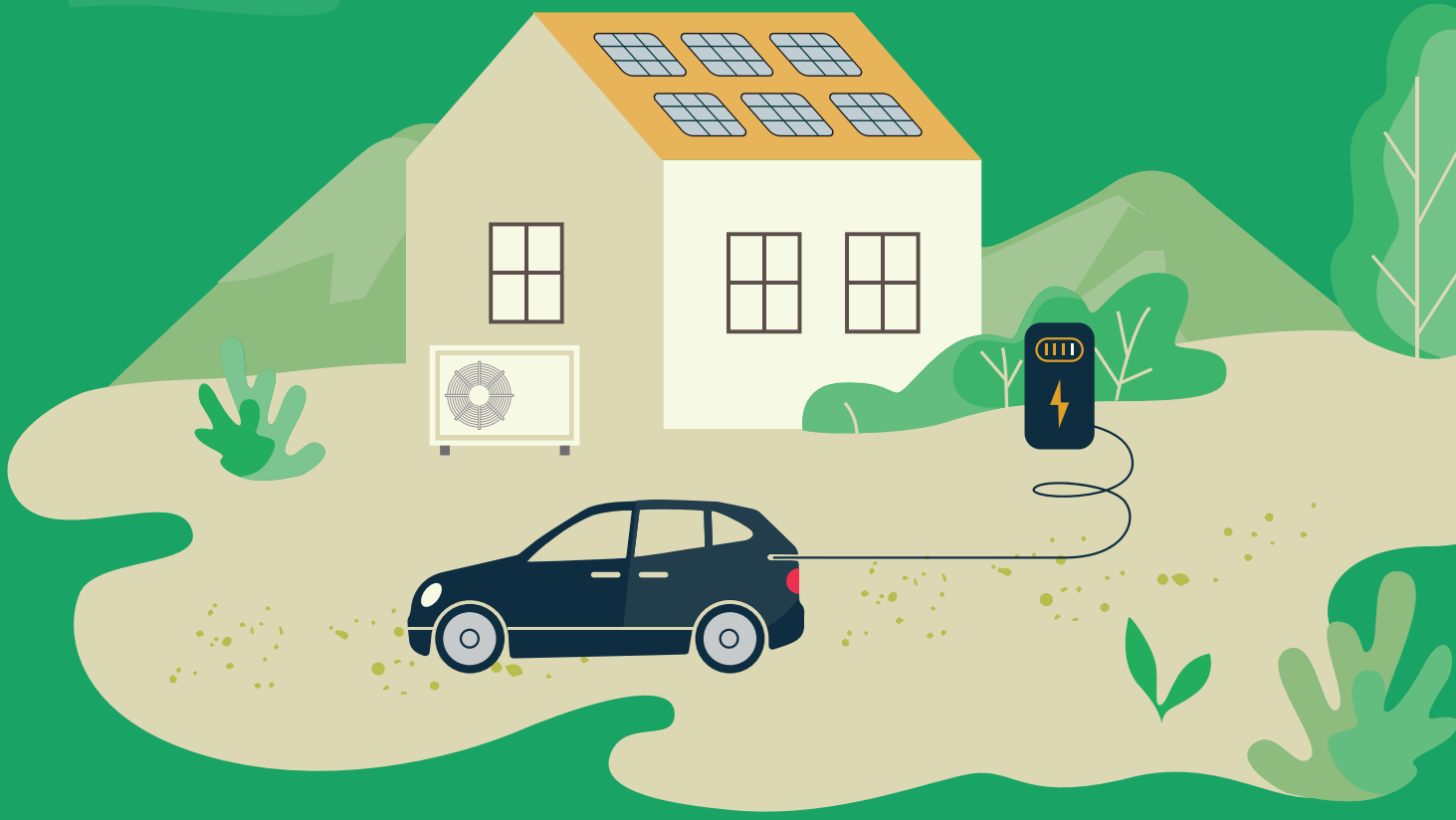
CommuniHeat

HOME ACTION PLAN



CommuniHeat
PATHWAY TO NET ZERO

OVESCO

BURO HAPPOLD

UK Power Networks
Delivering your electricity

INDEX

INTRODUCTION

This Home Action Plan was written for you and your home. It can help you to make your home more energy efficient as you are guided through the stages of how you can reduce your heat use in your home (saving both carbon and money) through to draft proofing, insulation and ultimately putting in renewable electric heat. There is plenty of useful information in the Appendix as well as a sheet for you to write down the measures you are doing in your home.

This plan came out of a project called CommuniHeat which looked at how a small village called Barcombe in East Sussex could simulate moving from fossil fuel heating onto electric heating as well as owning electricity generation so taking real ownership of their energy. The CommuniHeat project started in 2021 and was a partnership between UK Power Networks, Buro Happold, Ovesco and Community Energy South. To find out more about the project partners go to Appendix A.

THE AVERAGE HOUSEHOLD EMITS

2.6

METRIC TONNES

OF CO_2 EVERY YEAR HEATING THEIR HOME

THE AVERAGE CARBON EMITTED BY EACH INDIVIDUAL IN THE UK IS

5.5

METRIC TONNES PER YEAR

HOUSEHOLD FOOTPRINT OF OFF MAINS GAS HOMES IS ALMOST

DOUBLE

THE NATIONAL AVERAGE

14%

OF CARBON IN THE UK COMES FROM HOUSEHOLD HEATING.

WHY DO WE NEED TO SAVE ENERGY ?

We need to stop producing dangerous greenhouse gases from fossil fuels, known as carbon emissions, so that we reduce our emissions to a safe level to ensure that our climate remains stable. We are in a climate emergency and need to act quickly.

However, our climate is already warming year on year so we must keep this warming to an average of 1.5 degrees centigrade to ensure the effects of warming on the climate are minimized.

Above 1.5 degree centigrade, the climate will become increasingly unbalanced and likely to heat up to a point where extreme weather events will impact the whole world, sea levels rise more, coral reefs do not survive, hundreds of millions of people are exposed to climate related poverty and so forth. We need to transition off fossil fuel heating and onto electric heating as the electricity grid is due to decarbonize by 2035.

AND WHY DO WE HEAT OUR HOUSES?

In the past we would have hardly heated our houses, using wood on an open fire or a cooking range. Then coal became the main source of fuel with open fires in the main rooms– if you could afford it. Houses were cold and draughty with central heating not becoming the norm until the 1970s – cheap gas from the North Sea made heating every room in our homes widespread and affordable.

