** then this is another job which saves a lot of energy relatively cheaply. For older properties that do not have cavity walls, insulating your walls is a bigger job involving solid wall insulation but it will deliver significant savings on your fuel bill and make your home much cosier.

You might also want to consider improving the performance of your windows, options include various types of **secondary glazing** and **double glazing**. This will make your home more comfortable, reduce draughts, and cut out noise from outside.

If there are less than three people living in your home, or you live in a large house with lots of unoccupied bedrooms, you may benefit from installing a **water meter** (often free of charge) as you are likely to reduce your water bills. Speak to your water company to get advice.

Once you have exhausted opportunities to reduce demand and use energy and water efficiently, you can then consider renewable energy and water. It is important to assess the natural resources around your home and how you use energy and water to make the

most of the opportunities for renewable energy and water. For example, if you have a large south facing roof then solar panels to generate electricity or hot water may be appropriate. Alternatively, if you use a large quantity of water for flushing toilets or irrigating the garden, then rainwater harvesting or grey-water recycling might offer the greatest benefits. **Section 5** contains information on the different renewable energy and water technologies available

You can prepare your home for the changing climate, for example, by **harvesting rainwater** for use in WCs, reducing the amount of **paving** in your garden and installing blinds to limit overheating in the summer.

All of these solutions are explained in more detail in **Section 5.**

Step 6 Plan and combine your retrofit with other works

If you are planning to do any building work such as an extension, loft conversion or refurbishment to your home, it may be possible to combine this with some of the retrofit measures. Typical home improvement works that could be undertaken alongside the retrofit solutions are listed under each measure in **Section 5**.

It is important that any additional works, like building new walls and floors, are done in the right order and in the right way to ensure that the retrofit solutions you are installing work effectively to save you energy and money. It is important that you have a good understanding of each measure, particularly if it involves building work, and that work is done in the right order and in the right way. It is easy for quite important issues to be overlooked. Plan the work carefully and make sure you do not forget important details such as minimising air leakages and thermal bridging as these can have a significant impact on the success of your retrofit.

Preventing air leakage

In **Section 5** you will see how to draught-proof your house and make it airtight. Draughts can be found anywhere where the building envelope is punctured, for example, around door and window frames and where pipes and cables enter and leave the building. Once you have stopped the draughts in your home, you want to make sure that no further retrofit work creates more draughts. If you have double glazing fitted ensure that your installer takes care to make the windows airtight. Or if you have a new boiler fitted, or solar panels fixed to the roof, ensure that where the pipes/ cables enter the house are well sealed.

Thermal bridging

Thermal bridges exist where any material which conducts heat, such as metal or masonry, links the interior of the house to the exterior. Heat is thus lost to the outside along these thermal bridges. Thermal bridges tend to exist along intermediate floors, window and door lintels (a horizontal piece of wood or stone above the window or door) and partition walls. They can often be identified because they cause surface condensation, mould growth or damage to the plaster where they meet the internal surface. Ensure that you don't forget to insulate these, and ensure that your contractor deals with any thermal bridge which they create through doing retrofit work, for example, by installing double glazed windows.

Step 7 Sustainable materials and waste disposal

Often there will be a choice of materials as part of the retrofit. Consider using the longer-lasting options which have a lower impact on the environment, such as recycled insulation material. For information on sustainable materials, please see the Materials module - http://www.hertslink.org/buildingfutures/materials.

Many retrofit solutions will generate waste. Ensure that this is dealt with in a resource efficient way - remembering to reduce, reuse and recycle where possible. See the Waste module for further guidance - http://www.hertslink.org/buildingfutures/waste.

Step 8 Investigate your options to finance measures

Depending upon your circumstances, there are a variety of funding sources which might be applicable to you. These may cover all the costs of the retrofit measure (e.g. cavity wall insulation) or a contribution toward the costs. There are also a number of schemes which pay you for generating renewable energy, such as Feed in Tariffs. Please see **Section 4** for more detail. For each measure in **Section 5** the means of funding that particular measure are also provided.

Step 9 Get quotes

If the measure requires a professional, use the Retrofit **database** to find accredited installers operating in Hertfordshire and make sure you get at least three quotes.

They should have done this retrofitting work before but check this with all companies you contact. For renewable energy installations companies should have Micro-generation Certification Scheme Accreditation. Any works undertaken using **Green Deal** finance should be done by a Green Deal qualified installer.

Check to see what other services or benefits companies can offer you.

Step 10 Get Planning and Building Control Consent

Some retrofit solutions will require planning permission before you undertake the work and Building Regulations Approval once the retrofit work has been completed.

Planning Permission

You are allowed to make certain changes to your home without needing planning permission from your local planning authority – these allowances are known as 'Permitted Development Rights'. You can apply for a 'Lawful Development Certificate' from your local planning authority which would confirm that the changes you are making are considered 'Permitted Development', but this may not be necessary. Each solution in **Section 5** will highlight whether planning permission or Listed Building Consent is likely to be needed.

However, any change to your home that materially alters its external character and appearance will most likely need planning permission. For example, fitting external solid wall insulation, which would give your home a rendered appearance, would significantly change the appearance of your home if it is constructed of exposed brick. Homes that are located within Conservation Areas, or areas with a relevant Article 4 direction (this removes permitted development rights), have tighter planning restrictions on what changes you can make to the external appearance of the building without planning permission, and also what changes would be given permission by your local planning authority. If in doubt, speak to your local planning authority to find out if you need planning permission.

If your home is a Listed Building (Grade II, Grade II* or Grade I) then the majority of changes to the inside and outside of the building will require Listed Building Consent. Speak to your Local Planning Authority Conservation Officer for advice. See page 17 for contact details.

You can apply for planning permission via the Government's Planning Portal website – www.planningportal.gov.uk. English Heritage have produce additional guidance on how best to retrofit older properties, listed properties and properties in Conservation Areas. You can see the guidance at www.climatechangeandyourhome.org.uk/live.

Building Regulations Approval

Regardless of whether planning permission or Listed Building Consent is needed, certain retrofit measure must receive Building Regulations Approval. This ensures that certain standards have been met. Approval can be obtained from your Local Authority's Building Control team or an independent Building Control Body. Your installer will often deal with the approval process, and if they are part of a relevant competent person scheme they will be able to certify the work themselves.

For further information speak to your local Building Control team or visit www.planningportal.gov.uk.

Step 11 Choose someone to do the work

Once you've clarified what planning and building control consent you need, you now have to decide which quote to go with. When doing this you should consider things like any previous work the installer has done; where they source their materials; the quality of work and how sustainable it is; whether they are part of a competent persons scheme; and any other services or benefits they offer which could be of use to you. Also check what guarantees they offer for their work.

Try to avoid paying up front for work before it is undertaken. If you do this, it will be harder to get the installer to rectify any errors or damages. Accredited companies have to abide by their association's or industry's code of conduct and complaints procedures, so problems with quality and performance should be less likely to happen, and if they do they should be easier to resolve.

Step 12 Start work, enjoy lower energy bills, maintain your retrofit

Once the solutions have been installed, enjoy the increased comfort of your home and the savings in your energy bills! Make sure you carry on monitoring your bills to realise the savings and identify any further savings which could be made. It is also important to ensure that, where necessary, you maintain any of the solutions as recommended by the manufacturer.

Contact your local authority's Planning and Building Control departments for further information, and to find out if your home is within a Conservation Area.

