



*Gweithredu dros Gartrefi Cynnes
Action for Warm Homes*

Energy Advice Pack for Homes Off-Mains Gas

**Practical advice on saving energy and
reducing fuel costs for homes off the
mains gas grid.**



Developed by NEA with
the support of Calor



ENERGY ADVICE PACK FOR OFF-MAINS GAS HOMES

National Energy Action (NEA) Cymru has been working with Calor since 2010, through the FREE (Future of Rural Energy in Europe) Wales programme. Our work has been aimed at reducing fuel poverty in communities across Wales with no access to the mains gas grid.

This pack was originally created by NEA’s technical team in 2010. Unfortunately, fuel poverty levels in rural Wales remain high so the pack has now been updated to ensure the information remains relevant, reflects changes in policy and technology, and reaches a new audience of advisors working with households without access to mains gas and struggling with their energy bills.

This pack has been developed for Calor by National Energy Action.

National Energy Action Cymru is the national charity taking action for warm homes and to put an end to fuel poverty in Wales.



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SECTION 1

FUEL POVERTY

This section looks at the causes of fuel poverty and the solutions. It looks particularly at fuel poverty in rural areas and the specific problems of areas not covered by the mains gas grid. It includes an outline of the use of energy in the home and the reasons for the need to reduce its use.

Definition of fuel poverty

A fuel poor household is defined as one which needs to spend more than 10% of household income to achieve a satisfactory level of warmth (21°C in the living room and 18°C in other occupied rooms), while a household would be considered to be in severe fuel poverty if they would need to spend more than 20% of their income to achieve this heating level.

The extent of fuel poverty

It is estimated that there were 291,000 households in Wales - 23% of the population - in fuel poverty in 2016. 43,000 of these were in severe fuel poverty.

Fuel poor households will struggle to keep warm in cold weather, and may be forced into impossible decisions, such as whether to 'heat or eat', as budgets are stretched. Many fuel poor households are particularly vulnerable to cold-related ill health – especially older householders, families with children and householders who have a disability or a long-term illness.

The Welsh Government has a target to eradicate fuel poverty in Wales by 2018. However, this target will not be reached and no new target has been announced. Between 2012 and 2016, the number of fuel poor households in Wales is believed to have decreased by 73,000. At this rate, it could take another 16 years to eradicate fuel poverty in Wales.

The causes of fuel poverty

Fuel poverty is caused by a combination of:

- **Energy inefficient homes**

This can be due to the construction of the home, poor insulation standards and inefficient heating systems

- **Low income**

This includes people in low paid work as well as those on low fixed incomes such as pensions or benefits

- **Fuel costs**



SECTION 1

FUEL POVERTY

Fuel poverty in rural areas

Rural households are twice as likely to be in fuel poverty as those in urban areas.

All three factors that cause fuel poverty are exacerbated in rural areas:

- Rural residents are more likely to live in older, larger dwellings, possibly stone-built and very often with solid floors and high ceilings. These buildings can be very energy inefficient and therefore cost more to heat. In Wales, the most recent figures showed properties in rural areas had an average SAP rating of 38 (EPC band F) compared with a much higher average 54 SAP rating (EPC band E) in urban areas¹. The nature of the building stock also limits the range of energy efficient technologies that can be employed.
- Incomes in rural areas of Wales are often low and can depend on seasonal work. In one piece of research, nearly half (47 per cent) of rural households surveyed had an annual income of less than £21,000, while 17 per cent earned less than £10,000 per annum. 69 per cent were in receipt of some type of benefit².
- Mains gas tends to be unavailable in rural areas, and the range of fuels available for heating are often more expensive. 21% of Welsh households use a fuel other than mains gas to heat their home.

The price of fuel is particularly important in areas off the mains gas grid, and these are the homes with which this pack is particularly concerned. Around 143,000 Welsh households (11%) use oil to heat their homes, 63,000 (5%) use

electricity, 37,000 (3%) use solid fuel and 25,000 (2%) use LPG³. The UK Government estimates approximately 187,000 households (14%) of households in Wales are not connected to the gas main⁴. Based on current estimates⁵, an average 3 bedroom semi-detached house in Wales fitted with a modern mains gas central heating system with a condensing boiler would cost £898 in fuel per annum for space and water heating. Heating the same house with an oil condensing boiler would currently cost £745, although it should be noted the price of oil fluctuates so can also cost more than mains gas. If heated by wood pellets, the annual cost of heating would be £1179; using coal on an open fire with back boiler would cost £1227 a year; for an LPG condensing boiler, the annual cost of heating would be £1295; if heated by electric storage heaters, the cost would increase to £1342; and bills would reach a shocking £2380 per annum for homes heated by electric radiators - more than 2.5 times the cost of using mains gas.



1. Living in Wales 2008, Welsh Government
2. Rural Household Survey 2013, Wales Rural Observatory
3. Insights paper on households with electric and other non-gas heating, Ofgem, December 2015
4. Sub-national estimates of households not connected to the gas network: 2015 final, Department for Business, Energy and Industrial Strategy
5. Sutherland Tables October 2016. Comparative Heating Costs, South West England and Wales, space and water heating

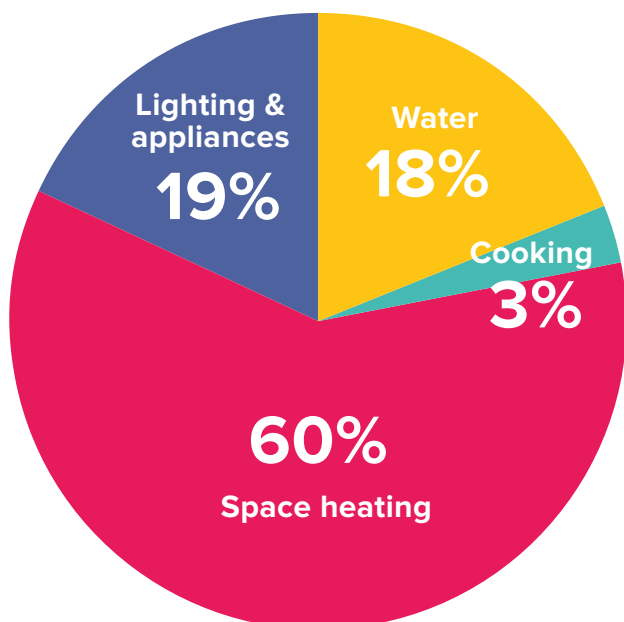
The solution to fuel poverty

The permanent solution to fuel poverty would be to ensure that all homes are so energy efficient that they are 'fuel poverty proof'.