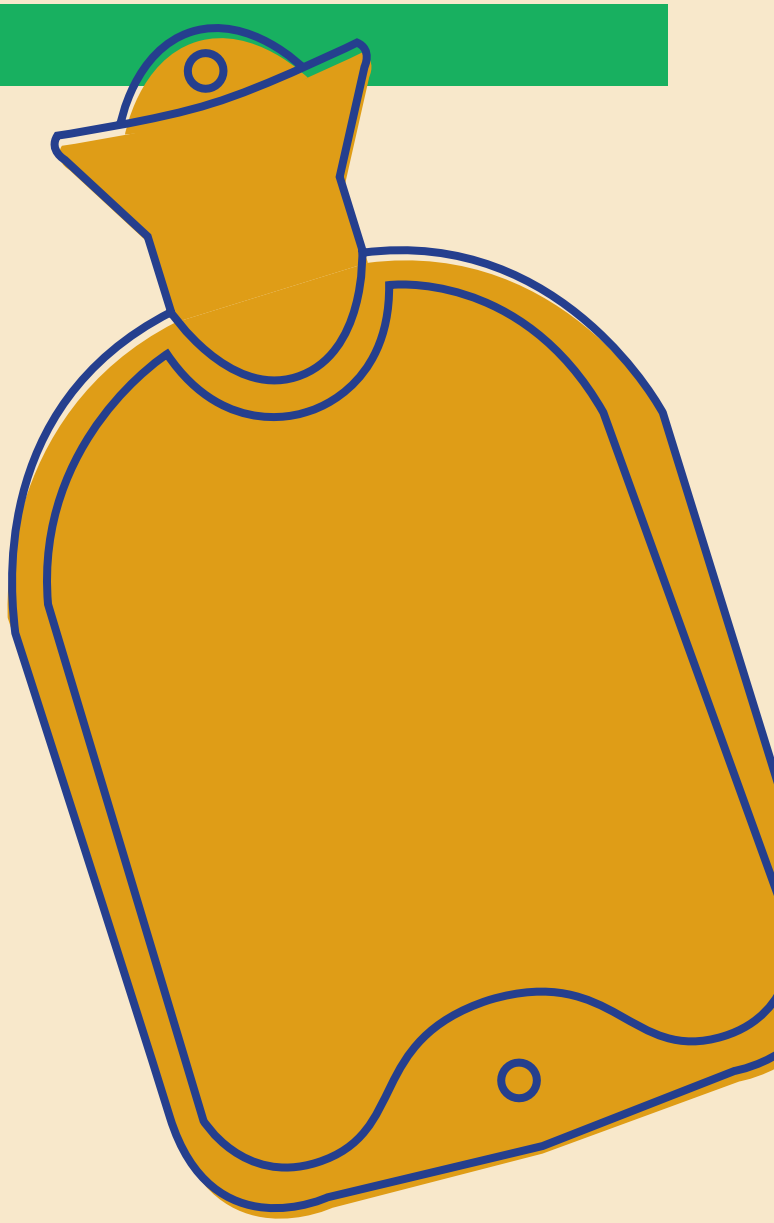
The gas network does not extend to every house however, and some more rural villages have to rely on heating oil as the main type of fuel used.

We heat our houses for comfort and for health. A warmer environment in our houses in winter is pleasant and enjoyable. Having cold hands or a cold body while watching TV is unpleasant. However, as long as we are fit and healthy, we can do many things to keep warm before we turn up the thermostat; dressing for winter not summer (wearing a jumper not a t-shirt in the house) making sure the house is free of draughts, closing curtains etc. See our tips in the next section and the Appendix for free and cheap things to do.

Cold homes are bad for our health, especially those who have underlying health conditions and those who are elderly. Cold homes can lead to problems and diseases linked to cold including blood pressure increases and common colds through to heart attacks and pneumonia.

Besides poor health, cold-related illness causes absence from work, social isolation, and sleep deprivation.

Tips for keeping warm



- If it is very cold, set your heating to come on for longer but keep the same temperature rather than just turning up the dial.
- Close the curtains when it gets dark.
- Stay warm with a hot water bottle or an electric blanket (but not both).
- Have regular hot drinks during the day and try to eat one hot meal a day. Eat regularly to keep up energy levels.
- Try to do some exercise if you can – this will warm your body.
- If there are draughts under doors, try to block them. A rolled-up towel is the simplest way.
- Cold houses which lack good ventilation will be prone to condensation, leading to more health problems and poor living conditions. Condensation is caused by wet air hitting a colder surface for example a cold wall or single glazed window. The water vapour then turns to water and tends to cause mould. This can lead to health problems as well as damage to the structure of the building – rotting window frames etc.

Ten ways to save energy and reduce your household bills

Ranked in order of most effective.

1. Turn your heating thermostat down by 2 degrees from 20°C to 18°C.
2. Turn your heating thermostat down by 1 degree from 19°C to 18°C.
3. Delay turning your heating on from October to November and turn off your heating a month earlier in the spring.
4. Wear a thick jumper at home in the heating season.
5. Replace your shower head with a water efficient eco shower head.
6. Use radiator valves to turn off heating in unused rooms.
7. Regularly service your boiler and heating system.
8. Turn off lights when not in use.
9. Ask your plumber to insulate your hot water pipes.
10. Take a shower lasting a maximum of 7 minutes instead of having a bath.

STAGE 2

FABRIC FIRST FOR OUR HOUSES

To make our houses more energy efficient, firstly we look at how we can reduce the energy use of the house. We look at how the house is constructed and see how we can make the house more energy efficient. We call this approach "Fabric First".

This is where the heat typically escapes in our uninsulated houses - let's stop the heat escaping !

YOUR HOUSE

There are typically five types of housing construction. How your house is built will determine how much heat it will use and therefore what you need to do to reduce this.

Which type is your house?

Houses built before 1930 - without cavity walls

Typically, these houses were built before 1930. Your home may be a terraced house, detached or semi-detached. Old houses tend to have ill-fitting doors and windows. If your house is listed talk to your conservation officer as you may need to have permission to change it.

Houses built between 1930-1970 – with a cavity wall

Your home is a house or bungalow, detached, terraced or end of terrace. It may be built as early as 1900 but importantly it will have cavity walls. There will be very little or no insulation in the house and it may have single glazed windows.

Flat/Apartment

This may be ground, middle floor or top floor flat. For flats, you will need the approval of all the flats in the block to install some measures e.g. cavity or solid wall insulation.

Houses built after 1980

The cavity wall will be already filled when the house was built, there may be some solid floor insulation after about 1990 and the loft will have some insulation. Your house may be a bungalow, detached or terraced.

HOW TO STOP HEAT ESCAPING FROM YOUR HOUSE

We will give general advice below on the various means of insulating your home. You may want to go further than the recommendations below but should take advice. For example, your house may have cavity walls but you may want to install external insulation.

In addition please note that the minimum amount of insulation that you can install is guided by Building Regulations and may need to be checked by a local council Building Inspector. Your builder or installation company will guide you on this.

Cavity Wall Insulation

Homes built after 1980 will have insulation built into the walls and therefore do not need to retrofit cavity wall insulation.

Homes built between 1930 (or even as early as 1900) and 1980 usually have a double wall with an empty cavity between them.

If this has not been filled already it can be filled with insulation and is reasonably inexpensive to do. Your local installer will check there is no exposure to driving rain and the house wall is sound before agreeing to undertake the work.

Solid Wall Insulation

Homes built before 1930 usually have a solid double wall with no cavity. So options would include internal or external solid wall insulation. For internal insulation, a thick layer of special foam backed plasterboard is fitted to the inside of the walls. For external insulation, mineral wool behind timber cladding can be used. There is also a system that uses foam insulation behind a horizontally ridged plastic with the ridges at brick course spacing and these ridges are used to take very think “slip” bricks. All these systems require a professional to install the insulation to ensure that it is correctly fitted.

Installing wall insulation comes under Building Regulations and should be signed off by your local council.

External wall insulation is most effective, less disruptive but could cost more.

Internal wall insulation can be cheaper, but you will lose room space and will have to redecorate and pipes, radiators, windowsills, sockets etc. will probably need resetting.

Loft Insulation

Mineral wood loft insulation is a cheap and cost-effective improvement. Aim to have a depth of about 270mm or more to ensure the best outcome. Layers should be laid at right angles to one another to reduce air flow between layers. It is important to keep the loft space above the insulation well ventilated, cool and dry.

Don't forget to insulate the loft hatch! This work could be DIY. As the loft will be cooler, any water pipes in the loft may need to be insulated to stop them freezing.

Alternatively, you may have sloping ceilings which are uninsulated if your attic space has been converted. If so, the plasterboard should be removed and insulation inserted between and over the top of the joists. New plasterboard will then need to be installed and plaster skimmed. This may be disruptive to the architrave and head height of the room. We suggest that you approach a builder to do this work.

Floor Insulation – suspended timber floor

Insulate a suspended timber floor from underneath to stop draughts and increase heat retention. The floor can be insulated from underneath if you have access via a cellar or undercroft. Alternatively, you can take up the floorboards and insulate that way. We suggest that you approach a builder to do this work or you could do it yourself. Do not remove any ventilation bricks in the wall that ventilate under the floor as this may encourage rot but if rain is blown in through them, there are louvered versions to reduce water ingress.