Local Authority	Building Control	Planning	Conservation Areas & Listed Buildings
Broxbourne	Tel: 01992 785510 http://www.broxbourne.gov.uk/environment_and_planning/building_control/building_control_service.aspx	Tel: 01992 785566 http://www.broxbourne.gov.uk/environment_and_planning/planning/development_control.aspx	Tel: 01992 785567 http://www.broxbourne.gov.uk/environment_and_planning/planning_policy/conservation,_green_belt,/conservation_areas.aspx
Dacorum	Tel: 01442 228587 http://www.dacorum.gov.uk/default.aspx?page=1643	Tel: 01442 228000 http://www.dacorum.gov.uk/default.aspx?page=3151	Tel: 01442 228176 http://www.dacorum.gov.uk/default.aspx?page=3119
East Herts	Tel: 01279 655261 http://www.eastherts.gov.uk/index.jsp?articleid=10776	Tel: 01279 655261 http://www.eastherts.gov.uk/index.jsp?articleid=15326	Tel: 01279 655261 http://www.eastherts.gov.uk/index.jsp?articleid=15427
Hertsmere	Tel: 020 8207 7456 http://www.hertsmere.gov.uk/planning/buildingcontrol/	Tel: 020 8207 2277 http://www.hertsmere.gov.uk/planning/developementcontrol/planningpermission.jsp	Tel: 0208 2077583 http://www.hertsmere.gov.uk/planning/conservation/conservationareas.jsp
North Herts	Tel: 01462 474000 http://www.north-herts.gov.uk/index/environment_and_planning/building_control.htm	Tel: 01462 474000 http://www.north-herts.gov.uk/index/environment_and_planning/planning/planning_advice.htm	Tel: 01462 474000 http://www.north-herts.gov.uk/index/environment_and_planning/planning/conservation_and_heritage/conservation_areas.htm
St Albans City & District	Tel: 01727 866100 http://www.stalbans.gov.uk/environment-and-planning/building-control/	Tel: 01727 819344 http://www.stalbans.gov.uk/environment-and-planning/planning/development-management/	Tel: 01727 866100 http://www.stalbans.gov.uk/environment-and-planning/planning/conservation/conservation-areas.aspx
Stevenage	Tel: 01438 242264 http://www.stevenage.gov.uk/planning/building-control/	Te: 01438 242838 http://www.stevenage.gov.uk/planning/planning-permission/	Tel: 01438 242255 http://www.stevenage.gov.uk/planning/other-planning-controls/42327/
Three Rivers	Tel: 01923 278304 http://www.swhertsbc.co.uk/	Tel: 01923 776611 http://www.threerivers.gov.uk/Default.aspx/Web/Do-you-need-Planning-Permission	Tel: 01923 776611 http://www.threerivers.gov.uk/Default.aspx/Web/ConservationAreas
Watford	Tel: 01923 278304 http://www.swhertsbc.co.uk/	Tel: 01923 226400 http://www.watford.gov.uk/ccm/navigation/environment-and-planning/planning/	Tel: 01923 226400 http://www.watford.gov.uk/ccm/navigation/environment-and-planning/conservation/
Welwyn Hatfield	Tel: 01707 357391 http://www.welhat.gov.uk/index.aspx?articleid=659	Tel: 01707 357000 http://www.welhat.gov.uk/index.aspx?articleid=1046	Tel: 01707 357000 http://www.welhat.gov.uk/index.aspx?articleid=1211

4 Funding your retrofit

Introduction

When deciding which retrofit solutions to use it is important to consider how you will pay for them. There are a variety of funding schemes which provide solutions for free or at a heavily discounted rate. In addition, the Feed-in Tariff and the Renewable Heat Incentive schemes mean you will earn money for generating renewable electricity and heat.

For those solutions that aren't currently funded these would need to be paid for using your own money. Before investing you should consider which solutions will provide the biggest savings in your energy bill for every pound you spend. At the end of 2012 the Government's Green Deal will be available to homeowners. This will allow you to install energy efficiency solutions and renewable energy technologies at no up-front cost, with the cost of the measure(s) being recouped from your energy bill savings. If you own a property and rent it out, the Green Deal allows you to make improvements to your property at no upfront cost, and the loan will be paid back via your tenants' energy bills. If you are a tenant your landlord will apply for the Green Deal loan, which will then be re-paid through the savings in your energy bills.

What is the payback period?
The payback period is how long it takes to save as much money from your utility bills as you have spent on buying and installing the solutions. For example, loft insulation can cost between £100 and £350. Once installed, you could save around £175 a year on your heating bill. This means that the payback period would be between under a year and two years.

Is my retrofit solution a good investment?

As you will see in **Section 5**, the costs of the different retrofit solutions range from £5 for an energy efficient light bulb to around £10,000 for external wall insulation. When deciding which solutions to install it is important to consider your reasons for retrofitting and what the payback would be. This is a measure of how long it will take before the reduction in energy bills created by the retrofit solutions equals the initial cost of the measure.

Broad payback periods for each retrofit solution are included in **Section 5**. Please be aware that these are indicative only, since actual payback periods will vary from home to home, depending on the costs of the measure, how

effective it is, and how much energy you currently use. Do also bear in mind that payback periods will become shorter as fuel and electricity prices rise. You may still want to use solutions that have a long payback period as they have other benefits, for example double glazing has a long payback period but it will reduce draughts and can improve the appearance of your home.

With the payback period in mind, you can then assess the best way to finance the measure, taking into account how much capital you have and what other funding options are available.

Funding available now

CERT (Carbon Emissions Reduction Target) funding is available for energy efficiency solutions and renewable energy technologies. It is provided by the "Big 6" energy companies since they are legally obliged to reduce their customers' carbon dioxide emissions. To meet this target they provide free or subsidised retrofit solutions, such as loft insulation and cavity wall insulation, via their chosen installers. You can contact the Energy Saving Trust (0800 512 012) to find out which particular offer is available to you.

Government funding is also available for homes which generate their own electricity, via the **Feed in Tariff (FiT)** scheme**.** For instance, if you install solar PV panels, you will reduce your electricity bill and earn money - you can earn around 21p for every unit of electricity (kWh) you generate even if you use all the electricity yourself. In addition, for every unit of electricity that you generate but don't use (for example if you have solar panels but are at work during the day when they are generating most of their energy) you will also receive around 3p/kWh for the electricity that you 'feed' back into to the national grid. Payment is made via your electricity supplier.

The combination of reduced electricity bills *and* payment for generating electricity can make renewable energy quite an attractive investment as, in many cases, the rate of return is more favourable than the rate of return in a savings account. A typical domestic installation of solar PV will give a rate of return of around 5 %[xi] where as a typical rate of return in an average savings account is 2 % to 3 %.

Funding available in future

The Green Deal

CERT will stop in December 2012 and will be replaced by the Green Deal. The Green Deal will provide a loan for energy efficiency solutions, which will be paid back via the home's electricity bill. Energy efficiency solutions which meet the "Golden Rule" will be eligible.

I am a landlord, is the Green Deal suitable for me?
Yes! It allows you to install energy efficiency measure without bearing the upfront costs. The loan will be re-paid via your tenant's fuel bills. However, you will be responsible for the loan.

The "Golden Rule" states that the monthly saving in the energy bill resulting from the installed measure must be equal to or greater than the monthly cost of paying back the loan over a standard loan period, e.g. 25 years. The loan stays with the property and the new owners will continue to repay the loan as they will also benefit from the reduced energy bills. It therefore doesn't matter if you move home before the measure has paid for itself.

When deciding if the Green Deal is right for you or not, consider how much capital you have to use and the measure's payback period. The interest paid on a Green Deal loan is likely to be much higher than the interest gained on any savings account. This means that if you have sufficient capital and intend to be in your home long enough for the savings in your energy bills to have paid off the measure, then it would be better to pay for the solutions using your own capital rather than a Green Deal loan. The Green Deal loan will be worthwhile in situations where you would like to install a measure, but do not have the upfront capital to do so, or if you are planning to move home before the cost of the measure would have been recouped from your energy bill savings.

For important but expensive retrofit solutions which do not meet the "Golden Rule", for example, solid wall insulation, there will be **Energy Company Obligation (ECO)** funding available. This funding will be used to reduce the cost of the measure so that it can pay for itself from the energy bill savings over a standard finance period, e.g. 25 years. This funding will *also* be available for *any* energy efficiency solutions required by people living on low incomes.

I am a tenant; can I take advantage of the Green Deal?
Yes! You can ask your landlord to take out the loan, and you will pay it back through your energy bill. From 2016 it will be illegal for the landlord to refuse any request to implement energy efficiency measures.

The Renewable Heat Incentive

In future, there will also be the Renewable Heat Incentive (RHI) which will allow homes who generate their own heat, for example, using a wood-burning boiler or solar thermal panels, to earn money for doing so. This will operate in a similar way to the Feed-in Tariff. You will be paid a certain amount of money for every unit of heat that you generate from your renewable energy system. This will also be paid to you through your energy supplier.

Please see the tables on the following pages which summarise the different funding schemes. Section 5 includes specific funding opportunities for each solution.

Funding for energy efficiency solutions

	Carbon Emissions Reduction Target (CERT)	Green Deal	Energy Company Obligation (ECO)
Which solutions are applicable?	Funding is focussed on insulation, but any measure which reduces energy consumption is allowed, except energy saving light bulbs.	Any measure which meets the "Golden Rule", i.e. the cost of paying back the loan on the measure is lower than the energy bill savings.	Solutions which are too expensive for the Green Deal, e.g. Solid wall insulation.
Who is eligible?	Anyone is eligible for discounted solutions and free solutions too for limited periods. If you are over 70 or are on certain benefits then you will be eligible for *free* solutions.	Anyone If you rent your home you can ask your landlord to install the measure (you will pay back the loan through the savings on your energy bill).	The vulnerable Those who are on low incomes Those who need solutions which are too expensive for the Green Deal.
How much funding is available?	Varies, depending on what solutions you need.	Depends on whether the measure will payback but potential for loans of as much as £20,000.	Solutions will be free for households with low incomes. For other households the solutions will be subsidised.
What is the deadline?	December 2012	Due to start in October 2012. No deadline.	Due to start in October 2012. No deadline.
Where to get more information	Contact the Energy Saving Trust Advice Centre to find out which installers are doing CERT-funded work (0800 512 012).	Energy Saving Trust website will have information when it becomes available (www.energysavingtrust.org.uk).	Energy Saving Trust website will have information when it becomes available (www.energysavingtrust.org.uk).