In practical terms, with existing homes, their occupants, their incomes and fuel costs, the solution is to tackle the causes of fuel poverty.

This means:

- Improving the energy efficiency of homes by reducing heat loss by improving insulation, installing energy efficient heating systems and ensuring that they are used effectively.
- Ensuring that incomes are maximised, for example from grants and benefits advice.
- Using the most affordable fuel wisely and efficiently and minimising costs by selecting the cheapest tariff.
- Installing the most energy efficient heating system which gives the lowest overall costs.



DECC 2012

The use of energy in the home

The pie chart shows how energy is used in the home. Most energy is used in space and water heating. Therefore, if you need to save energy these are the priorities, and are the main focus of this pack.

Domestic energy use makes up 36% of all the energy used in the UK⁶.

Reducing energy use in the home will:

- Save money, reducing the pressure on household budgets.
- Reduce fuel poverty and reduce the risk of households falling into fuel poverty as their circumstances change or if fuel costs increase.
- Reduce CO₂ emissions from homes. CO₂ emissions are a key component of climate change and there is an urgent need to reduce them wherever possible.

Though the focus is on fuel poor households, these reasons mean that all households would benefit from reducing energy use in the home.

Energy consumption in the home can be reduced without any decrease in warmth, comfort or convenience if it is achieved through the efficient use of energy.

6. UK Energy Statistics, 2015 & Q4 2015, Department of Energy and Climate Change, March 2016

SECTION 2

BUYING FUEL

This section looks at the cost of household fuel, options for the cost effective payment for fuel and consumer protections.

UNDERSTANDING FUEL COSTS

Energy consumption is measured in kilowatt hours.

The key to the efficient and inexpensive use of energy is to:

- Reduce the number of kilowatt hours used
- Reduce the cost per kilowatt hour

A kilowatt hour (written kWh for short) is a measure of energy and is the standard used across all types of fuels to compare the cost of fuel. More useful to a householder is the cost per kWh of delivered heat as it takes into consideration how efficient the appliance is at delivering heat to the home. As an example, with open coal fires only 28% of the energy in the coal is turned into useful heat, whereas with a butane heater 92% of the energy in the gas is turned into useful heat.

Energy can be purchased in many forms; electricity by the unit, gas by the cubic metre, coal by the tonne, LPG and oil by the litre and wood by the size of container it comes in. So how do we identify the real cost of energy? We do this by converting energy to the kWh which is used as the standard unit of energy in all forms of fuel.

Comparing the kWh and useful heat costs of different domestic fuels can only be done using tables known as Sutherland Heat Cost Tables, which are updated twice yearly for each region of the UK. The cost per kWh is used in the tables to compare costs of heating.

Electricity

The cost of electricity will vary between supplier and region, and there are a wide and varied range of tariffs. The cost per kWh for the tariff is always printed on the electricity bill but it may be difficult to find.

All electricity providers offer both standard and low tariffs. The standard tariff is the most expensive; the low (usually overnight) tariff is much cheaper.

With some suppliers the low tariff can be used on all appliances after a set time (ie midnight to 7.00 am with a typical Economy 7 tariff) and should be used wherever possible.

If the householder has an Economy 7 tariff, it will be clear from the electricity meter or bill. Some electric heating systems, for example overnight storage radiators, are designed to maximise the use of the overnight tariff and certain appliances such as washing machines may have timers that can be used to switch on when the overnight tariff is in force.

In addition to this, each company will have a range of other tariffs, some of which are only available to customers paying by specific methods (see below). The current range of tariffs for each of the main companies is difficult to find as most companies only give this information to their customers. Customers on their supplier's standard variable tariff generally pay the highest rates for their energy so savings can be made by switching tariffs, even if a customer remains with the same supplier. However, by considering switching supplier, a customer will have the greatest opportunity to access the cheapest tariffs on the market.

The simplest method of comparing costs is to use a comparison web site, which has been accredited with the Ofgem Confidence Code or use the Citizens Advice Energy Compare Tool, which compares the whole of market:

<https://energycompare.citizensadvice.org.uk/>

The cheapest tariffs available to online or direct debit customers are unlikely to be available to the poorest customers who are more likely to buy their electricity as and when they can using a card or key (see below).

Understanding electricity bills can be complex.

Bills will now state the cost per kWh of the tariff used and many contain comparative information from previous consumption. Standing charges and estimated bills complicate matters further. Tariff advice is best given after referring to online sources, but the bill may give a pointer as to whether the householder is using their electricity wisely.

All suppliers use a different format for their fuel bills but they all contain the same basic information. Although efforts have been made to make bills easier to understand, in the majority of cases, many customers will not find it easy to understand their fuel bills. It is easiest to look at bills in conjunction with the householder and identify the elements of the bill. The important items to check are:

- Is this the correct name and address?
- Are the readings estimates or actual (has the meter been read)?
- Is the bill higher or lower than expected?
- Is the bill due to be paid or is it for information only?
- Is the client in a position to pay the bill?

Mains gas

Mains-gas customers are not the client group for this pack, but as advisors you are likely to come across them and some basic information is necessary:

- Gas consumption has been traditionally measured in cubic feet, but this is now converted to cubic metres on gas bills
- There is no distinction between daytime and overnight costs
- There is a complex range of tariffs from the various companies
- Companies are likely to offer special 'dual fuel' deals for customers who buy both electricity and gas from them
- Average gas bills have risen by 153% since 2007⁷.
- Wales & West Utilities and National Grid provide funding to some householders to connect to the mains gas network, depending on the householder's circumstances. The grant may cover the full cost or part of the costs of connecting the property to the gas supply. Householders should contact their gas distribution network for more information.



1. Average annual domestic gas bills for UK countries, Department for Business, Energy and Industrial Strategy, 22 December 2016.