Floor Insulation – solid floor

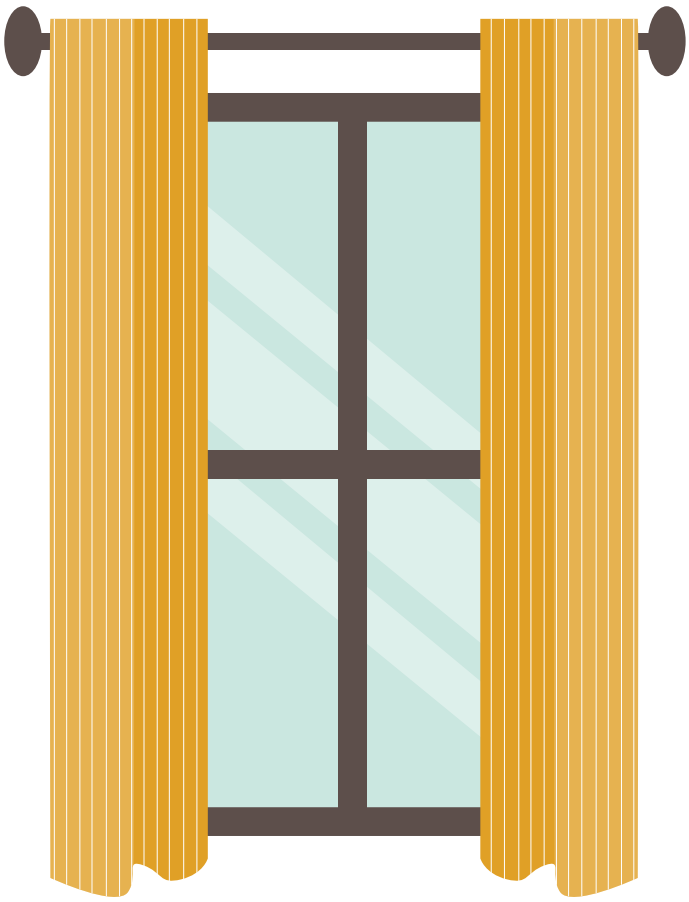
To insulate a solid floor, the floor slab will need to be removed and excavated underneath then a damp proof membrane is added, underfloor insulation installed and a replacement concrete slab is put on top. You may want to install underfloor heating in the floor while doing this work.

Alternatively, insulating board can be laid on top of the existing slab with a laminate floor on top – much less disruptive than the above but may reduce head height of room and disrupt doors, skirting pipework etc.

We suggest that you approach a builder to do this work.

Thick cork tiles provide some insulation and can be fitted yourself.

Windows



Replace your single glazed windows with double glazing or even triple glazing. If your house is listed, you may be able to fit secondary glazing but speak to your Conservation Officer first.

Heavy lined floor length curtains fitted close to the window with a capped pelmet to stop air convection can provide substantial insulation.

If you have old, draughty double glazing, replace the panels with modern up to date windows.

Doors and fireplaces

Draughts make people feel cold and blow away the heat. Draught exclusion is cheap, simple to install and should lead to cost savings. Use sealer in gaps and cracks especially floorboards, use draught excluders for doors and hatches. You can buy special balloons for chimneys. A curtain behind the front door hung from a rising portiere rod that lifts the curtain when the door is opened can reduce heat loss and draughts.

Ventilation

Remember to allow some ventilation in your house, especially the rooms which become moist i.e. your kitchen and bathroom. These two rooms should preferably have mechanical ventilation. If not, then open windows after cooking and bathing. If you fit new windows, they should have vents to allow an air flow – do keep these open to allow this to happen.

For a thorough retrofit of your house, you may think of fitting a whole house ventilation system with heat recovery – however please take professional advice as it is difficult to retrofit.

STAGE 3

GENERATION OF HEAT AND POWER

Generating either heat or power from the sun or wind means that we reduce our dependency on fossil fuels.

Solar Thermal

Panels or glass tubes on your roof to heat domestic hot water when the sun shines – you will need a water storage tank (a thermal store) in your house to store the water in.

If your present hot water tank has a heating coil in it heated by your boiler, it will need replacing with a tank with two coils.

You can use this system to supplement your hot water needs for showering/bathing/washing up etc. The system should provide between 40-70% of an average home's hot water needs depending on usage for baths, showers and washing up and be concentrated in the summer months where it may supply all your hot water requirements but hardly any hot water in mid-winter. Your existing system will provide the remainder. This system will not provide enough hot water to heat your radiators.

The price for installing solar thermal varies between £3,000 and £6,000.

A solar thermal array could save you up to £235 per year (based on an average house using 2,800kWh of energy to heat their water, a price for heating oil of 12p per kWh and the solar thermal providing you 40%-70% of your home's hot water needs per year).

Solar PV (Photo Voltaic)

Solar PV panels sit on your roof and use sunshine to make electricity for use in your home, export any unused electricity to the grid or to store it in a battery at your home. You will also have an inverter to convert the electricity so it can be used in your home and a meter to measure how much electricity you are generating.

The installation costs are around £7,500 for 5kW of panels. You should ideally have a south facing roof which tilts up at 30 degrees but south-east to south-west can also work. You should ask your installer for more details. Heavy shade on just one small part of one panel can greatly reduce the output of the whole system as can any dirt on the panels e.g. from seagulls.

There are no grants available for solar PV panels, however you can sell any unused electricity back to the grid and get an income under the Smart Export Guarantee. It is more cost effective to use as much as you can in your house and only export the amount you do not need to use.

Solar PV is very unlikely to provide 100% of your electricity use. How much it provides depends on the size of your solar PV array, your electricity needs and whether you can store the electricity in a battery for use when the sun is not shining and it is dark. Your installer will tell you how much your panel will generate and how much you can use.

As a guide, in the south of England an ideally situated array should generate 1000 kWh per year for every kW of solar PV installed on your roof. So if you have 3.6kW of panels this should generate 3600 kWh of electricity per year.

Your local electricity network company – which is UK Power Networks in the South East of England, must allow you to connect 3.6 kW of PV on a single phase supply, or 10.8kW for a 3 phase supply. Your solar PV installer will guide you on the permissions needed. This is in addition to any planning permission that may be needed.

Wind turbines

You can install a wind turbine at your house which will connect to the electricity grid and/or link to a battery to store power for when you need it. If your house sits in a windy, unobstructed site, then you may be able to generate a lot of your own electricity. There are some real disadvantages to domestic generation – you need space, the turbines can be noisy and you will need planning permission for all but the smallest of turbines. Please approach a specialist company to discuss further.

General Advice

PV panels should have a minimum of 15-year product and 24 year linear performance warranty. The inverter should have a minimum 10-year product warranty as should batteries.

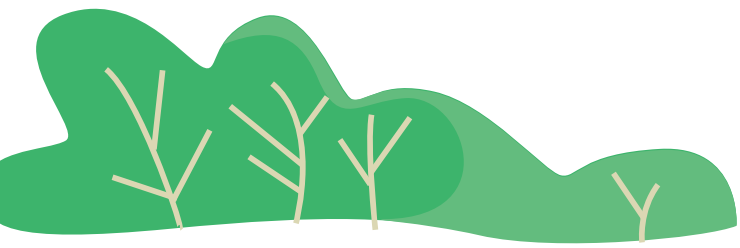
The generation and export meters should be compliant with the requirements for the Smart Export Guarantee Scheme.

Batteries are currently very expensive at an installed price of around £1000 per kWh of stored electricity. If the difference between what is earned by exporting a kWh of electricity and what is saved by using to displace a kWh of electricity bought from the grid is 20 pence it will need 3000 full battery charge and discharge cycles to pay for itself.