Funding for renewable energy technologies

	Carbon Emissions Reduction Target (CERT)	Feed in Tariff (FiT)	Renewable Heat Incentive (RHI)
Which solutions are applicable?	Any small-scale renewable energy technology.	Solar photovoltaics Wind turbines Micro CHP Anaerobic digester Micro-hydro power	Air-source heat pumps Ground source heat pumps Biomass boilers Solar thermal panels
Who is eligible?	Anyone is eligible for discounted solutions. If you are over 70 or are on certain benefits then you will be eligible for *free* solutions.	Currently anyone, but from April 2012, your home will need to install energy efficiency solutions to achieve an EPC rating of D or above before receiving funding.	(To be confirmed.) Anyone, but it must be installed in your main home and have basic energy efficiency solutions in place.
How much funding is available?	Varies, depending on what options you go for.	Depends on technology, but an average home could make around £525 a year.	This has yet to be defined but an average home could earn around £400 a year.
What is the deadline?	December 2012	No deadline, but the later you install the panels the lower the tariff you receive.	Will be available towards the end of 2012.
Where to get more information	Contact the Energy Saving Trust Advice Centre to find out which installers are doing CERT-funded work (0800 512 012).	Contact the Energy Saving Trust Advice Centre (0800 512 012) or see their website: www.energysavingtrust.org.uk.	Energy Saving Trust website will have information when it becomes available (www.energysavingtrust.org.uk).

[i] http://www.energysavingtrust.org.uk/In-your-home/Heating-and-hot-water/Replacing-your-boiler
[ii] BBC. (2009). (http://news.bbc.co.uk/1/hi/8297882.stm)
[iii] Based on data from *Hackbridge – an area based study for zero carbon buildings.* BioRegional (2012) (http://www.bioregional.com/news-views/publications/energy-retrofit-tool-for-buildings/)
[iv] Energy Saving Trust (http://www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Cavity-wall-insulation)
[v] Eco Chic or Eco Geek: The Desirability of Sustainable Homes, Research Study Conducted for The Sponge Sustainability Network by Ipsos MORI
[vi] http://www.haringey.gov.uk/index/housing_and_planning/housing/housingadvice/homeheatloss.htm
[vii] WWF. (2010) *Living Planet Report 2010* (http://assets.wwf.org.uk/downloads/wwf_lpr2010_lr_1_.pdf)
[viii] BioRegional. (2009) *BedZED seven years on.* (http://www.bioregional.com/news-views/publications/bedzed-seven-years-on/)
[ix] Hertfordshire Forward. *A Climate Change Strategic Framework for Hertfordshire.*(http://www.hertslink.org/buildingfutures/content/migrated/obdocs/pdfs/hertsccstratfwork)
[x] DECC. (2011) *UK Energy in Brief 2011.*
[xi] DECC (2011) *Consultation on Feed in Tariffs for solar PV* (www.energysavingtrust.org.uk%2Fcontent%2Fdownload%2F32568%2F391030%2Fversion%2F1%2Ffile%2FLAHA_FiTs_consultation_briefing_note.pdf&ei=CnYiT7-XJMm70QXltfTOCg&usg=AFQjCNHsxOGttUjUzSODvtmgIqsODLTJ_w)

5 Solutions to retrofit your property

There are a wide range of retrofit solutions you can carry out to improve the performance of your home. On the following pages you will find information on what you can do to save energy, save water, use renewable energy and harvest water, and adapt your home to the changing climate.

For each solution the potential costs of installation, work involved and the potential savings you can expect are detailed. Considerations such as planning restrictions, funding opportunities and accreditation schemes are also covered. Use the key below to find the type of solution you are interested in, and look out for the symbols that tell you whether this is an easy DIY job, a more challenging DIY job, or one for the professionals.

Energy saving solutions

Renewable energy solutions

Water saving solutions

Climate change adaptation solutions

For each solution symbols are provided to make it easy to find the information you are looking for. An explanation of what each symbol denotes is provided below.

Financial issues

Provides the indicative cost of buying and installing the solution.

Provides the savings on your utility bills that you will achieve each year by installing the measure. This is based on current energy prices. It is likely that savings will increase year on year as energy prices are expected to rise.

For solutions that save water this shows the amount of water saved.

Indicates for a typical building how long it takes to save as much money on your utility bills as you have spent on buying and installing the solutions.

Identifies what different funding opportunities there are for each solution. You can click on the name of the funding to see more detail in the Funding section.

Planning issues

Many of the retrofit solutions need planning permission or building control approval. Advice is given as to whether permissions might be needed.

If you have a building that is in a Conservation Area or is Listed then different planning rules apply. This symbol provides more information on this for each solution.

Before starting work

This shows how difficult it is to install the solution. One hammer denotes an easy DIY job, two hammers for a more advanced DIY job and three hammers for a solution that would require professional installation.

It is often possible to reduce the costs of retrofitting by combining your retrofit solution with other refurbishment works on your home. This section identifies what other refurbishment projects you could do alongside each solution.

For renewable energy and water recycling technologies the expected maintenance requirement is provided.

Other information

Highlights the accreditation body you should look for when procuring a contractor or installer to undertake the work.

Provides links to further information.

Reduce your utility bills for free

Before reading on to see the all the different retrofit measures which exist, see below for some tips on how to reduce your utility bills before going anywhere near your wallet or a screwdriver!

Cooking

- When cooking on the hob put a lid on the pan. You can turn the heat down and won't need to use the extractor fan to clear the steam - another simple step which saves a significant amount of energy.
- Only fill the kettle for as many cups as you need.

Fridges and freezers

- Keep the freezer in a cool location, to prevent it from doing extra work to keep cold.
- Allow food to cool before putting it in the fridge, so that the fridge doesn't need to use extra energy to cool it.
- Space in the freezer fills up with warm air each time you open it. Fill the gaps using things like crumpled newspaper or old milk cartons filled with water to help it stay cool.
- Don't leave your fridge door open, it wastes energy. If the door is left open for 1 minute, 3 minutes' worth of energy is used to cool the fridge back to normal temperature.

Heating and hot water

- You can reduce your heating bill by 10% by just turning your thermostat down by 1°C - you probably won't even feel a difference, but you will notice one in the fuel bill!
- Make sure that your hot water tank temperature is not set too high. 60°C is the recommended temperature for household uses, any hotter than this and you will just be wasting money and risk scalding yourself.
- A dripping hot tap can leak up to 5,000 litres of water in a year – equivalent to having 46 baths. So it is worthwhile fixing the tap to save energy and water

Washing

! Most washing detergents work well at 30°C, so try washing your clothes at this temperature instead of 40°C and save lots of energy.

! Try to wash full loads only to limit the use of the washing machine - saving more energy and prolonging its lifetime.

! Tumble dryers are big consumers of energy. Save money by drying your washing outside - or inside on a drying rack - and just use the tumble drier for a few minutes to finish it off.

Leisure

! Try to turn off appliances at the wall if you can; if left on standby they use a surprisingly large amount of energy

- A DVD left on standby uses 60% of the energy when it's in use.
- A digital set-top box left on standby uses 80% of the energy used when it's switched on – (note: some set-tops might need to be left on –check with your TV company)

! Draw your curtains at dusk to keep in the heat and to reflect light back in.

An introduction to energy saving & energy efficiency solutions

Energy saving solutions

In line with the ABCs of retrofitting, it is best to first concentrate on measures which reduce the amount of energy you need. This section details the solutions available to help reduce your energy needs:

- **Draught-proofing**
- **Insulating your roof**
- **Insulating your walls**
- **Insulating your floors**
- **Installing secondary glazing**
- **Replacing your windows and external doors**

Energy efficiency solutions

Once you have reduced the amount of energy you need, the next step is to make your house as energy efficient as possible, which helps you to save even more energy. This section provides guidance on how to make the following areas more energy efficient:

- **Lighting**
- **Heating and hot water (gas, electric and oil-fuelled systems)**
- **Ventilation**
- **Appliances**

Draught-proofing

What's involved?


Credit: Anderson Windows

Up to 15% of your heat could be lost through draughts, so it is a good idea to block them! The draught-proofing measures you can do are listed below. Draught-proofing can be a tricky job in some properties, especially older properties. It is important that it is done correctly, to avoid condensation and maintain necessary ventilation, so if you are unsure you could get a professional to do it which would cost around £250. The costs below are for the materials only. All the measures together could save £55 per year on your fuel bill. However, once you have a draught-free home you will be able to turn down your thermostat, which could save another £60 per year. Draught-proofing can be paid for using the **Green Deal**.

For more information please see www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Draught-proofing .