SECTION 2

BUYING FUEL

Liquefied petroleum gas (LPG)

LPG is paid for by the litre when being delivered in bulk and by the kilogram when purchasing bottles. LPG in bulk storage is supplied by the tank owner with whom the householder has a contract. After the initial contract period, customers wishing to switch bulk LPG supplier shouldn't have to pay for the transfer or removal of the tank. Domestic 47kg cylinders for whole home heating and cooking can be bought directly from a range of independent outlets, or delivered, which may be more expensive but avoids personal transport costs and handling.

Some suppliers use telemetry systems so empty cylinders can be automatically replaced by suppliers when they are making deliveries in the local areas.

Households off grid have a choice of an average 4 or 5 suppliers of LPG. The UKLPG website allows you to enter a postcode to see all the suppliers who operate in that area.

Nearly all LPG suppliers are members of the trade association UKLPG. UKLPG members should each have their own complaints procedure, which can be used if a customer has any issues with their LPG supplier. UKLPG is currently developing ombudsman procedures with Utilities ADR for disputes which cannot be resolved through the company's complaints procedure.

All UKLPG members have agreed to follow their industry protocol for vulnerable customers, which covers protection embodied in contracted supply arrangements; support for customers with visual or aural impairments or in payment difficulties; and delivery priority when demand exceeds supply or resource capability.



Oil

Oil is delivered to a customer-owned tank on the property by tanker. Normally the cost is per litre. Over the past 4 years in Wales, oil has fluctuated from a high of 67p per litre to a low of 24p per litre. There is usually a minimum delivery of 500 litres and it may be cheaper per kWh to purchase a larger quantity. It is more expensive to purchase oil at certain times of year, such as December, so savings can be made by ordering larger quantities in the summer. There are also more likely to be delays to delivery at busy times of year, with additional charges made for emergency deliveries.

Over 80% of domestic heating oil in mainland UK is distributed by suppliers who are members of trade association, the Federation of Petroleum Suppliers (FPS). Members of the FPS who distribute domestic heating oil are expected to follow a Code of Practice. The FPS Customer Charter sets out the service that customers can expect from their members. This includes information about what to do if a customer has a complaint, including escalation of the complaint to an Ombudsman if it is not satisfactorily resolved.

Average Heating Oil Prices for Wales (4 Years)

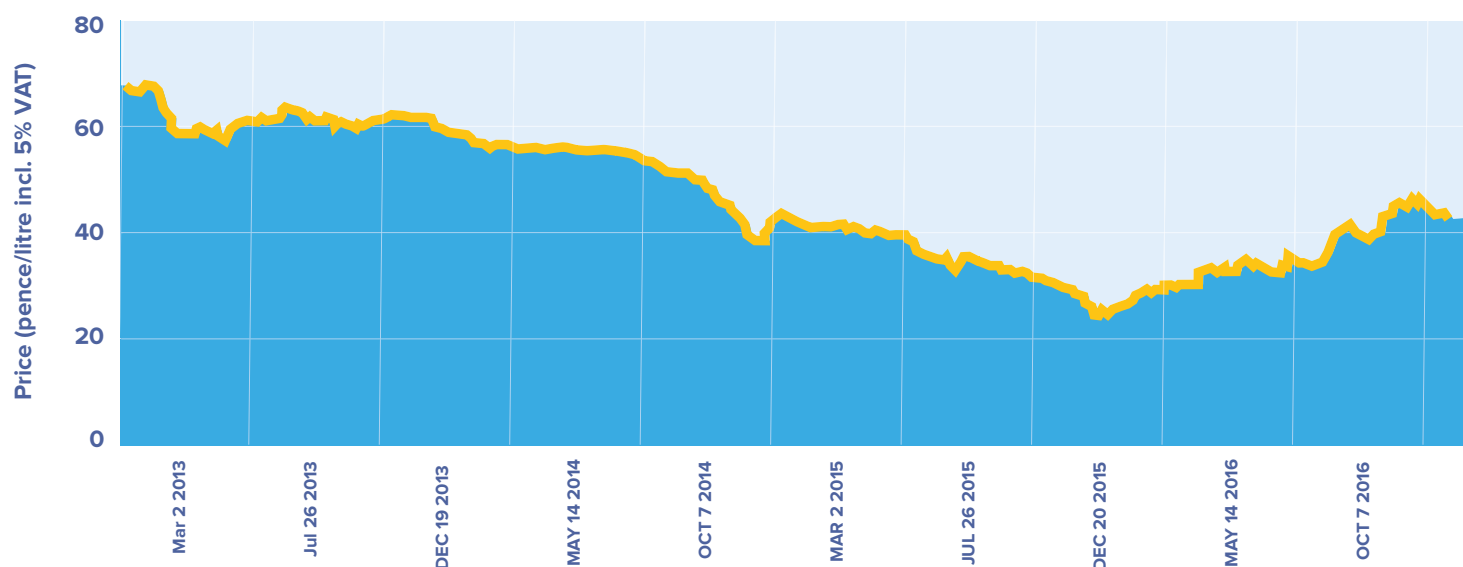


Chart courtesy of Boilerjuice.com 27/2/17

Solid fuel

Listed below are some of the more popular types of solid fuel, although this is not an exhaustive list.

Coal, including anthracite and other coal-derived products, can be bought from a range of outlets or delivered. Coal is priced by the size of bag and the type and quality of the coal, with smokeless fuel being the most expensive and with smaller quantities costing considerably more. Some more urban areas may come under the smoke control regulations. The increase in the cost of mains gas has seen a resurgence of solid fuel heating appliances.

Waste wood is normally free and collected by the householder though there may be the option of paying someone to collect/deliver it and a possible payment to landowners. It is available also from waste as firewood/kindling or from wood yards.

Wood chips are delivered and paid for in large quantities and delivered by truck to a room with hopper storage for fuel or a storage facility located outside.

Pellets, the most economical method of fuel purchase, are bought in bulk from a producer or importer who will supply sealed bags, usually around 10 -15kg, delivered on pallets to the nearest hard-standing near the home. The householder then has to move and store the bags to a waterproof storage area, such as a shed or garage. They can also be delivered directly into the householder's hopper.

Budgeting and paying for fuel

It is not only the cost of fuel per kWh which needs to be kept in mind when assessing whether the most appropriate fuel is being used by a householder, but also the options available to budget for fuel and the range of payment methods. This is particularly important for low-income households where avoiding debt is an issue. Many people like to budget in specific ways and their choice must be respected. This means that there may have to be a compromise between the cheapest fuel and the most cost-effective for individual circumstances.