There are however some companies such as Tesla/Octopus that are offering deals to those with batteries and PV panels that offer a low electricity purchase and high export price for allowing them to control your battery and export electricity when the spot market price of electricity is high.

We suggest that the same company install your PV panels and batteries.

A solar diverter controller is only recommended if you do not have batteries. The cylinder should also be equipped with the Marlec Solar I-Boost or similar. This will provide thermal disinfection and also use any excess electricity from the panels to heat the water.



STAGE 4

LOW CARBON HEATING

Once you have insulated your home and perhaps fitted some generation capacity (not essential but will help to keep your bills down) you can turn to looking at how you will heat your home.

Heat pumps

Heat pumps work by bringing in heat from the outside, either from the ground, air or water. The heat they provide should be at least 3 times greater than the electrical energy they use. It is low temperature heat but provides enough warmth to heat a well-insulated house. A heat pump typically costs less to run than an oil boiler but about the same as gas. Heat pumps are low carbon compared to oil boilers, especially if you buy 100% renewable heating. Good insulation in houses is good news for heat pumps as this reduces running costs.

There are two main types of heat pump:

Air Source Heat Pump

Air Source Heat Pumps sit on an outside wall of your house and are powered by electricity. The heat pump takes the latent heat from the air which then heats your home. The system will also need a water tank of around 300-600 litres to store hot water for showers, baths etc.
In addition, there will be some much smaller plumbing items, such as an expansion vessel (20-30 litres), pumps and controls which sit by the tank as well as heating controls.

Your installer should position the air source heat pump on an outside wall to minimise pipe heat loss. It should be no further than one meter away from the wall. However, if you want the unit further from the house you could install underground pre insulated pipework.

Your installer should ensure good airflow around the heat pump so it should not be boxed in or have vegetation too near it.

Heating systems make a noise, whether they are oil, gas or heat pumps. In the past, Air Source Heat Pumps had a reputation for being noisy. They are now very quiet, producing about the same amount of noise as a modern dishwasher. There are even quieter models available, as quiet as a fridge.

Air Source Heat Pumps are designed to deliver lower temperature heat than conventional boilers. The heat will be at 30-50 degrees rather than 75 degrees from a boiler. Your air source heat pump will therefore be on for longer to deliver the comfort to your home that you are used to. The lower the temperature, the cheaper it will be to run.

You may need to upgrade some or all of your radiators, especially if they are very old and single width, in addition your installer should ensure that the pipework is correctly sized. For more information see the radiator section below.

Air Source Heat Pumps are set up to run automatically. You can adjust the temperature of the room you are in by a normal room thermostat. No other adjustments are normally needed.

The cost of installing an air source heat pump will depend on the size of your home and how insulated it is. The more insulation you have the smaller the air source heat pump output. As a guide, a two-bed terraced house is in the region of £9,000 - £11,000, a four-bed detached house in the region of £12,500 - £15,000.

Ground Source Heat Pump

A Ground Source Heat Pump is a unit which sits in your utility room or garage which takes latent heat from the ground to heat your home.

There are two parts; the heat collector and the heat pump itself.

The heat collector is made up of long tubes or boreholes. The tubes can either be installed about a meter deep, with the tubes curling around (slinkies) or in straight trenches. You will need some space for this method, either a large lawn for slinkies or a field for the straight trenches. Or boreholes can be drilled into the ground, typically 100 metres deep, to save space. The amount of pipework depends on the sizing of the system.

The heat pump itself is typically the size of a fridge/freezer. You will also need a hot water tank and probably a buffer tank too. Most commonly, the heat pump will sit in an outbuilding, a garage, a utility room or even a basement. Please talk to your MCS registered installer about the amount of room needed.

Like Air Source Heat Pumps, Ground Source Heat Pumps are designed to deliver lower temperature heat than conventional boilers. The heat will be at 30-50 degrees rather than 75 degrees from a boiler. Your ground source heat pump will therefore be on for longer to deliver the comfort to your home that you are used to.

You may need to upgrade some or all of your radiators, especially if they are very old and single width – see radiator section below.

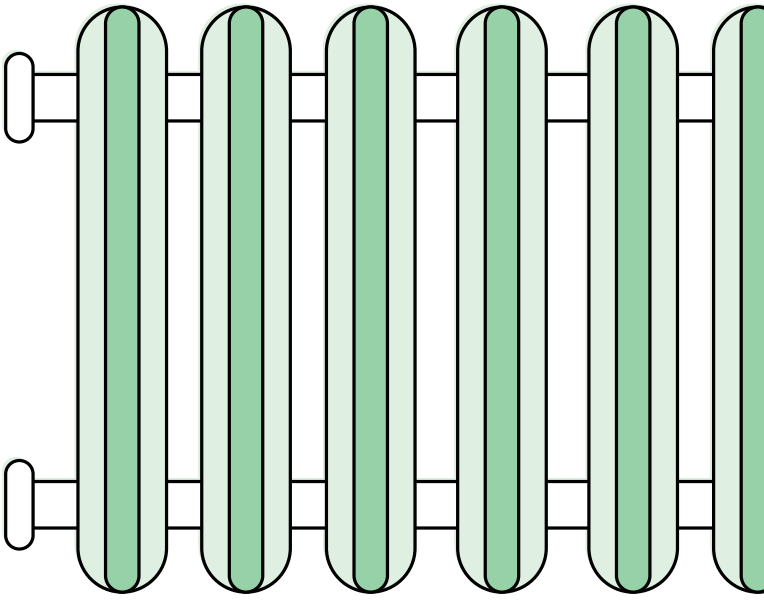
The cost of installing a Ground Source Heat

Pump will depend on the size of your home and how insulated it is. The more insulation you have the smaller the heat pump output. As a guide, ground source heat pumps tend to be fitted in larger houses. A four-bed, detached house could cost In the region of £30,000 with 2 boreholes. A six-bed house may be In the region of £40,000 with 4 boreholes. For a much more detailed price, please request a quote from your installer.

Radiators for heat pumps

Heat pumps deliver lower heat than a boiler – typically between 30 degrees centigrade and 55 degrees centigrade. The means of delivering this heat needs to be sized for this level of heat. There are various ways to deliver heat:

- **Underfloor heating** is an ideal way to deliver heat with heat pumps as it runs at around 30 degrees centigrade. Underfloor heating can be retrofitted but is more expensive to install than radiators.
- **Radiators** will need to be sized for the heat pump and will typically be larger than radiators for boilers. There are various alternative options for radiators for example aluminium radiators – smaller than conventional radiators but more expensive, fanned radiators which have a small electrically driven fan at the bottom which blows air over the water pipes instead of relying on convection – they again can be smaller than conventional radiators. You need to ensure that the pipes delivering the heat are correctly sized too.
- **Trench Heaters** are situated in the floor and have unobtrusive grills which deliver the heat. They can be boosted with fans.
- **Plinth Convectors** for use under your kitchen cabinets if wall space is limited.



Biomass

Biomass boilers provide home heating from logs or wood pellet. The boiler can be situated behind a wood burner (a back boiler) or more commonly be a stand-alone boiler in a utility room or garage. What are the different types of biomass boilers?

Log Boiler

This is a system where wood logs are fed into a boiler to batch burn, the heat is then stored in a large hot water buffer tank up to 2-3000 litres. This will then provide heating for a few days at a time. This type of boiler is very hands on and could be ideal if you have your own supply of wood.

A log boiler system comprises a large boiler (larger than a fridge freezer), a large water storage buffer tank (1,000 – 3,000 litres is quite common), an additional hot water tank (200-400 litres) and all the pumps and controllers needed for the system. This will sit in an outhouse or a garage. A log boiler could cost from £11,000 depending on the size of your house.