	General information	Difficulty	Costs
Windows and skylights	Fit foam, brush or wiper strips around the edges of the window frame to fill the gap. For sash windows you should only use brush strips so that you can still open the windows easily. Hang heavy curtains to keep the heat in.	A relatively easy DIY job, but it will need a bit of patience.	£20 per window*.
External doors	Use a letterbox flap or letterbox brush. Use a brush or hinged flap draught excluder to prevent draughts coming in through the bottom of the door. Fit foam, brush or wiper strips like those used for windows around the edges of the door frame. Buy a purpose-made cover that drops a metal disc over the keyhole.	A relatively easy DIY job, but it will need a bit of patience.	Letterbox draught-excluder: £10* Door brush: £10* Strips for side of door: £5* Key-hole cover: £6*
Floors and skirting boards	Block cracks using filler that you squirt into the gaps. You need a filler that won't crack as the floorboards move. Suitable fillers are: • Decorator's caulk • Flexible fillers usually containing silicone • Mastic-type products	A medium difficulty DIY job, you will need to be careful to wipe excess filler away before it dries.	£5 per metre*.
Chimneys and fireplaces	If you don't use you fireplace, then your chimney could be a source of unnecessary draughts. Fit a cap over the chimney pot or buy a chimney balloon - an inflatable cushion which blocks the chimney.	Chimney balloon: simple DIY measure.	£20*
Pipework	Fill small gaps around pipework with silicon fillers, similar to the fillers used for skirting boards and floorboards. Fill larger gaps with expanding polyurethane foam. This is sprayed into the gap, expands as it dries, and sets hard.	A slightly trickier DIY job.	£10 per metre* *All costs are approximate.

Roof insulation

What's involved?

If your home has a pitched roof, with easy access to the loft and the joists (the wooden planks which make up the floor of the roof) are regularly spaced, you can lay rolls of insulation between the joists. If you have irregular joists then loose-fill insulation can be used. If you don't have easy access to your roof, you can use blown-in insulation, which will need to be installed by a professional.

Credit: South-end on Sea in Transition

If you have had your loft converted into a room, or plan to, you should insulate the roof of the loft rather than the floor, by fixing rigid insulation boards between the roof rafters.

If you have a flat roof, this should be insulated from above. A layer of rigid insulation board can be added either on top of the roof's weatherproof layer, or directly on top of the timber roof surface with a new weatherproof layer on top of the insulation.

Financial issues

Costs

Pitched roof: £100 to £350

Room in a roof: around £14/m^2

Flat roof: around £17/m^2

Savings

Up to £175 per year.

Payback period

Pitched roof: up to 2 years.

Room in a roof: around 5 years.

Flat roof: around 3 years.

Funding

Free or reduced rates through **CERT**.

ECO (for residents receiving certain benefits and those who are over 70).

Green Deal

Before starting

Difficulty

Pitched roof: A more challenging DIY job.

Room in a roof: A more challenging DIY job, probably one for the professional.

Flat roof: One for the professionals.

Before starting

If the roof space is currently used for storage, it will have to be emptied first.

Other work

Pitched roof: standalone job.

Room in a roof: loft conversion.

Flat roof: roof repair or replacement.

Planning issues

Permissions

Planning permission is not required.

Must meet Building Regulations.

Conservation or listed

Old buildings need to breathe so use natural materials, e.g. sheep's wool insulation, to help the house breathe and prevent the build-up of damp.

Other information

Accreditation

National Insulation Association (NIA)
http://www.nationalinsulationassociation.org.uk/householder/index.php?page=installer-members

More information

www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Roof-and-loft-insulation

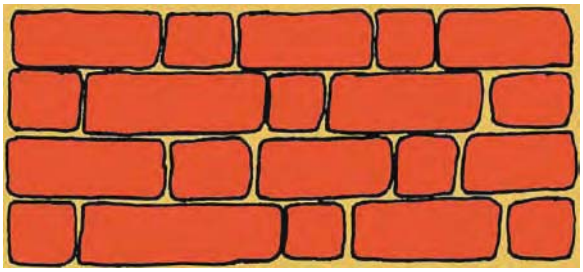
Walls

What type of wall do you have?

Your house is likely to be of solid wall, cavity wall or timber frame construction. Each type of construction needs to be insulated in different ways, so you need to identify which type you have.

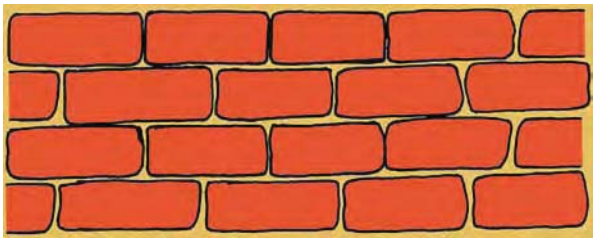
Solid wall

Solids walls consist of one layer of bricks. The bricks in solid walls tend to alternate between the long and short end of the brick, as you can see in the diagram below. Solid walls are generally found in buildings built before the 1920s.



Cavity wall

Cavity walls have a small gap in between two layers of bricks or breeze block and brick. In cavity walls the external bricks are normally laid in a regular pattern as shown below. Cavity walls are generally found in buildings built after 1920. Buildings built after 2001 will already have an insulated cavity. For buildings built before 2001 it is likely that the cavity will need to be filled.



Timber frame

These houses are often insulated but can be improved by using solid wall insulation. You can tell if you have a timber frame by measuring the thickness of the walls (you can do this at the front door or at a window). Timber framed walls are around 19 cm thick whereas cavity walls are around 32 cm thick.

What type of insulation to use?

Cavity walls

If you cavity walls which have not yet been filled with insulation you will be able to install cavity wall insulation. Also, if you have cavity wall insulation which is over 25 years old, it may need to be topped up.

Solid walls

If you have solid walls, you can either install insulation to the interior face of the walls or the exterior facade. More information about the two approaches and the advantages and disadvantages of each approach are listed below.

Internal insulation: There are two types of internal insulation: rigid internal insulation and flexible insulated lining which is a more affordable, simple version of the rigid internal insulation which you apply like wall paper.

Advantages	Disadvantages
Doesn't affect home's external appearance	More disruptive to install
Doesn't need planning permission (does need Listed Building Consent)	Slightly reduces the area of the room
Requires redecoration of the wall and possibly the room	Not quite as effective as external wall insulation

External insulation: An insulating board attached to the external face of the wall with render over the top. A cheaper but less effective alternative is to use insulating render.

Advantages	Disadvantages
Less disruptive than internal insulation	Likely to require planning permission, which may be difficult to obtain, as it changes the external appearance of the home
Can improve the external appearance of the walls	More expensive than internal insulation
Solves thermal bridging problems	Roof may need to be extended to accommodate extra thickness of walls.

Timber frame

If you have a timber frame house, you can opt for either internal or external solid wall insulation. However, this type of construction is usually well insulated and there may not be much benefit gained by installing internal or external solid wall insulation so check with an installer first.

Cavity wall insulation

Energy saving measures

What's involved?

An installer drills small holes at regular intervals of around one metre in the outside wall of your home. With specially designed equipment, they then blow insulation into the cavity. Once all the insulation is in, the installer fills the holes in the brickwork so you'll barely notice them.

Source: Septuagent

Financial issues

Costs	£100 to £350
Savings	Around £135 per year.
Payback period	Less than one year, up to three years.
Funding	Can be provided free or a reduced rates through **CERT** funding. **ECO** (for residents receiving certain benefits and those who are over 70) **Green Deal**

Before starting

Difficulty	One for the professionals.
Before starting	Any problems with damp in the walls should be remedied before installing the insulation.
Other work	Stand-alone job

Planning issues

Permissions	Planning permission is not required, but it is notifiable building work - the installer will submit a building notice to your local planning department. Must meet Building Regulations.
Conservation or listed	Conservation Area: no issues Listed building: it is unlikely that Listed Buildings will have cavity walls, but if it does you should contact your local planning authority before proceeding.

Other information

Accreditation	National Insulation Association www.nationalinsulationassociation.org.uk/householder/index.php?page=installer-members
More information	www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Cavity-wall-insulation

Solid wall insulation - internal

What's involved?

An insulation board is fixed to the inside of the wall, or a stud wall (timber frame over which plasterboard is laid) is built and filled with mineral wool fibre. Alternatively, you can apply a wallpaper-like flexible insulated lining which is a more affordable, simple version of rigid insulation but not as effective. Internal insulation is more disruptive to install and slightly reduces the area of the room, however it does not affect the appearance of your home. Also bear in mind that internal insulation requires redecoration of the wall and possibly the entire room.

Source: Parity Projects

Financial issues

Costs: £5,500 to £8,500 (costs based on a three-bed home.

Savings: Around £445 per year.

Payback period: 12 to 19 years.

Funding: Combination of **Green Deal** and **ECO** because of the long payback period.

Before starting

Difficulty: One for the professionals.

Ensure that the installer fits insulation carefully to avoid condensation problems.

Before starting: Any problems with damp in the walls should be remedied before installing the insulation.

Other work: Redecorating any of the rooms. The radiators, window edges and skirting boards will need to be removed and refitted after applying the insulation.

Installing a new kitchen or bathroom.

Planning issues

Permissions: Planning permission is not required.

Must meet Building Regulations.

Conservation or listed: Conservation Area: no issues.

Listed Building: you will need to apply for Listed Building Consent.

Other information

Accreditation: National Insulation Association

www.nationalinsulationassociation.org.uk/householder/index.php?page=installer-members

More information: www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Solid-wall-insulation

Solid wall insulation - external

What's involved?