SECTION 2

BUYING FUEL

FUEL PAYMENT METHODS

Electricity (and mains gas)

Electricity and mains gas are metered, which has the advantage that a householder who is a regular customer does not have to pay upfront for fuel and only pays for what they use. They can use as much or as little as they need or can afford. There is however the temptation especially amongst older households to turn the heating off (to self-disconnect) to avoid the prospect of high fuel bills at the end of a quarter. To encourage regular payment, suppliers have a range of methods to pay for fuel.



Payment options include:

- Budget Scheme/Direct Debit/Standing Order with a set monthly payment, often with a discount
- Quarterly credit/bi-monthly credit payment on receipt of bills, with a range of methods to pay
- Pay-as-you-go/flexible payment schemes
- Prepayment meters are often, but not always, at a higher tariff. They are usually topped up with a card, token or key but smart meters enable prepayment customers to buy credit in a range of ways, including over the telephone or online.
- Fuel Direct – a means of paying off fuel debt directly from certain benefits.

Some of the above will require the customer to have a bank account.

Oil

Most oil companies offer a payment plan so that the cost of buying oil can be spread out as regular payments, but the volatility of the price of oil can work against the householder, with oil suppliers linking fuel costs to world prices. Cash purchase and the clubbing together of several households can bring savings to oil purchase costs. Oil clubs are becoming more prevalent and sometimes link to credit unions to help householders get the best rates on their oil and to budget for bulk purchases.

ACRE, Citizens Advice and FPS have put together a best practice guide for oil buying groups, which can be accessed online:

www.citizensadvice.org.uk/Global/Migrated_Documents/corporate/pdf-cam-oc-buyingguide-2011.pdf

LPG

LPG can be purchased either by the cylinder or in bulk, which is an advantage to those on limited budgets in that fuel can be bought in small quantities as required, and can be purchased from a variety of sources. However, bulk purchase is cheaper and most bulk suppliers will allow payment plans or direct debit options to be set up with regular customers to help spread the cost, although deliveries can also be paid for upfront. Unlike natural gas or electricity, LPG does not use prepayment meters and does not offer differential pricings which vary by payment method or by size of the delivery.

Solid fuel (eg. coal or wood)

Solid fuel can work well for those on limited budgets as the fuel can be bought in small quantities as required from local suppliers such as filling stations. However it is often an expensive fuel to use for heating which can lead to householders limiting their use of fuel, leading to self-disconnection. Bulk purchase of solid fuel is likely to be much cheaper but requires a householder to pay cash up-front or to enter into a financial arrangement with a solid fuel supplier. The householder would also need to be able to store the bulk delivery.



FUEL DEBT

Fuel debt is a complex issue as it is often part of a number of household debts. However in the case of electricity or mains gas debt, the major utility companies may cut off supply if a customer does not pay their bill within the required time scale.

There are several possible causes of fuel debt – some caused by the supplier, some by the householder. They include incorrect bills, lack of accurate meter readings, immersion heaters on constantly, prepayment meter on an incorrect setting, lack of understanding on how to use heating, lack of budgeting skills, low income and change in circumstances (eg. illness, bereavement, redundancy).

A householder who is struggling to pay their bills should contact their fuel supplier to make alternative payment arrangements. This should not be put off as the fuel companies can apply to the courts to gain possession and may install a prepayment meter or may cut off supply as a last resort.

The danger of focusing on reducing fuel debt could have the unexpected consequence of making other debts worse. It is best to refer clients to a debt adviser or money advice counsellor at a Citizens Advice Bureau.

NEA Cymru has produced the Fuel Poverty Action Guide Wales, which is aimed at advisors working with people at risk of fuel debt and contains more detailed information on how to help. It can be downloaded here:

www.nea.org.uk/nea-cymru/publications/

Remember that improving the energy efficiency of a home is the best way of reducing the amount of fuel a home consumes.

SECTION 2

BUYING FUEL

SMART METERS

Smart meters are the new generation of gas and electricity meters. Every home in England, Scotland and Wales will be offered a smart meter by their energy supplier, at no extra cost, between now and 2020. Suppliers will contact their customers to arrange an appointment when they are ready to install in that property. Properties without mains gas will still be able to have an electricity smart meter.

Smart meters will enable householders to see exactly how much energy they using in real time and what it is costing in pounds and pence. They take regular readings and share these directly with the energy supplier through a secure wireless network, putting an end to estimated bills and manual meter readings. For more information about smart meters, visit smartenergyGB.org



SERVICES FOR VULNERABLE CUSTOMERS

Electricity and gas suppliers, electricity distribution network operators and gas distribution networks have **priority service registers** for customers who are considered vulnerable for any reason including, but not limited to, being of pensionable age, or having a disability or chronic illness. Services include; bills in special formats (Braille, talking, large print), special controls and adaptors and no winter disconnection. For further details, contact the companies that supply the householder. This service will not be automatically offered by the company so a client will have to ask to be placed on the register.

FPS, UKLPG and Certas Energy have recently piloted a Cold Weather Priority Initiative to map vulnerable oil and LPG customers and ensure they receive extra assistance they may require, such as being prioritised for delivery during times of shortage. The different trade associations are hoping to roll this scheme out to more customers later in 2017. It is likely to initially be targeted at older customers and those with certain disabilities.



SECTION 3

REDUCING HEAT LOSS IN HOMES

This section explains how you can reduce heat loss, and therefore energy consumption, in existing homes through insulation. This depends on the construction of the home, and this section includes appropriate insulation for hard to treat homes, often found in rural areas.

HEAT LOSS IN HOMES

Heat is lost from homes by a variety of routes. In a typical house, the biggest proportion of heat loss will be through the walls at 35%, followed by the roof at 25%, then draughts and floor each at 15%, with heat loss through windows making up the smallest amount at 10%. Insulating a home can dramatically reduce this loss, with the biggest savings to be made by starting with insulating the walls and roof, although this can be expensive to do in properties with solid walls, or lofts which are difficult to insulate.