Pellet boiler

Pellet boilers run off wood pellets. The wood pellets are made from compressed wood chip and are about 6-8 mm in length. They are generally fed automatically into a pellet boiler from a large store and have automatic ash extraction to an ash bin. You would expect to get a delivery of wood pellets a few times in the winter depending on the size of your store. This is the least hands-on type of biomass boiler although you should expect to have to clean the boiler occasionally – even once a week – to keep it running smoothly and efficiently.

A pellet boiler is about the same size as a log boiler or slightly smaller, has a buffer tank and a hot water tank of about 300 -500 litres, pumps and controllers which can all sit in a garage, a utility room or even in a basement. You may also have a pellet store of about 2-7 tonnes which sits outside in your garden. A pellet boiler could cost from £12,000.

Wood chip

This type of biomass is not suited to domestic houses – only multiple houses on a district heating system or for commercial use as there needs to be a large building to store the wood chip in and the cost of the wood chip boiler and associated equipment is much higher than the cost of pellet and log boilers. A chip boiler system takes up much more space, the boiler typically being in an outbuilding and the chip store would need to be in a barn, silo or underground store.

General Advice

Your installer should carry out a room by room heat loss assessment so that they can accurately size your heat pump or biomass boiler and recommend radiator upgrades (for heat pumps).

Your heat pump should be set to supply heating water at the lowest temperature possible for your home.

Avoid siting your Air Source Heat Pump where there is limited air flow e.g. in a small courtyard.

The heat pump should automatically allow a weekly disinfection cycle which raises the water temperature in the hot water tank to 60 degrees C to eliminate legionella.

When your system has been installed, your heating engineer should show you how to operate your new heating system and also advise the maintenance requirements.

Your installer should offer a 12-month defects warranty from the date of handover. During that time the installer should repair any faults or defects that occur due to faulty materials or workmanship.

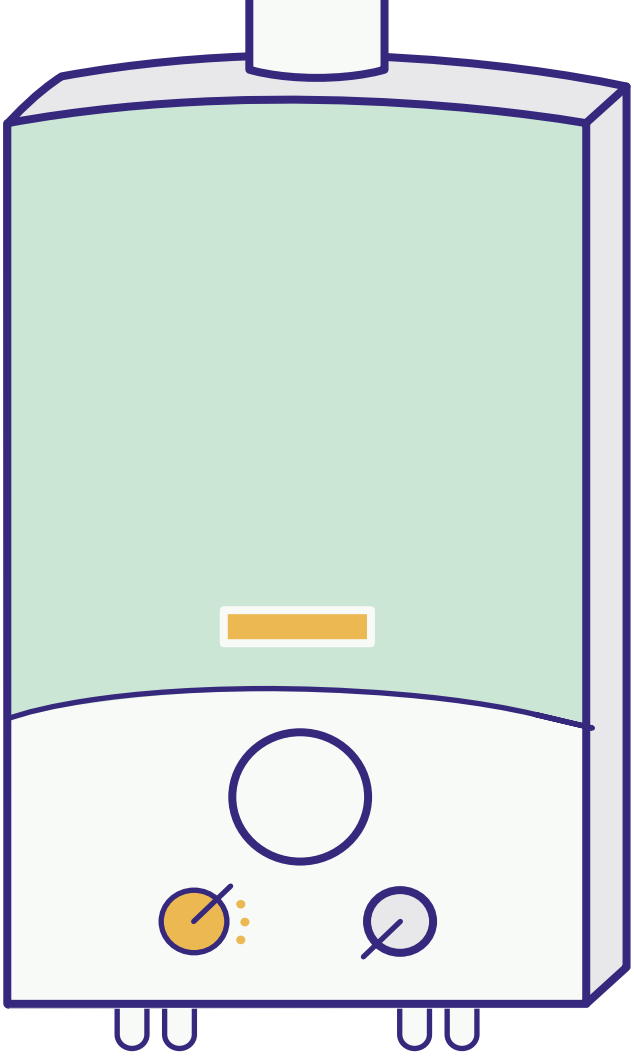
After the warranty expires the manufacturer's warranty should cover any defects caused during normal operations. However, if the defects occur due to poor workmanship then a claim can be made for latent defects. You should obtain legal advice.

Your new heating system will need to be serviced once a year in the same way you would service your current boiler.

The biomass boiler will supply hot water to your radiators at high temperature like an oil boiler so no need to change your radiators.

If you opt for a log boiler, there will be considerable work to load the boiler with logs by hand and you will be handling logs by stacking and moving them around. Most log and pellet boilers need some regular cleaning and pellet boilers can get jammed with fuel.

Other types of electric heating



Night Storage Heaters

Night storage heaters contain a brick like material which is heated during the night (using low-cost night rate Economy 7 rates) and then discharges the heat during the day. Modern night storage heaters can modulate the rate of heat discharge so that there is a steady flow during the day. If you are on Economy 7 your daytime electricity is more expensive than a normal rate. The advantage of night storage heaters is that installation costs are much lower and you won't need to have radiators. However the running costs are higher than for heat pumps.

Radiant panels

These use an element to heat the air – this warms the room quickly by convection and radiation. They are quite cheap to install but are expensive to run.

Oil filled radiators

The oil heats and cools quicker than storage heaters and they are cheaper to run than radiant panels.

Infrared Panels (IR)

These emit radiation like the sun to warm our skin. We feel the warmth directly from a panel or the walls which have warmed up and radiate the heat back to us. The air in the room is warmed very slowly. They are cheap to install and quite cheap to run.

Electric boiler

This is 100% efficient but for one unit of electricity into the boiler, you get one unit of hot water out. Therefore, they are 3 times as expensive to run as a heat pump but are considerably cheaper to install.

WHAT TO DO NEXT

If you are not sure how your homes should be retrofitted or you are refurbishing an out of date house, call an assessor who can come round and give you a plan of action. There is a charge for this but it will be money well spent and should be no more than £400 for a family house. You can look up Retrofit Assessors online.

Talk to your neighbours who have had works done, ask if they can recommend an installer and ask if they are happy with the end results.

You may want to find out some more information here (you can also search to see if your house has an Energy Performance Certificate via this site): www.simpleenergyadvice.org.uk

The Energy Saving Trust also gives advice for making your house warmer; www.energysavingtrust.org.uk

If you would like to install a heat pump or biomass boiler, then you should obtain at least two quotes from an MCS registered installer. Please visit mcscertified.com/find-an-installer to find an installer near you.

The installers will know what you need to provide to obtain any government grants. They will advise you that you need an Energy Performance Certificate and if you need to undertake any further measures on your house. The more insulation that you can install, the lower the heat load of your house and therefore the lower your bills.

Remember that this may be a disruptive process as you may need to replace some or all of your radiators and therefore may need to lift floorboards and carpet. You could also find that your electrical system may need updating too.

STAGE 6

GRANTS AND FUNDING – JANUARY 2023

Boiler Upgrade Scheme

From May 2022 the Boiler Upgrade Scheme (BUS) was introduced which helped towards the cost of installing heat pumps and biomass. This is a payment of £5,000 for Air Source Heat Pumps and biomass and £6,000 for Ground Source Heat Pumps. There is further information here;

www.gov.uk/apply-boiler-upgrade-scheme

Energy Company Obligation (ECO) Funding

If you own your own home, you can talk to your utility company about whether they offer ECO (the main utility companies do) and if you are eligible. The main criteria is if you claim the Warm Home Discount or you claim benefits. There are other criteria and your utility company will be able to help. If you live in social housing with a Energy Performance Rating of E,F or G you may be able to access funding.

There is more detail on this scheme here;

www.ofgem.gov.uk/environmental-and-social-schemes/energy-company-obligation-eco/support-improving-your-home

STAGE 7

COMMUNITY OWNED RENEWABLE ENERGY

If you are not able to install PV onto your own rooftop then you could consider investing in a local community owned renewable scheme such as a small ground mounted solar PV array.