A layer of rigid insulation material is fixed to the external walls, which is then covered with a special type of render (plasterwork) or cladding. The installation of external wall insulation is less disruptive than internal insulation but will change the appearance of your home unless you already have a rendered finish to your external walls.


Source: BioRegional

Financial issues

Costs: £9,400 to £13,000 (costs based on a three-bed home).

Savings: Around £475 per year.

Payback period: 20 to 27 years.

Funding: Combination of **Green Deal** and **ECO** because of the long payback period.

Before starting

Difficulty: One for the professionals.

Before starting: Any problems with damp in the walls should be remedied before installing the insulation.

Other work: If you need to re-point your brick walls this is an alternative, repairing damaged render, painting the windows, new roof, installation of solar panels (make the most of the scaffolding that is required).

Planning issues

Permissions: Planning permission may be required if it significantly alters the appearance of your home.

Must meet Building Regulations.

Conservation or listed: Conservation Area: you will need to apply for planning permission.

Listed Building: you will need to apply for Listed Building Consent. However, it is unlikely that you would be given consent as the external facade of the building will be altered.

Other information

Accreditation: Insulated Render and Cladding Association

http://www.inca-ltd.org.uk/find-a-member.asp#

More information: www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Solid-wall-insulation

Floor insulation

What's involved?

Typically 15% of a home's heat is lost through the ground floor. The method of insulating it depends on what type of floor you have.

An older home is likely to have a suspended timber floor. You can lay insulation between the joists (the planks of wood which lie horizontally under the floor boards).

It is a bigger job to insulate a solid concrete floor, found in most newer homes. The existing floor covering (e.g. carpet) must be pulled up and rigid insulation placed between it and the concrete, a layer of chipboard is then put over the insulation before re-flooring.


Source: Halfwayupamountain

Financial issues

Costs — Around £40 per m^2

Savings — Around £60 per year.

Payback period — Around 27 years.

Funding — **Green Deal.**

Before starting

Before starting — Suspended: ensure that the joists are in good condition before insulating.

Solid: if a rigid layer is being added to an existing concrete floor, doors may need to be trimmed to make room for the raised floor.

Other work — Suspended: replacing carpet and re-wiring or can be a stand-alone job.

Solid: replacing upper flooring layer or concrete floor.

Planning issues

Permissions — Planning permission is not required.

Must meet Building Regulations.

Conservation or listed — Many older buildings have air bricks on the outside walls below ground level for ventilation. Ensure that insulation does not block these.

Other information

Accreditation — National Insulation Association
www.nationalinsulationassociation.org.uk/householder/index.php?page=installer-members

More information — www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Floor-insulation

Secondary glazing

What's involved?

There are three types of secondary glazing:

Pane of glass and frame: fitted inside the window recess. This looks and behaves like a normal window.

Plastic pane: fixed to the existing window frame using adhesive magnetic strips. This is used in the winter then taken down and stored during summer. This is a cheaper option than above.

Thermal films: This is similar to a layer of cling film which is fixed to the inside of the window using double sided sticky tape. It is not possible to open the windows when it is in place, so this needs to be installed in the winter and removed in the summer. Unlike the plastic panes which can be used year after year, new thermal film would need to be applied each winter.

These are all good options if you live in a Conservation Area or property where replacement double glazing is not permitted or feasible.

Financial issues

Costs

Window & frame: around £500 per m^2

Plastic pane: around £60 per m^2

Thermal film: around £1 per m^2

Savings

Around £100 a year.

Payback period

Window & frame: around 80 years.

Plastic pane: around 10 years.

Thermal film: less than a year.

Funding

No funding available.

Before starting

Difficulty

Window and frame: one for the professionals.

Plastic pane and thermal film: this can be done by the competent DIYer.

Before starting

Nothing.

Other work

Standalone job.

Planning issues

Permissions

Planning permission is not required.

Building Control approval not required.

Conservation or listed

These are good options for Listed Buildings or homes in Conservation Areas if you need to retain your existing windows, or if double glazing is not permitted.

Other information

Accreditation

Fenestration Self Assessment Scheme:

www.fensa.co.uk/asp/member_search.asp

More information

www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Windows

Replacement windows and doors
Double and triple glazing

Energy saving measures

What's involved?


Source: BioRegional

Double-glazed windows have two sheets of glass with a small gap between them, to create an insulating barrier which stops heat escaping outside. The most insulating windows are filled with inert gas.

Triple-glazed windows have three sheets of glass, but aren't always better than double-glazed windows: to choose the most energy-efficient window look for the British Fenestration Rating Council (BFRC) rating and Energy Saving Trust Recommended logo.

If you can feel a draught from your windows installing new windows will also remove this draught.

If you have an external door which lets a lot of heat out (it may not fit in the frame very well, or is thin) you could consider replacing it with a well-insulated version. A new well insulated door will cost around £300.

Financial issues

Costs	Around £150 to £500 per window. Could be more expensive for certain window types such as sash windows.
Savings	Around £160 a year.
Payback period	Around 16 years or more.
Funding	No funding available.

Before starting

Difficulty	One for the professionals.
Before starting	Make sure that the windows have been measured properly to ensure a close fit.
Other work	Standalone job or could be done when redecorating or installing solid wall insulation.

Planning issues

Permissions	Permitted development, so planning permission is not required (see below). The new windows must meet the Building Regulations Approval required.
Conservation or listed	Conservation Area: there may be additional restrictions in place, contact your local planning department. Listed Building: need to apply for listed building consent.

Other information

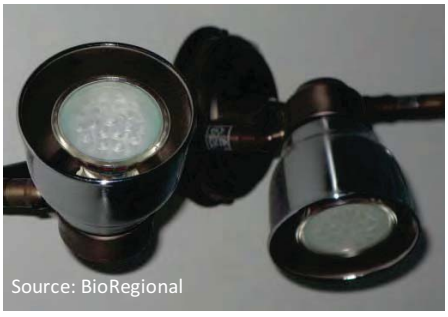
Accreditation	Fenestration Self Assessment Scheme: www.fensa.co.uk/asp/member_search.asp
More information	www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Windows

Lighting

What's involved?

Traditional incandescent bulbs waste lots of energy. Converting to energy saving light bulbs is a cheap way to reduce your electricity bills. In fact, the energy savings are so large it is worthwhile replacing any incandescent bulbs immediately, rather than waiting for them to blow. No funding is currently available for energy saving light bulbs.

You can save even more money by making the most of natural light, for example by putting transparent panels in internal walls and doors.

	General information	Costs	Savings	Payback period
Compact Fluorescent Lamp (CFLs)  Source: BioRegional	These use 80% less energy than a standard incandescent bulb and they can last up to 10 times longer than incandescent bulbs. They have a reputation for not producing a warm light but this has improved and the difference in the quality of light is now negligible. There are now varieties to suit all types of light fittings.	Around £5 (for a 9W CFL, equivalent to a 40W incandescent bulb).	Around £3 per year for each bulb.	Around 2 years.
Light Emitting Diode (LEDs)  Source: BioRegional	These are even more efficient than CFLs – they use 90% less energy than an incandescent bulb. They cost more than CFLs but, over the lifetime of the bulb, will save you more money. They last 50 times longer than incandescent bulbs. Because LEDs emit a very bright, direct light, they are best to use when replacing down-lighters, rather than other types of light.	Around £10 for a 6W LED bulb (equivalent to a 50W halogen bulb).	Around £4 a year (if replacing a 50W halogen down-lighter with a 6W LED).	Around 2 years.

Solutions for gas or oil-fired systems

Introduction

There are lots of things you can do to make your central heating and hot water system more efficient. Make sure you maintain your heating system properly to ensure that it is running efficiently. All of the measures listed below will be eligible for funding through the **Green Deal**.

If you are off the gas grid you may seriously want to consider a renewable energy option since the savings are more favourable. See the **renewable energy section** for more information.

More information is available from www.energysavingtrust.org.uk/In-your-home/Heating-and-hot-water

	General information	Difficulty	Costs	Savings	Payback period
Radiator panels	The panel sticks to the wall behind the radiator and reflects heat back into the room instead of being transferred into the wall.	Very simple DIY job.	£2.50 each	£5 per year each	Around 6 months
Insulate hot water pipes	Insulating material is placed around hot water pipes to prevent heat being lost as the water circulates around the house.	Moderately easy DIY job.	£10	£15 a year	Around a year
Insulate hot water tank	An insulating jacket (at least 70 mm thick) is placed around the tank, reducing the amount of heat lost.	Very simple DIY job	£15	£40 a year	Around 6 months
Room thermostat and programmer	A thermostat allows you to set the temperature of the house. It will turn the heating on until the desired temperature is achieved, it will then turn the heating off until the temperature drops. You should make sure that the room thermostat has a two-channel time clock to ensure that you can programme it to come on when you want.	One for the professionals	£200	£70 a year	4 years
Thermostatic Radiator Controls (TRVs)	A TRV allows you to control the temperature of a room. It fits onto the radiator and turns it on until the desired temperature is achieved, it will then turn the radiator off until the temperature drops. Do not put a TRV on the radiator in the room that has your thermostat in.	A difficult DIY job – draining the water from all the radiators is required first	£150 for a professional installation or £50 for materials only	£20 a year	7 years (professional installation) 2-3 years (DIY)
New boiler	If your boiler is more than 15 years old it will be worth upgrading to a new, A-rated model. If you live in a listed building you will need to contact your local planning department before installing a new boiler. Building Regulations Approval will be required. Use an accredited plumber: Chartered Institute of Plumbing and Heating Engineers (CIPHE) (http://www.ciphe.org.uk/Find-a-Plumber/?pc=hertfordshire&lat=51.8097823&lng=-0.2376744)	One for the professionals	Around £2,500	Between £100 and £300 a year, depending on original boiler.	8 to 25 years

Solutions for electric heating systems

What's involved?