TYPES OF HOMES

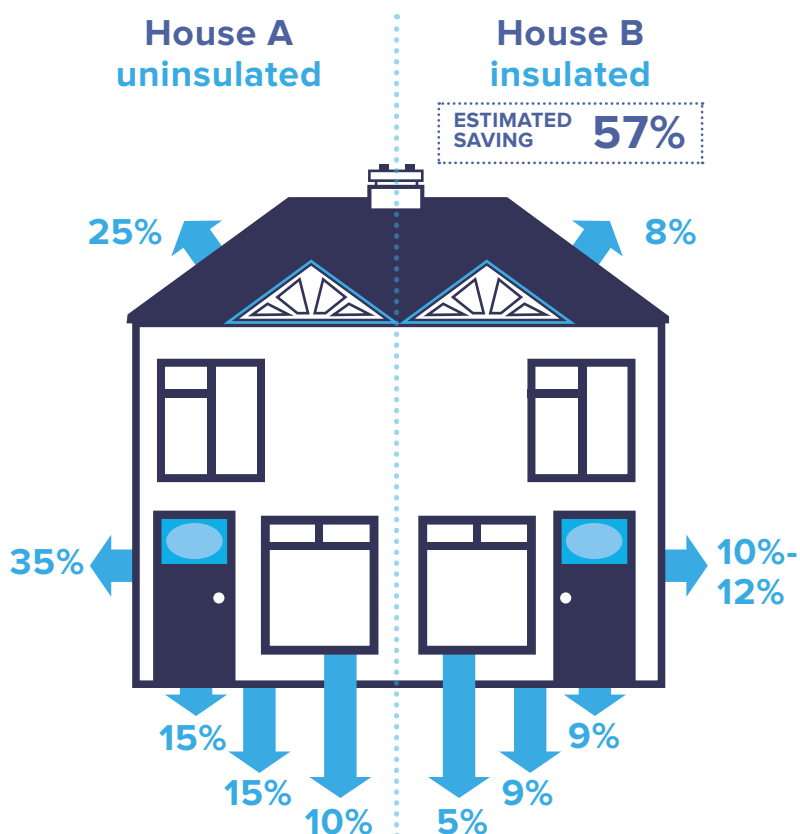
Traditional homes have walls of brick, block, or stone construction and fall into two categories; cavity wall construction or solid wall construction, depending on whether or not they have a cavity, or hollow space, between an inside and outside 'skin' of brick, block or stone. The inner skin may be timber or steel-framed. Note that some cavities in older stone buildings were filled with rubble during construction and should therefore be considered as solid walls.

Non-traditional homes were built mainly post-war, and fall into four main construction types: pre-cast concrete, in-situ concrete, timber frame and steel frame. In many cases a mixture of materials was used. They were commonly called pre-fabs (pre-fabricated). They were predominantly erected in urban areas to replace housing destroyed in World War 2, but can be found in small clusters in rural areas and can

be of mixed and varied construction. NEA has specialists on non-traditional construction who can be contacted for further advice.

Hard-to-treat and expensive-to-treat homes.

Generally a higher proportion of pre-1930s housing stock exists within rural areas than urban areas. Urban areas tend to have a greater proportion of new(er) build homes. Houses that were constructed after the 1930s have cavity walls and are the easiest and cheapest to insulate. Pre-1930s houses tend to have solid walls and, therefore, are more expensive to insulate and so are classed as hard-to-treat and expensive-to-treat. Certain homes, particularly large detached properties, will be expensive to treat no matter what their construction due to their large rooms and (often) high ceilings. In certain cases, such as listed buildings, options will be restricted by their protected status. Residential caravans known as Park Homes are another type of home where options are restricted largely due to a lack of space.



SECTION 3

REDUCING HEAT LOSS IN HOMES

INSULATION

The purpose of insulation is to reduce heat loss in order to achieve suitable comfort levels in the home without having to increase the heat from the existing heating appliances/systems. To work properly it is essential that insulation is installed to an appropriate standard. After insulation, sufficient heat loss must remain to provide adequate ventilation. The range of options is set out below:

Wall insulation has to be installed to an approved standard with the system being installed by a registered contractor who will give a guarantee from the company or from the Cavity Insulation Guarantee Association (CIGA), with the contractor giving advice on the most appropriate system for the home.

Where possible, the insulation system should meet the requirements as set out in Building Regulations.

Cavity wall insulation reduces heat loss through walls by up to 60%. It is a quick process, taking only 3 to 4 hours to install. It is cheap to install and is achieved by injecting mineral wool, beads or granules, or foam into the cavity. This involves drilling small holes in the brickwork from the outside and injecting the insulation to fill the cavity. An investigation will first be made to confirm the cavity is within certain tolerances to accept the insulation proposed. Although cavity wall insulation can cost between £330 and £740, depending on the size of property, the average savings to energy bills mean that it has a payback period of only 4 years. There are also grant schemes available to allow cavity wall insulation to be installed for free in certain circumstances.

Where there is no cavity or it is not suitable for filling, external or internal wall insulation are the only options:



External wall insulation is the least intrusive to the inside of the home but involves a weather-proof coating which may also involve brick or stone effect. This may not be possible or desired on some homes for aesthetic reasons, and planning permission will be required for homes in conservation areas, national parks, areas of outstanding natural beauty or World Heritage sites. Householders living outside these protected areas will be able to add external wall insulation to their home without planning permission, providing it is no more than 16cm thick.



Internal wall insulation is the most intrusive method of insulating, reducing the size of rooms and affecting living conditions during installation, but may be the only available option. It allows more rapid heating of the rooms compared to other methods.

Other methods of reducing heat loss from the home include:

Hot water cylinder jacket

Insulating the hot water tank and pipes around the tank with a good quality cylinder jacket and insulation is a priority measure. Tanks lose a lot of heat otherwise and providing this type of insulation is very inexpensive.

Draught-proofing

Draught-proofing windows and doors reduces unwanted ventilation and is one of the easiest and cheapest ways to reduce heat loss.

Loft/roof insulation

Where a home has a **pitched roof**, insulation should be laid between and over the ceiling joists in the loft space to a depth of at least 10" (250mm). Once installed, air in the loft will be colder so tanks and pipes will also need lagging. The loft hatch should also be insulated. On **flat roofs** insulation can be installed above or below the roof surface. If a flat felt roof covering has to be replaced, it is very cost effective to have it insulated at the same time by fixing slab insulation on the roof and then recovering with felt.