Why community owned energy ? Community owned energy puts people at the heart of power generation and allows the community to take democratic climate action. The community can then

- Generate energy
- Own energy
- Use energy
- Save energy

It is easier for a community to transition to a zero-carbon energy system while also gaining resilience if they own local energy systems. In addition, community owned power is lower in price, helping the whole community transition to electric heating.

It is estimated that community owned solar PV could bring electricity costs down by almost 30% if part of a co-ordinated village-based plan. Visit www.communityenergysouth.org to find your local community energy group.

COMMUNITY LED ENERGY PLAN

KEEPING ELECTRICITY PRICES LOW

TRANSITION FROM FOSSIL FUELS TO RENEWABLE POWER

LONG TERM COMMUNITY RESILIENCE

STAGE 8

MY HOME ACTION PLAN

Actions on my house to 2030.

My address:

Action	Installed - details	Date
Loft insulation upgraded		
Cavity Wall insulation installed		
Windows replaced		
External doors replaced		
Ventilation installed		
Solar PV Generation installed		
Solar thermal Generation installed		
Heating system upgraded		
Radiators/underfloor heating upgraded		
Other		
Other		
Other		

APPENDICES

Appendix A Project partners

Ovesco CIC is a pioneering community interest company run for the local community in Lewes and the surrounding area since 2007. The first of its kind in the UK, Ovesco was described as 'the vanguard of the community revolution' when winning the Ashden Award in 2014. Since then, Ovesco has created community owned renewable energy projects, generating local investment and saving many tonnes of carbon emissions. Their vision is for a future where 100% of our energy needs are generated locally from renewable resource. Their mission is to generate community owned renewable energy locally and help as many people as possible to do the same. We educate and help people to use less oil, coal and gas and share our experience to inspire others.

Ovesco is a founding member of Community Energy South, a regional umbrella group for the community energy sector in the South East and a support partner for CommuniHeat.

Some examples projects:

Brickyard Farm in Barcombe has 19.5kW of solar PV generating 18,500kW, saving 7.95 tonnes of carbon a year and providing free electricity to the eco friendly facilities at the Secret Campsite.

Barcombe Nursery Box Scheme has 9kW of solar PV generating 9,500kW, saving 4.1 tonnes of carbon a year and providing free electricity for the on site chillers to keep the fruit and vegetables fresh prior to delivery.

www.ovesco.co.uk **01273 472405**
communiheat@ovesco.co.uk

Buro Happold is an independent, international engineering practice that for over 40 years has become synonymous with the delivery of creative, value led building and city solutions for an ever changing world. Having worked on every continent, their clients include more than 90% of the world's leading architectural practices and they have collaborated with global organisations such as the United Nations, The World Bank and UNESCO. Follow them @burohappold and find out more at www.burohappold.com.

UK Power Networks is the country's biggest electricity distributor, making sure the lights stay on for more than eight million homes and businesses across London, the South-East and the East of England.

Network operators manage local power lines and substations and UK Power Networks invests more than £600 million in its electricity networks every year, offers extra help to vulnerable customers at times of need, and is undertaking trials to ensure that electricity networks support the transition to a low carbon future. It also moves cables and connects new electricity supplies. If you have a power cut ring 105, see www.ukpowernetworks.co.uk or tweet them @UKPowerNetworks

Appendix B Free (or very cheap) ways to reduce your carbon footprint

- If you have a thermostat which sets the temperature of your house, turn it down a degree in winter. But not so low that you are cold- it is important to stay healthy.
- Turn on your heating a bit later in autumn and switch it off earlier in spring.
- Wear a jumper in the house in winter and a scarf and thick socks – oh and slippers !
- Draw the curtains at night in winter, to keep in a bit of heat and keep out a bit of cold.
- Close doors between rooms if you are not using them.
- Use the car less – walk instead.
- Turn the tap off when you brush your teeth – and use the cold tap.
- Turn the shower off when you shampoo – turn it back on to rinse, time yourself – a 2 minute shower!
- Don't leave taps running.
- Reduce, reuse, recycle.
- Eat (much) less meat, dairy, fish.
- Grow a little or a lot of your own food – start with a pot of herbs on a window sill.
- Turn off the light when you leave the room.
- Turn off your washing machine and dishwasher at the plug.
- And do the same with your computer, TV, Playstation, charging devices and anything else you can think of (but not your fridge or freezer!).
- Buy less stuff.
- Switch to a renewable energy supplier.
- Read your meters so you know your energy use – knowledge is power. Track your energy use.
- Ask your electricity supplier to fit a smart meter with a display unit to make it easier to track your energy use.
- Reuse carrier bags.

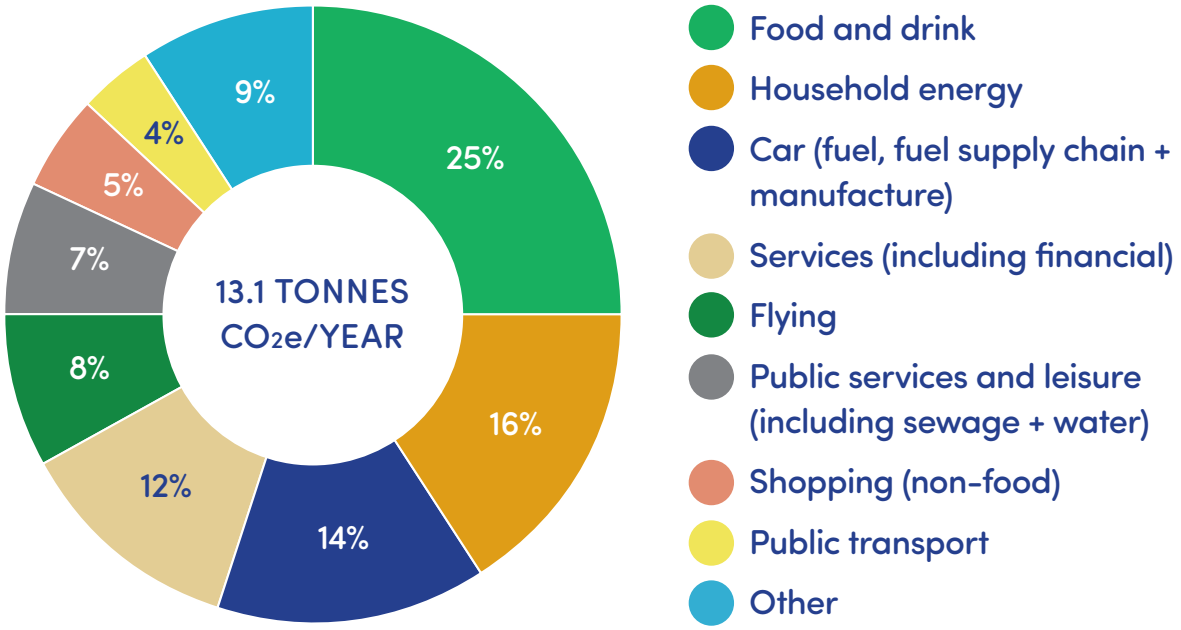
Appendix C For a little bit of money

- Use a draught excluder for your front and back door.
- Service your boiler every year so it runs efficiently.
- Do some draught proofing throughout your house.
- Phone Ovesco (01273 472405) and ask to see a thermal image of your house.
- Mend dripping taps.
- Buy a bike and cycle everywhere.
- Increase your loft insulation to 270mm or more.
- Insulate your loft hatch.
- Fit a chimney balloon to your open but unused fireplace to stop heat escaping.
- Take the train.
- Take the bus.
- Fit LED light bulbs in your house.
- Buy laptops not computers as they are made to run economically.
- Look for energy efficiency ratings when replacing electrical goods.
- Buy second hand clothes.
- Buy second hand (tested) energy efficient electrical appliances.
- Buy local food.
- For radiators mounted on external walls, fit a reflector behind the radiator.