Electric systems are more polluting than gas or oil systems. Older systems tend to be less easy to control and so harder to run efficiently. Aside from changing your heating system, there are a few cheaper measures which will help. Make sure you have an Economy 7 tariff which provides cheaper electricity at night and set your storage heaters to charge overnight. You should also turn the input dial on the heater to zero an hour before you go to bed to prevent heating empty rooms. Regular maintenance will also ensure your system is running efficiently. All these measures could be funded through the **Green Deal**.


Credit: Pigpogm

Further information from: www.energysavingtrust.org.uk/In-your-home/Heating-and-hot-water. Local accredited installers can be found via the Chartered Institute of Plumbing and Heating Engineers (CIPHE)'s website: http://www.ciphe.org.uk/Find-a-Plumber/?pc=hertfordshire&lat=51.8097823&lng=-0.2376744

	General information	Costs	Savings	Payback period
Insulate hot water tank	An insulating jacket (at least 70 mm thick) is placed around the tank, reducing the amount of heat lost.	Around £15.	Around £100 a year.	Less than 6 months.
Change to gas-fired central heating (if you're on the gas grid)	Gas-fired heating is less polluting and cheaper than electric heating. You would need to replace your existing storage heaters with radiators, plumbing and a new gas boiler. You would need Building Regulations Approval for new heating system. Planning permission would only be needed if the new flue does not meet certain conditions. Speak to your local planning authority for advice. If you live in a Listed Building you would have to contact your local planning department before making any changes to the fabric of the building.	Around £2,500, plus the cost of radiators.	Up to £500 per year.	Around 7 years.
Replace with more efficient storage heaters	Modern slimline fan-assisted storage heaters are better insulated so they waste less heat. They also have improved controls which allow you to heat your home more efficiently.	Around £100 per heater.	Around £150 per year.	Around 4 years.
Renewable energy options	You could consider generating some of your hot water and heating using renewable energy – particularly if you are not on the gas grid. See the **renewable energy section** for more information.			
Radiator panels	The foil panel sticks to the wall behind the radiator and reflects heat back into the room instead of being transferred into the wall.	Around £2.50 each.	Around £6 a year each.	Around 6 months.
Insulate hot water pipes	Insulating material is placed around hot water pipes to prevent heat being lost as the water circulates around the house.	Around £10.	Around £7 a year.	Around 2 years.

Mechanical ventilation with heat recovery

Energy saving measures

What's involved?


Source: BioRegional

After insulating and draught-proofing, most homes, will still have adequate ventilation without the need for mechanical ventilation. The only rooms which could require it will be kitchens and bathrooms to reduce the build-up of moisture. In these rooms you should use an extractor fan with a heat recovery function

It would not be worthwhile installing fans with a heat recovery function except when you need to replace the existing fan, or if you don't already have a fan, as the energy savings are not very high.

If you are carrying out a whole house retrofit to achieve high levels of air tightness, then you may need to consider whole house mechanical ventilation with heat recovery to maintain internal air quality and avoid condensation.

Financial issues

Costs	Around £350 for each fan.
Savings	Around £15 per year.
Payback period	Around 23 years.
Funding	**Green Deal**

Before starting

Difficulty	One for the professionals. Qualified electricians will be able to install an extractor fan.
Before starting	No preparation is required, although a space on an external wall will need to be identified.
Other work	When replacing existing fan or undertaking re-wiring of your property.

Planning issues

Permissions	Not classed as "development", planning permission is therefore not required. You will need to ensure that the air flow rate of the extractor fan meets the Building Regulation's requirement. See: http://www.planningportal.gov.uk/permission/commonprojects/kitchensbathrooms/#Needforadditionalventilation.
Conservation or listed	The flue may affect the appearance of your property so speak to your local planning department first.

Other information

Accreditation	Heating Ventilating & Air Conditioning Manufacturers Association (HEVAC) www.feta.co.uk/membership/memberslist.php#

Appliances

What's involved?

When replacing your electronic appliances, aim to get the most energy efficient models. Most electronic goods must now carry the EU Energy rating label (shown on the right), which will guide you in choosing the most energy efficient appliances.

Look for the highest A-rated appliances on the market. Be aware that the ratings vary between different appliances. Please see the table below to help guide you and www.sust-it.net for further advice on electronic appliances.

If you don't plan to replace an appliance yet, there are still a couple of things you can do to reduce its energy consumption. When not in use, switch it off at the plug. Some appliances use a surprising amount of energy when in "stand-by" mode. You can buy devices which enable you to cut the power to a number of appliances with just one remote.

There is currently no funding available for new energy efficient appliances.

	General information	Savings
Fridge/ freezer	New appliances may be rated up to "A+++" Previously, appliances were rated up to a maximum of "A++", and originally only to a maximum of A.	Up to half of your current electricity bill.
Washing machine	New appliances may be rated up to "A+++" Previously the scheme rated appliances up to "AAA". The original scheme rated appliances up to a maximum of "A".	Up to £40 a year
Dishwasher	Appliances may be rated up to "A+++" Previously the scheme rated appliances up to "AAA". The original scheme rated appliances up to a maximum of "A".	Around £17 a year
Television	New appliances may be rated up to "A+++" The previous scheme rated appliances up to "A".	Up to £60 a year.
Energy saving plugs	Restricts electricity used by appliances to when they need it – particularly good for fridge freezers.	Up to 20% reduction in electricity normally used

An introduction to renewable energy solutions

Renewable energy describes energy which is generated from resources which are replenished naturally. Renewable energy technologies which can be used at a domestic scale include:

- **Solar panels** – photovoltaic panels for electricity, thermal panels for hot water
- **Wind turbines** – for electricity
- **Heat pumps** - ground, air or water for heating, hot water and cooling.
- **Wood-fuelled boilers and stoves** – for heating and hot water

Domestic-scale renewable energy technologies can cost more than conventional systems, but once installed they will provide you with free or lower cost energy, and you may be able to earn money from the energy you generate. If you live in a property which is off the main gas grid, then heat pumps or woodfuel solutions could be particularly attractive from a financial perspective.

In some situations, there may be the opportunity to connect to a community heating scheme. These are an efficient way of providing heating and if a district heating network exists in your area then you could consider connecting to it. Or, if you live in a block of flats, you could look into having one central boiler which provides heating and hot water to each of the flats.

Solar thermal

What's involved?


Source: BioRegional

Solar thermal panels generate hot water for your home. They are fitted to your roof where they collect energy from the sun to heat water. The heated water is then stored in a hot water cylinder. A boiler or immersion heater is used for back-up hot water supply and to heat water further if necessary. The system can provide around 60% of your annual hot water needs.

There are two types of panels: evacuated tubes and flat plate collectors. Evacuated tubes are generally better performing, however flat plate collectors are sometimes preferred because they are less visually intrusive, are more robust and are cheaper.

Financial issues

Costs

Around £5,000 for a system for three-bed house.

Savings

Replacing gas heating: around £55 per year.

Replacing electric heating: around £80 per year.

Payback period

60 to 90 years. This will decrease with the **Renewable Heat Incentive**.

Funding

Renewable Heat Incentive (RHI).

Before starting

Difficulty

One for the professionals.

Before starting

You need around 5m^2 of roof space which faces south and is free from shading. The panels can also be fixed to a frame on a flat roof.

Incompatible with a combination boiler as you need a hot water cylinder.

Other work

Heating replacement.

Roof repairs.

Anything that requires scaffolding.

Maintenance

A maintenance visit is required every 5 years, and will cost around £150. A well-maintained solar panel could last over 25 years.

Planning issues

Permissions

Permitted development, subject to conditions and limits such as appearance and height. See:
www.planningportal.gov.uk/permission/commonprojects/solarpanels/

Must meet Building Regulations.

Conservation or listed

Conservation Area: contact your local planning authority

Listed Building: need to apply for Listed Building Consent

Other information

Accreditation

The system and installer will need to be Microgeneration Certification Scheme certified in order to obtain the Renewable Heat Incentive.
www.microgenerationcertification.org/mcs-consumer/installer-search.php

More information

www.energysavingtrust.org.uk/Generate-your-own-energy/Solar-water-heating

Solar photovoltaic panels

What's involved?