Floor Insulation

Insulation can be installed under a suspended timber floor, or on top of a solid floor. The cost and level of disturbance make it only worthwhile if renovating a property.

Double glazing

Sealed unit double glazing can reduce heat loss through windows by up to 60%. It is very expensive and has a long payback period though it looks good and is low maintenance.

Secondary glazing takes several forms. A thin film is the cheapest way to insulate windows, but the film only has a short life span of about a year. Rigid/semi-rigid plastic sheets can be fixed on with Velcro in early autumn and taken off in late spring. Internal wooden framed windows can be constructed on the inside of the existing window. This option is as expensive as sealed unit double glazing but may be an option for homes that are listed and are not able to install sealed unit double glazing.

Shutting curtains at night, particularly thick curtains or those with a thermal lining, will also help to reduce energy loss through windows.



SECTION 4

HEATING, HOT WATER HEATING, APPLIANCES AND SYSTEMS FOR OFF-MAINS GAS HOMES

This section briefly describes the range of heating and hot water systems that may be found in rural areas off the gas mains, for each of the main fuels – electricity, oil, solid fuel, and LPG. It starts with space heating, then hot water, then central heating systems that provide both. Lighting and appliances are mentioned briefly.

SPACE HEATING

Electricity

Electric heating can use either standard rate or low rate electricity (see Section 2) with some appliances designed to make maximum use of cheaper low rate electricity.

The main options are:

- Electric element heater providing radiant heat on demand from one or more elements, with no other controls; the traditional ‘electric fire’.
- Fan-heater.
- Convector heater, either stand-alone or wall-hung.
- Electric storage heater designed to charge up overnight and release heat during the day. Some storage heaters may be combination heaters with separate controls for a heater which operates on peak rate electricity.
- Oil-filled panel radiator.

The principal method of control in addition to on/off is by appliance thermostat, operated either manually or automatically as the desired temperature is reached.

Oil

Can only be used for central heating systems (see below).

Solid fuel

- Open fires give little control, with up to 72% of heat lost, mostly through the chimney. A range of solid fuels can be used.
- Closed solid fuel room heaters have more control and deliver between 60% to 70% efficiency.
- To reduce the risk of carbon monoxide poisoning, you should empty the ash can daily, clean the flue ways at the back of the boiler weekly and clean the throat plates at the top of the room heater monthly. Have your chimney swept at least once a year if burning smokeless fuel or at least twice a year if using wood or bituminous coal.

LPG for portable heaters

Portable heaters/portable gas fires provide a high heat output, delivering up to 95% efficiency. They deliver instant heat when and where required. They can provide a focal point for a room.



HOT WATER

Electricity

- Electric single-point instantaneous water heaters provide hot water in one place, for example an electric instantaneous shower or over sink water heater.
- Electric immersion heater in hot water cylinder. A single immersion is normally used in a 110 litre cylinder and will heat the whole tank. A twin immersion is used in a 210 litre cylinder and saves money and electricity by heating the cylinder using low rate overnight electricity instead of the whole tank, with the top element used for daytime boost using standard rate electricity.

Oil

See central heating below.

Solid Fuel

- Solid fuel room heater with back boiler – the heat from the fire is used to warm the water in the boiler behind the fire and, depending on the output, can heat a cylinder of hot water.

LPG

- Single-point instantaneous domestic hot-water heaters provide hot water in one place.
- Multi-point instantaneous domestic hot-water heaters will deliver hot water from any connected draw-off point in the home.

CENTRAL HEATING SYSTEMS

Central heating systems combine both space heating and water heating, usually throughout the home.

Electricity

Electric storage heating systems, with storage heaters in each room and a twin immersion hot water tank (see above) are often referred to as central heating, though they are in fact separate units.



SECTION 4

HEATING, HOT WATER HEATING, APPLIANCES AND SYSTEMS FOR OFF-MAINS GAS HOMES

Wet central heating systems – gas, LPG, oil, or solid fuel

Wet central heating systems use a central boiler and a pump to pipe water to a network of radiators. Whilst mains-gas wet central heating systems make up the majority of central heating systems in the UK, they can also be fuelled by oil, LPG, biomass or solid fuel. From an energy efficiency perspective, the key components are the boiler and controls.

Central heating boilers

- Condensing boiler (oil or LPG) – the most efficient, on average 85%.
- Conventional boiler (oil or LPG) – the most common but no longer installed in homes since a change in the building regulations in 2005.
- LPG back boilers.
- Combi boiler combines standard boiler for room heating with instantaneous water heating (at mains pressure), so does not need hot or cold water storage tanks. It can be condensing or conventional.
- Solid fuel boiler with solid fuel heating back boiler, radiators and hot water cylinder.
- Gas-powered micro combined heat and power (mCHP) boilers allow the heat provided by generating electricity to be used in the home, rather than being lost as mostly happens in central power stations. Micro CHP boilers therefore have the capability of significantly reducing overall energy costs.
- It is important to service boilers every year to keep them running efficiently. Engineers should be registered with the relevant body – OFTEC for oil fired boilers, Gas Safe for LPG or mains gas or HETAS for solid fuel heating.

Central heating controls

- Thermostatic radiator valves (TRVs) control the temperature in individual rooms.
- Room thermostats control whole house heating and should be set at a temperature that gives an adequate level of comfort for the property. This is particularly important as effectively controlling how much heat is put into each room, and the whole house, will significantly affect overall energy consumption but at a relatively low installation cost.
- Hot water cylinder thermostats are used to control water temperature at a safe level of 60°C.
- Central heating control programmers allow for heating and hot water to be produced at separate times, especially useful during the milder weather.



LIGHTING, APPLIANCES AND COOKING

Lighting, appliances and cooking account for 22% of the energy used in the home, so advising householders to use them efficiently will contribute to a reduction in energy use. The number of appliances used in the typical home continues to increase, for example as the number of computers and televisions per home increase.

Important facts, which may not be known by the householder:

- Electrical appliances left on standby can cost around £30 per year.
- Using a bowl to wash up, rather than a running tap, could save £30 a year in energy bills.
- Low energy lights use much less energy than conventional light bulbs. Compact Fluorescent Lamps (CFLs) are a cost effective option for most general lighting requirements and can save around £5 per year per bulb. LEDs are more efficient than CFLs and will save more money in the long term – around £35 a year by replacing all halogen downlighters in your home - but may be more expensive to purchase.
- EU energy rating labels must be shown on all refrigeration and laundry appliances, dishwashers, electric ovens, air conditioners, lamps and light bulb packaging. The EU label rates products from A+++ (the most efficient) to D (the least efficient). It is worth replacing lower rated appliances with those with higher ratings as this saves energy and therefore money in the long run.