How to measure and lower your carbon footprint

By making some simple changes to your life, you can lower your carbon footprint and save money too - and who doesn't like that! Your personal and household carbon footprint is the measure of how much carbon and other greenhouse gases your lifestyle gives out into the atmosphere – contributing to global warming. By decreasing this, you can help to lower carbon emissions and therefore help to control climate change and global warming.

Average carbon footprint in the UK*



*A **carbon footprint** measures the total greenhouse gas (GHG) emissions caused directly and indirectly by a person. It's **measured** in tonnes of **carbon** dioxide equivalent (tCO_2e), a standard unit which expresses the impact of different GHGs.
Image Courtesy of Small World Consulting Ltd

Calculate your Carbon Footprint

World Wildlife Fund calculator includes food and lifestyle
www.footprint.wwf.org.uk

Or try Terrapass which is a bit more detailed
www.terrapass.co.uk

Once you know what your carbon footprint is you can start to reduce your carbon emissions and help to reduce the effects of climate change.

Appendix D More ways to reduce your carbon footprint

Check out www.energysavingtrust.org.uk for more information especially on heating.

If you have single glazed windows and especially if they are draughty, a very cheap form of secondary glazing is one of the shrink film kits; www.ebay.uk.co.uk/itm/ and others. They are fragile but, with care, can last the winter.

Or Be inspired by Jill ! Check out her website; www.jillgoulder.plus.com/green/index.html

Heat loss up open chimneys can be greatly reduced with a chimney balloon such as; www.amazon.co.uk/STORMGUARD

The gaps between old fashioned non-tongue and groove floorboards can be filled with a springy strip; www.draughtex.co.uk/standard-40m-roll/

Heavy curtains, especially lined ones, increase insulation. For doors, the curtain can be lifted off the floor when the door opens with a Portiere Rod;

The ventilation bricks in walls that allow air into the space under suspended floors are necessary to prevent rot but if they are in a position where rain can be blown in they can cause a lot of heat loss. Louvered ventilation bricks prevent this and are cheap but need to be fitted; www.toolstation.com/204mm-horizontal-louvred-air-brick/p16279

Saws for cutting out bricks can be hired from tool hire companies. Hand made louvers made of sheet metal and nailed to the wall have been used successfully.

Radiators on external walls lose heat through the wall. A reflector behind the radiator can reduce this; www.amazon.co.uk/Yuzet-Radiator-Reflective-Insulating

Tested second hand electrical equipment can avoided the embedded carbon dioxide of a new appliance. However, government regulations have increased the minimum efficiency of some types of units. Check the energy rating label and choose high rated units, new or second hand.

LED light bulbs are available with A, A+ and A++ energy rating. There is a ratio of nearly 2 to 1 in the electricity consumption of lamps of the same brightness rated at A and A++

Lighting systems should absorb as little light as possible. Large, frosted globe bulbs can be looked at directly without discomfort and can have very open or no lightshade; www.lightbulbs-direct.com/crompton-led

Lighting systems with downlighters and concealed lights can use a lot more electricity to achieve the desired brightness than a simple central light.

We provide the links on this page to third party companies for example only - please note that these items are widely available.

Follow the temperature guide below for your house:

19–21° centigrade is the recommended temperature range for occupied rooms.
18° centigrade is the recommended night-time bedroom temperature for those with pre existing medical conditions or over 65s.
If your home is below **16°** centigrade you may be diminishing your resistance to respiratory diseases.
If your homes is below **13°** centigrade you may increase your blood pressure and risk of cardiovascular disease.

Source - Centre for Sustainable Energy – Fuel Poverty and Ill Health

It is especially important for those who are vulnerable; the elderly, the poorly, that at least one room is heated to the recommended temperature. But do remember that we breathe out water vapour and rooms need to be aired too – open a window for 10 minutes or so if the room is unoccupied.

Appendix E Nine tips for reducing condensation in your home

1. Close the doors of your kitchen when cooking.
2. Keep lids on pans when boiling food.
3. Keep the kitchen window open during and after cooking.
4. Longer term, think about fitting an extractor fan in your kitchen.
5. When bathing or showering, keep the door shut.
6. Open the window after bathing and showering for half an hour or so. Again – longer term, think of getting an extractor fan fitted in your bathroom.
7. Drying clothes – try to dry clothes outside if you can.
8. If drying clothes inside, then do it in a room where you can keep the window open (and shut the door).
9. If you have mould in your house, please be careful when cleaning it away – you should wear a mask. You can use a spray with bleach in it to start to clean the mould and remove the stain which may be left. You should spray this on and leave overnight then use an anti fungal spray and leave that to dry too. Do not use anti fungal spray near food.

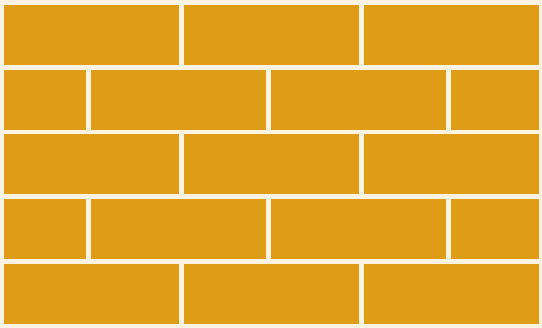
Appendix F Make 6 changes to how you live your life to protect our earth

Find out more at www.takethejump.org

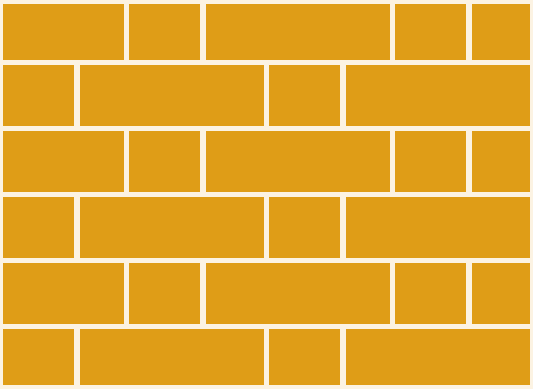
- Eat a largely plant-based diet, with healthy portions and no waste.
- Buy no more than three new items of clothing per year.
- Keep electrical products for at least seven years.
- Take no more than one short haul flight every three years and one long haul flight every eight years.
- Get rid of personal motor vehicles if you can – and if not keep hold of your existing vehicle for longer.
- Make at least one life shift, like moving to a green energy, insulating your home or changing pension supplier.

Appendix G Cavity Walls

How to tell if you have Cavity Walls (and if they have already been retrofitted with insulation). If your house has cavity walls, then the external bricks will only show their "long sides" like this (except at the corners):



If the cavity has been retrofitted with insulation, you will be able to see small spots in the mortar joints where the insulation has been injected. Drill marks in the bricks themselves near the bottom are usually a sign of an injection damp-proof course.



If your house has solid walls, you should see some header bricks (i.e. short sides) as well as the stretcher brick (long sides);

There are many variations of patterns of solid wall e.g. English Bond, Flemish Bond, English Cross Bond. We show Flemish Bond here.

Appendix H Glossary

A kilowatt (kW) a measurement of power electrical or generated by burning fuel – 1000 watts = kW.

Energy is what is required to accomplish a finite task. 1 kWh is sufficient to heat a 100 litre tank of water by 8.5°C. The units shown on fuel bills are kWh and the prices in p/kWh.

A kilowatt hour (kWh) a measure of energy, electrical or generated by burning fuel.

Power is the rate of flow (consumption or generation) of energy and the flow continues as long as that consumption or generation applies. Appliances are rated by their power in W or kW and that power is consumed continuously as long as they are turned on fully.