Source: BioRegional

Solar photovoltaic panels generate electricity from sunlight. However, they even generate on cloudy days. The panels come in various sizes; an average system size of 3 kWp would cover approximately 18m^2 of your roof and generate up to 75 % of your home's electricity needs! Most systems are made up of panels that fit on your roof, but solar PV tiles are also available.

Shading of any part of a panel will reduce the effectiveness of the whole system, so be careful when siting and positioning the array, or opt for a parallel system – get advice from your installer about this.

Financial issues

Costs

An 18m^2 system would cost around £10,000.

Savings

Around £670 a year (including Feed-in Tariff earnings).

Payback period

Around 15 years.

Funding

Feed in Tariff (FIT). Current rates are 21p/kWh for all electricity generated plus 3p/kWh for electricity exported to the grid. The tariff will be paid for 25 years and will increase year on year with inflation.

Before starting

Difficulty

One for the professionals.

Before starting

You need at least 6m^2 of roof space. Roofs should face south but facing south of due west or east are feasible, with reduced output. Ideally the roof should be sloped at 30° from the horizontal but you can put panels on a flat roof using frames to tilt them.

Other work

Roof repairs

Any work that requires scaffolding

Maintenance

Minimal maintenance visit required every 5 years (~£150), panels should be cleaned occasionally. Replacement inverters are needed around every 10 years (around £1,000).

Planning issues

Permissions

Permitted Development Right, subject to some conditions and limits (such as appearance and height). See: www.planningportal.gov.uk/permission/commonprojects/solarpanels/

Must meet standards set out in Building Regulations.

Conservation or listed

Conservation: contact your local planning department

Listed: Need Listed Building Consent

Other information

Accreditation

Installation will need to be registered with the Micro-generation Certification Scheme to ensure it qualifies for the Feed in Tariff.

www.microgenerationcertification.org/mcs-consumer/installer-search.php

More information

www.energysavingtrust.org.uk/Generate-your-own-energy/Solar-panels-PV

Small wind turbine

What's involved?

Wind turbines use large blades to catch the wind. As they move round, they drive a turbine which generates electricity. The stronger and less turbulent the wind, the more electricity is produced. There are two types of domestic wind turbines: pole mounted and building mounted. Pole mounted turbines are free standing and are placed in a suitably exposed position. For homes, a capacity of 6 kW is enough. Building mounted turbines are smaller (1 kW to 2 kW) and fix to the roof, however they are not recommended as they can cause disturbance to the building structure.


Source: Farm4

Financial issues

Costs — Pole mounted (6 kW) = around £22,500 including installation.

Savings — Around £3,200 a year (for a well sited 6kW turbine, including FIT earnings).

Payback period — Around 7 years (6 kW turbine).

Funding — **Feed in Tariff** (FIT). Current rates are 28p/kWh for all the electricity that you generate plus 3p/kWh for any electricity that you export to the grid.

Before starting

Difficulty — One for the professionals.

Before starting — Ensure that your site is windy enough, that there are no obstructions such as tall buildings or trees. You can estimate how windy your site is here: www.carbontrust.co.uk/emerging-technologies/current-focus-areas/offshore-wind/_layouts/ctassets/aspx/windpowerestimator/windpowerestimatorterms.aspx

Other work — Standalone job.

Maintenance — Minimal checks are required every few years, and will cost around £150. A well-maintained turbine should last around 20 years, but you may need to replace the inverter during this time which costs around £1,500.

Planning issues

Permissions — Permitted development, subject to conditions, see www.planningportal.gov.uk/permission/commonprojects/windturbines

Must meet Building Regulations.

Conservation or listed — Conservation Area: Permitted Development, subject to conditions, see link above.

Listed Building: contact your local planning department.

Other information

Accreditation — Installation and product must be registered with the Micro-generation Certification Scheme to qualify for FIT. www.microgenerationcertification.org/mcs-consumer/installer-search.php

More information — www.energysavingtrust.org.uk/Generate-your-own-energy/Wind-turbines

www.decc.gov.uk/en/content/cms/meeting_energy/Renewable_ener/feedin_tariff/feedin_tariff.aspx

Woodfuel heating

What's involved?


Source: BioRegional

Wood-fuelled (biomass) heating systems burn wood to create heat. There are two different types of systems for a home:

- Wood-fuelled stove: Heats a single room, and can be fitted with a back burner to provide hot water as well.
- Wood-fuelled boiler: Provides hot water and central heating.

These systems are designed to use pellets, chip or logs. Pellets are the most expensive at around £190 per tonne. A three to four bedroom house would need 5 to 10 tonnes of pellets a year to provide heating and hot water (maximum cost £1,900 per year).

Financial issues

Costs

Stove: around £4,500.

Boiler: around £11,500.

Pellet cost: around 3.6p/kWh.

Wood chip cost: around 2p/kWh.

Savings

Replacing gas heating: No savings.

Replacing electric heating: £580 a year.

Replacing oil heating : £280 a year.

Payback period

20 to 40 years, depending on your original heating system, will decrease with the Renewable Heat Incentive.

Funding

Renewable Heat Incentive

Before starting

Difficulty

One for the professionals.

Before starting

Make sure you have room to store the fuel. You will also need to check where you can obtain woodfuel – use woodfuels produced locally or in the UK to reduce transport emissions, and fuels from sustainable sources, see www.biomassenergycentre.org.uk for a list of suppliers.

Other work

Installing new radiators.

Changing your boiler.

Maintenance

An annual service of the system.

Planning issues

Permissions

Permitted Development Right subject to conditions, see www.planningportal.gov.uk/permission/commonprojects/flueschimneys/

Must comply with Building Regulations.

Conservation or listed

Conservation Area: Permitted development, subject to conditions, see www.planningportal.gov.uk/permission/commonprojects/flueschimneys/

Listed Building: check with your local planning department.

Other information

Accreditation

The product and installation must be certified under the Micro-generation Certification Scheme in order to receive the Renewable Heat Incentive.

More information

www.energysavingtrust.org.uk/Generate-your-own-energy/Wood-fuelled-heating

Air-source heat pumps

What's involved?


Source: BioRegional

Air-source heat pumps absorb heat from the outside air and use it to provide central heating and/or hot water. They are a good option if you currently have electric or oil heating, and if there are no opportunities for other renewable solutions. If you have gas heating they are unlikely to save you any money.

Even when it is cold outside, it can still extract heat from the air. The pump has running costs associated because it requires electricity to work. If it performs well then it produces a lot more heat energy than the electrical energy it uses and so the running costs will be relatively low.

Financial issues

Costs

£6,000 to £10,000.

Savings

Compared to gas heating: no savings.

Compared to electric heating: around £380.

Compared to oil heating: around £80.

Payback period

Replacing gas: No saving.

Replacing electric: 16 to 26 years.

Funding

Green Deal

Before starting

Difficulty

One for the professionals.

Before starting

You need a space outside your home where the pump can be fixed to the wall or placed on the ground.

Your home must be well insulated and draught-proofed.

They work best with under-floor heating or large radiators.

Other work

Replacing heating system.

Maintenance

Minimal. They should be serviced as often as your gas boiler would be.

Planning issues

Permissions

Permitted development, subject to conditions. See www.planningportal.gov.uk/permission/commonprojects/heatpumps

Must comply with Building Regulations.

Conservation or listed

Conservation Area: permitted development, subject to conditions. See www.planningportal.gov.uk/permission/commonprojects/heatpumps

Listed Building: contact your local planning authority.

Other information

Accreditation

Microgeneration Certification Scheme. www.microgenerationcertification.org/mcs-consumer/installer-search.php

More information

www.energysavingtrust.org.uk/Generate-your-own-energy/Air-source-heat-pumps

Ground source and water source heat pumps

What's involved?


Source: BioRegional

A ground source heat pump uses pipes which are buried in the ground to extract heat from the ground to provide central heating and/ or hot water. The length of piping needed depends on the size of the system and your heat demand. If space is limited, a vertical borehole can be drilled instead which is more expensive than a horizontal length of pipe. It is a good option if you currently have electric or oil heating, but if you have gas heating it may not be as good an investment.

The pump has running costs associated with it as it requires electricity to work. If it performs well then it produces a lot more heat energy than the electrical energy it uses and so the running costs will be balanced out by the savings you make.

If you have a water course or body of water such as a river or a lake next to your home, you could install a water source heat pump, which runs on a similar principle as a ground source heat pump.

Financial issues

Costs

£6,000 to £10,000.

Savings

Replacing gas heating: around £130.

Replacing electric heating: around £610.

Replacing oil heating: around £310.

Payback period

Gas: 46 to 77 years.

Electric: 10 to 16 years.

Oil: 19 to 32 years.

Payback period may be improved with the Renewable Heat Incentive.

Funding

Renewable Heat Incentive.

Before starting

Difficulty

One for the professionals.

Before starting

Make sure your home is well insulated and draught-proofed.

Works best with under-floor heating or large radiators.

Other work

Replacing heating system.

Maintenance

Minimal. They should be serviced as often as your gas boiler would be.