- Appliance suppliers often offer discounts on the lower rated machines to clear stocks, so check prices and energy ratings together – the more expensive machine may be the cheaper to run over the life of the machine.



SECTION 5

RENEWABLE & NEW TECHNOLOGIES

This section looks at renewable and other new technologies and the potential they have to reduce fuel costs in off-grid homes and make them affordable.

RENEWABLE TECHNOLOGIES, ENERGY EFFICIENCY AND FUEL POVERTY

It is important not to see these technologies in isolation from general efforts to improve energy efficiency and reduce domestic energy use. They complement one another, and the technologies are at their most efficient when combined with high levels of insulation. It is important therefore to ensure that homes are well insulated, that the heating and hot water systems and appliances the technology will operate are efficient and controllable, and that the householder is receptive to using energy efficiently.



The introduction of the feed-in tariff (FIT) and renewable heat incentive (RHI) subsidies in recent years has stimulated demand for renewable technologies and led to a lowering of costs. Now, it is not only the environmentally conscious, but also social landlords and homeowners looking to lower energy bills who are installing these technologies. In addition to affordability, the technology must be easy to operate, the fuel easy to handle, with convenient payment methods available, and advice and support readily and locally available to quickly solve any problems.

RENEWABLE ELECTRICITY

It is possible to install 3.68kW of a renewable electricity generating technology on a single phase domestic supply without prior agreement with the District Network Operator (DNO). This increases to 11.04kW for a three-phase supply. Larger installations will require a grid connection agreement and a payment might be required to fund grid reinforcement.

Solar Photovoltaics

Solar PV is the most commonly used renewable technology for domestic properties. The solar panels generate direct current electricity and an inverter normally converts the electricity to alternating current which can be used in the home.

The annual generation from the PV system will depend on the size of the solar PV array, its angle of orientation and inclination and the level of shading. Other factors which have an influence include the geographic location and the quality of the panels and inverter. Installations on a slate roof are normally more expensive than on a tiled roof. A 2kW array requires a roof of about 15 metres squared.

Electricity generated by the PV system can be used by the householder for free. In addition to this, the Feed-in tariff (FiT) subsidy pays the owner of the PV system for every kWh of electricity that is generated and a smaller sum for electricity exported to the grid. To claim the Feed-in tariff, the system must be fitted by a Microgeneration Certification Scheme (MCS) accredited installer.

A PV array on a south facing roof inclined at 30-40 degrees should have a higher annual generation. However an array split between east and west facing roofs could still be worthwhile. This would generate more electricity in the morning and late afternoon when many families are at home to consume it.

As an addition to PV alone, it is worth considering a solar immersion device which typically costs a few hundred pounds, and maximises the electricity used on site. This device diverts electricity that would otherwise be exported to the grid to power the immersion heater of the hot water cylinder. This is particularly beneficial for larger solar PV arrays or households who are out during the day.



Battery storage can also make use of excess solar generated electricity, not solely for water heating as with the solar immersion device above. As the technology develops, battery prices are expected to fall and the capacity rise. Batteries will allow residents to store electricity generated by PV systems during the day for use in the evening. Some battery systems can provide residents with a backup during a power cut. As time of use tariffs become more common, a solar PV system plus battery storage will also allow residents to limit their use of peak rate electricity.

Wind Power

Small wind turbines may be suitable for farms or rural homes with sufficient land. The turbine needs to be located in an area with a high average wind speed and away from obstacles such as trees and buildings which can limit the local wind speed or cause turbulence. Suitable turbine sizes may range from 3 to 11kW and a three phase supply would be required for the larger turbine. Examples of popular models include the Kingspan KS3 and KS6 as well as the Gaia 133 – 11kW turbine.

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The electricity generated will normally be higher for turbines with longer rotors and greater hub heights.

The annual generation is strongly dependent on wind speed and so turbines which are poorly located can generate significantly less and make a poor investment for householders.

The amount of electricity generated by a 10kW wind turbine may be at least double that from a 10kW solar PV system. There is also a better match between generation and household demand as wind turbines will generate at night and more during the winter. Wind turbines are several times more expensive than a similar rated solar PV system, but there are currently subsidies through the feed-in tariff. This provides payments for each kWh of electricity that is generated by a wind turbine, regardless of whether the electricity is consumed on site or exported to the grid.

Planning permission will typically be required for a wind turbine. However, it may be permitted development to install stand-alone turbines within the boundaries of a dwelling. This will only include smaller turbines like the Kingspan KS3 using the lower tower height of 6.5m.



Hydro Power

Homes with a river close by might consider hydro power. Important considerations are the 'head' (height difference across the hydro installation), the water flow, the grid connection and land ownership across the site. Installations up to 5kW are classed as Pico Hydro, while those from 5kW to 100kW are Micro hydro. The output from a hydro power plant is more consistent than for solar or wind, but costs per kW are higher. Planning permission and licences from the Environment Agency will be required. As a result, developing a hydro power installation can be a lengthy process.

RENEWABLE HEATING

Heat Pumps

Heat pumps operate on a similar basis to refrigerators and air conditioning units. They use mains electricity to operate and in suitable homes can produce heating costs per kWh similar to using mains gas. They capture heat from outside a property, either from the air, the ground or nearby water and concentrate it for use inside. The process works by evaporation and condensation of a refrigerant fluid in a closed loop system, with the process driven by a compressor powered by mains electricity. For each unit of electricity that the compressor of a heat pump consumes, between 2 and 4 units of heat are released.

The coefficient of performance (CoP) is a measure of the system efficiency and is the ratio between the heat output and the electricity input. The heat pump will operate more efficiently if the temperature difference between the heat source and the emitters is lower. As a result heat pumps will typically use under-floor heating or larger radiators which operate at lower temperatures than with a typical boiler system. While gas

boilers are often run in shorter bursts, heating up a building fairly quickly, a heat pump will operate more continuously and takes longer to reach a set temperature. A house needs to be well insulated and free from draughts otherwise a heat pump system may be expensive to run.