EPC Energy Performance Certificate – this is a rating system to summarise the energy of your home. An A rated home is very energy efficient and G is very inefficient (ie your home takes a lot of energy to heat it up) EPCs are used extensively in government and beyond as a standard to measure houses. You will need one if you sell your house, if you are a landlord renting a house, to apply for some renewable energy grants etc.

Net Zero means any carbon emissions which are created are balanced by taking the same amount out of the atmosphere. For example by planting trees or using new technology such as carbon capture and storage. We reach net zero when the amount of carbon emissions produced equal the amount of carbon taken away.

In 2019, the UK government was the first major economy to pass a net zero emissions law. This included a target which requires the UK to bring all greenhouse gas emissions to net zero by 2050.

However, as well as trying to take CO2 out of the atmosphere, it's very important to reduce the amount of CO2 that we are putting into the atmosphere in the first place.

Zero Carbon refers to the emissions produced from a product or service – it means no carbon is given off at all. An example in energy generation is a wind turbine creating electricity or solar PV panels.

Decarbonisation of the electricity grid This current government has pledged to decarbonise the electricity grid by 2035. This means that electricity generated by the National Grid will be carbon neutral. The means of generation of this electricity will include off shore and on shore wind, solar PV as well as nuclear, hydrogen and carbon capture and storage. Our electricity grid is currently decarbonisating in 2019, greenhouse gas emissions from electricity generation were down 12% on 2018 levels and 71% lower than 1990 levels the share of low-carbon electricity generation has risen to 59.3% in 2020, with renewables at a record 43.1% the amount of renewable capacity connected to the grid has increased from 8GW in 2009 to 48GW at the end of June 2021, an increase of 500%

Fabric First This expression means that we look at the fabric of our houses (the bricks, mortar, roof, floors, windows) and see how we can keep more heat inside the house by insulation. We do this first before we start to look at generation of renewable power or by fitting new heating systems. By insulating and reducing the heat load of the house, this ensures that we are reducing the amount of heat used and the size of the heating system we install.

Appendix I U-Values

This is an overview only of the building regulations around upgrading insulation in your house and a technical note. U-values are important as they are a way of measuring what you are doing when you insulate. Here is a definition of a U-value:

A U-value is n watts flows through a one metre square panel with a U value of N for every degree difference in temperature between the inside and the outside.

The units are officially given as W/m^2K. You will see U-values for roofs, walls, windows etc. Building Regulations in this country specify what U-value a particular layer needs to be when it is built or when it is changed.

The lower the U-value the better i.e. the layer is more resistant to heat loss.

There are different U-values depending on whether you are new building or refurbishing or extending and more detailed rules than specified here. You should take professional advice as the works done may need to be signed off by a Building Control officer.

As this guide is for refurbishing, we give the U-values below – nb these are for England only, different rules apply for Wales and Scotland. Figures take from Approved Document L1B Conservation of fuel and power in existing dwellings last updated 15 December 2021.

Refurbishing existing building

Wall – internal or external wall insulation	**0.30 W (m 2.K)**
Wall – cavity	**0.55 W (m 2.K)**
Floor	**0.25 W (m 2.K)**
Pitched roof – ceiling level	**0.16 W (m 2.K)**
Pitched roof – rafter level	**0.18 W (m 2.K)**
Flat roof	**0.18 W (m 2.K)**
Windows	**1.6 W (m 2.K)**

With thanks to our friends at Energy Alton for helping with some of the content of this document. energyalton.org.uk

Appendix J Case study

Example case study:

Spithurst Road

This family have lived here since 2009. In 2012 they undertook full cavity wall and loft insulation and draught proofed all doors, windows and the loft hatch via the CERT scheme, which Ovesco arranged for many Barcombe properties.
This year they had an air source heat pump and new radiators, TRVs and thermostat installed. A wood burner supplies supplementary heat when required. Their annexe is fully insulated and double glazed, with full electric heating. They next plan to install solar panels.

Archetype	1976-1995
Built	1985
Residents	Five (3 adults, 2 children)
Type	Detached (2009 annexe)
Features	ASHP Cavity wall insulation Double glazing Draught proofing EV charge point

7,207 kg pa

Running costs £1,390 pa

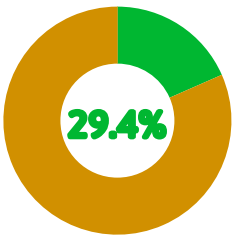
Potential 2021

3,478 kg pa

Potential 2030

670 kg pa

Running costs PA £871



Possible reduction in overall personal carbon emissions

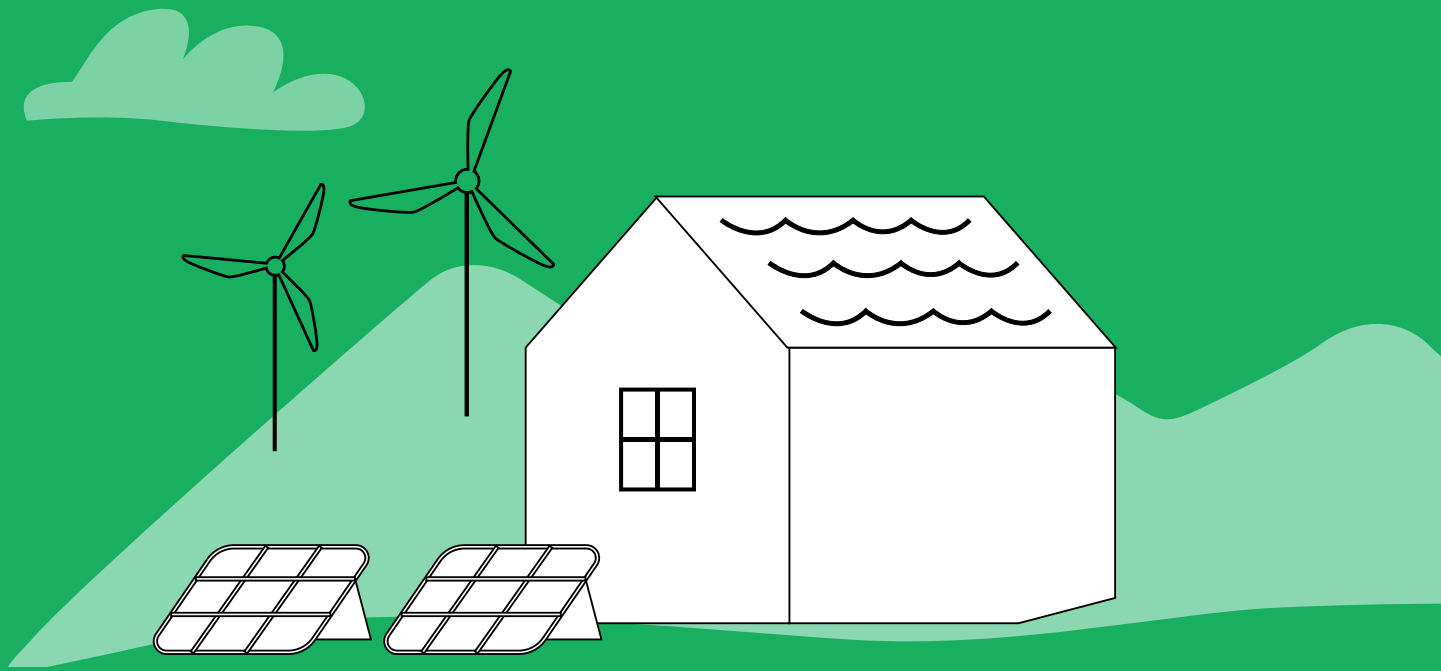
EPC Rating:

See other case studies on the CommuniHeat website.

CommuniHeat

PATHWAY TO NET ZERO

www.communiheat.org



OVESCO

BURO HAPPOLD

UK Power Networks
Delivering your electricity