Planning issues

Permissions

Permitted development, but speak to the Environment Agency if you plan to install a system in water.

Must comply with relevant Building Regulations.

Conservation or listed

Conservation Area and Listed Building: seek advice from your local planning authority.

Other information

Accreditation

The product and the installer must be Microgeneration Certification Scheme accredited to receive Renewable Heat Incentive.
www.microgenerationcertification.org/mcs-consumer/installer-search.php

More information

www.energysavingtrust.org.uk/Generate-your-own-energy/Ground-source-heat-pumps

Water saving measures

This section focuses on how you can reduce your water consumption and use renewable and recycled sources of water.

In line with the ABCs of retrofitting, the first page explains how to reduce your demand and make your water appliances as efficient as possible. This could help you save money through reduced water bills, and may also reduce your energy bills as the less hot water you use the less energy you will need to heat it up. The second and third pages explain how you can use rainwater and recycled water for irrigation and within the home.

- **Saving water**
- **Irrigation**
- **Harvested & recycled water**

For further information please see the Building Futures guide on Water.

Saving water

What's involved?

There are a few relatively easy solutions you can install which can reduce your water consumption significantly. For more information see the Water module on the Building Futures website and www.energysavingtrust.org.uk/In-your-home/Water/Water-saving-products.

				
Installing a water meter	Installing a water meter means that you will only pay for the water you use, as opposed to a flat rate based on the property type. If there are three people or less living in the home, a water meter is likely to save you money. You will also then be able to notice the reductions your water-saving measures have produced. See: https://central.veoliawater.co.uk/apply-for-a-water-meter.aspx	Free from your local water company (Veolia Water).	The average saving in Herts would be around £30 a year. If you are in a particularly high water charge area this can increase to around £300.	Your water company will install this.
Aerated taps and shower heads	These reduce the flow of water from taps and showerheads, but you won't notice the difference! You can buy inserts that just fit into your tap. You can also swap your shower head for a lower flow one. Do not put a low flow head on an electric shower as it may damage it.	Low flow tap inserts: around £10 for 4 taps. Low flow shower head: around £15-£50.	Reduces the device's water use by up to 60%.	Simple DIY job.
Dual flush WCs	If you buy a new WC you should opt for one that has two different flush volumes. Alternatively, you can retrofit a dual flush insert device to your existing toilet. An easier option is to put a hippo or save-a-flush device in the cistern which will save a few litres each flush.	Dual flush insert: around £15. Hippo: free from your water company.	Can save up to 6 litres of water every flush.	Dual flush insert is a trickier DIY job or you could get your plumber to do it.
Water efficient appliances	When replacing appliances like dishwashers and washing machines, make sure you choose a model with a low water consumption rating. In addition to energy consumption, the **EU energy symbol** also rates appliances such as dishwashers and washing machines according to their water consumption. Visit www.sust-it.net for further information.			
Water saving baths	A reduced capacity bath tub will reduce how much water you use.	Reduced capacity bath: around £200.	Can save up to 60 litres with every bath.	One for the professsionals.

Irrigation

What's involved?

You can cut down on the amount of mains water you use for watering your garden with the following steps. For more information see the Building Futures Water module.

	General information	Costs	Savings	Difficulty
Water butt  Source: BioRegional	If you have a garden and access to a drain pipe from your roof you can save a significant amount of mains water by installing a water butt. You can get water butts that have lids to ensure that leaves and other debris are kept out. Make sure there are effective overflow arrangements so that overflows don't drain into ground next to any foundations – this can cause structural problems.	Around £20.	Each year an average roof collects around 85,000 litres of water - enough to fill 450 water butts a year.	More challenging DIY job – make sure to connect the water butt to the down-pipe
Planting to reduce irrigation  Source: Richard Blanchard	If you use pots, try to plant in larger containers which don't dry out as quickly. Choose plants which need less watering, for a list of drought-resistant plants see: http://apps.rhs.org.uk/advicesearch/profile.aspx?PID=396. Use mulch – a layer of loose material which covers the cultivated soil – to help the soil retain moisture.			

Renewable & recycled water

What's involved?

Once you have reduced your water consumption, you could then consider meeting some of the remaining demand from harvested or recycled sources. The two solutions below result in less water being withdrawn from the mains supply by using rainwater or recycling 'grey' water. In either case, you would still require mains water supply for drinking water. For more information see the Building Futures Water module.

	General information	Costs	Savings	Difficulty
Rainwater harvesting	Rainwater is collected in a tank which can be underground or in the garden. The water is filtered to remove any debris and then is used for flushing and irrigation. You will need a reasonable sized roof to make this worthwhile. More information is available from: http://publications.environment-agency.gov.uk/PDF/GEHO1110BTEN-E-E.pdf	Around £2,500-£4,000.	30-50% of water use.	One for the professionals
Grey-water recycling	Waste water from showers, baths and wash-basins is collected in a tank (which can be underground or in the garden). The water is treated so that it can be used again for toilet flushing and watering the garden. Water from washing machines, kitchen sinks and dishwashers is not collected. More information is available from: http://publications.environment-agency.gov.uk/PDF/GEHO0511BTWC-E-E.pdf	Around £3,000.	30-50% of water use.	One for the professionals

Climate change adaptation

When considering how to make your home more energy and water efficient, it is also important to consider making it more resilient to the changing climate. This section focuses on the following two areas:

Managing run-off from storms

When it rains heavily, roads and paved areas prevent water from soaking into the ground causing surface flooding. Hertfordshire has the highest number of homes in the east of England that are situated in areas with a high risk of surface flooding. If storms do become more intense then this number is set to rise.

Preventing overheating

The average UK building is not very good at keeping warm in the winter. It is also not very good at keeping cool in the summer. Summer heat waves are expected to become more common in the future, so you may want to consider taking some steps to help your home remain cool.

The solutions discussed here will not produce immediate savings in your bills, unlike the energy and water saving solutions. However, they will make your home more comfortable during the summer, reduce the risk of surface flooding, and avoid having to install air conditioning.

For further information on how our climate is changing please see the Building Futures Climate Change Adaptation module.

Managing water run-off from storms

What's involved?

When it rains heavily, roads and paved areas prevent water from soaking into the ground causing surface flooding.

Hertfordshire has the highest number of homes in the east of England that are situated in areas with a high risk of surface flooding[1]. If storms do become more frequent and more intense, then this number is set to rise. You can protect your home and your neighbours' properties from flash flooding by taking steps to make it easier for water to soak into the ground.

The easiest way of doing this is by installing a water butt, permeable surfaces and soakaways.

	General information	Costs	Difficulty
Permeable Paving  Source: BioRegional	Surface flooding can be avoided by installing a surface that is permeable. The rainwater can then permeate down through the layer of paving and gravel, either directly into the ground or into a channel or other water body. Permeable paving includes: • Gravel • Interlocking brick pavers (no mortar is used) • Paving slabs separated by strips of grass. More information is available from: http://apps.rhs.org.uk/advicesearch/Profile.aspx?pid=738 and the Building Futures Water module. You will need planning permission if you want to pave over 5m^2 or more of your garden area ('curtilage') with a non-permeable material.	Around £3.75/m^2 for gravel.	Gravel: moderately easy DIY job. Paving options need a professional.
Soakaways	A soakaway is a cavity which you create in the ground to provide a store for immediate storm water run-off, which can then infiltrate the adjacent soil. Careful design is required to ensure that water infiltrates at a high enough rate and does not encroach on nearby buildings.		One for the competent DIYer.
Rainwater harvesting	Collecting rainwater is another great way to reduce surface run-off during storms. For more information please see the **Water Re-use** or **Irrigation** sections.		

[1] http://news.bbc.co.uk/1/hi/england/7959207.stm

Preventing overheating

What's involved?

The average UK home is difficult to heat in the winter; similarly, it is hard to keep cool in the summer. Summer heat waves are expected to become more common in the future, so you may want to consider taking some steps to help your home remain cool.

	General information	Costs
Passive ventilation and cooling	You can keep your home cool by taking some simple steps. For example, whilst you're out at work during the day, you should keep the curtains on any south-facing windows drawn to prevent the sun shining in and heating the home up. Whilst you're inside, make sure that enough windows are open to allow air to flow through the home, for example, by opening windows on opposite sides of the house. Finally, if it is safe to do so, leave the windows wide open overnight as this will allow the house to lose the heat which has built up during the day.	No cost.
Louvers, external blinds and shutters	When closed, these provide shading during the day and keep the home cool. They also help protect the home during storms.	From £150 per window.
Green walls and other planting  Source: BioRegional	Plants are well known for their cooling effect. If your home is surrounded by a leafy garden, it will remain cooler than a home surrounded by paving, so think about growing more plants, in pots if you don't have access to the ground. They also protect your home during storms. If you live in a built up area and planting in this way is not possible, you could consider planting a green wall. You could have a "green façade" where climbing plants, such as ivy, grow up the wall. Or you could have a "living wall", where a medium for plants to grow in is attached to the wall. More information is available from: http://apps.rhs.org.uk/advicesearch/profile.aspx?PID=547	Low cost.