It will be necessary to confirm with the District Network Operator (DNO) that the grid supply to the home is sufficiently robust before an installation can go ahead. For domestic properties, the output from a heat pump is normally up to 16kW.

The Renewable Heat Incentive (RHI) has encouraged installation of technologies such as heat pumps. The rates vary between heat pump technologies.

Air to water source heat pumps (ASHP) are the most common type of heat pump installed in the UK and transfer heat from the air into a wet central heating system. The main unit, sited outside the home, looks similar to an air conditioning unit. Within the house, the heating system will look similar to a standard wet central heating system, with underfloor heating, radiators or fan units acting as heat emitters. In off gas network areas they can be a cost effective option for smaller well-insulated properties. The heat pump is more efficient in summer when the outside temperature is warmer. Air source heat pumps are the cheapest heat pump technology, but are still considerably more expensive than a solar PV system.

There are also air to air source heat pumps where the heat is transferred by the air. At the time of writing, this technology is not supported with the Renewable Heat Incentive. NEA has evaluated the performance of 6kW Worcester Bosch air to air source heat pumps in Park Homes. Most systems consist of one external unit and between one and four indoor units which are mounted high on the wall. These are individually controllable and take

the place of radiators. The system will also remove excess moisture from the home.

Ground source heat pumps (GSHPs) extract heat from a borehole or loops of pipe laid in the ground. The installation is more costly and disruptive than for air source heat pumps. A sufficiently large garden or field with good access is needed near the house for the pipes. The ground temperature decreases less in the winter than the air temperature. This makes a GSHP more efficient than most ASHPs in winter and cheaper to run. It is possible to improve the economics of an installation by properties sharing boreholes. As well as reducing costs, a shared borehole installation will be eligible for the Non Domestic RHI which is paid over a longer period than the Domestic RHI.

Water source heat pumps (WSHPs) extract heat from a body of water such as a river or lake. Pipes are laid below the surface of the water and heat is absorbed by a fluid passing through the pipes. The efficiency of WSHPs is high due to the good heat transfer with the water and the limited variation in water temperature during the year. Although installation costs for WSHPs are lower than for GSHPs, it is rare for homes to be next to a river or lake and so few have been able to install the technology.

Newer technologies which may become more important include **Minus 7**, hybrid and CO₂ heat pumps. The Minus 7 system claims to combine the best of solar thermal, PV, energy storage and heat pump technologies in a single product. Retrofits involve replacing part of the roof of the building with aluminium tile-planks which act as the heat collector for the system. There is also a solar energy processor and two thermal stores. The system is currently eligible for both the feed-in tariff and renewable heat incentive.

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As discussed earlier, ASHPs are less efficient in winter. A potential solution to this problem could be to install a **hybrid heat** pump, such as the model from Daikin (and others) which combines an ASHP with a conventional boiler, using fuels such as mains gas, LPG or oil. The system automatically chooses (using several variables such as outside temperature and fuel cost) whether to run the heat pump, conventional boiler or a combination of both to maximise efficiency. It is possible to claim the RHI payments for heat generated by the heat pump. NEA has tested the Daikin Altherma Hybrid Heat Pump as part of the Technical Innovation Fund programme.

Refrigerant chemicals used in the past have affected the ozone layer while those currently used have a significant global warming potential. Heat pumps using CO₂ as a refrigerant are more environmentally sensitive. There are added benefits that it is possible for systems to produce high water temperatures while still operating at high efficiencies. **CO₂ heat pumps** currently are more commonly used for water heating, but systems including space heating may become more common.



Solar water heating (solar thermal)

A solar thermal system has a roof mounted collector which is typically between 2 and 4 square metres in size. The system will produce more hot water over the year if the roof faces south at an angle of about 30 degrees. Fluid in the solar collector is heated by the sun. As the temperature rises, the fluid is pumped through the panel and then used to heat water in a conventional hot water cylinder. A solar thermal system can provide much of the water heating requirements in summer. An additional form of water heating is however necessary for around six months of the year when there is limited solar gain

The collector can be in the form of flat plates or a series of evacuated glass tubes. Systems with flat plate collectors are typically cheaper, the collectors are more robust and modern units appear little different from Velux windows and so are not visually intrusive. Evacuated tube collectors can produce hotter water, have lower heat losses and perform better in winter. The economics for solar thermal are better in off-gas areas where the alternative would be heating water using electricity, oil or LPG. Retrofits of solar thermal systems may cost about £4000, with the majority due to installation costs. Households installing a solar thermal system are at the time of writing eligible to receive annual payments for a fixed duration from the Renewable Heat Incentive (RHI).

Biomass (wood)

Wood is the oldest heating fuel, but in recent years there has been a revival in its use for heating homes, particularly in rural areas. Popular technologies include wood burning stoves for room heating and central heating using biomass boilers which can provide an attractive alternative to oil and LPG boilers or electric heating in off gas grid areas.

Open fireplaces cause draughts and result in heat losses from rooms. When there is a fire, the efficiency is only about 37% (using premium briquettes), with most of the heat lost up the chimney. An alternative would be a **wood burning stove**. The cost of a stove may range from £500 to over £1000, but the installation can also cost over £1500. During the installation, the chimney will be lined and the fireplace closed off, which will reduce draughts. The operating efficiency of wood burning stoves can be around 70%. This is because of improved combustion of the wood due to the controlled air flow and higher operating temperatures. There is more efficient combustion of volatile hydrocarbons released by the wood and of the char and ash left behind. If you have your own free supply of wood, it will significantly reduce the running costs. It is best to season the wood for a period of months, allowing it to dry out. A seasoned log can produce up to twice the heat output of a 'green' log. Disadvantages of wood burners include the need to store large volumes of wood and manual nature of lighting the fire and carrying the fuel. It will also be necessary to get the chimney regularly swept. Wood burning stoves that burn logs are not eligible for the RHI, but stoves which burn wood pellets and provide space heating using a wet heating system such as radiators are eligible. Please be advised that any wood burning appliance must be installed by a qualified HETAS installer – DIY installations will invalidate any buildings insurance.

Biomass boilers which provide space heating via a wet central heating system can claim the RHI. The technology has been popular in Europe for many decades and so it is now a mature technology. A rise in fossil fuel prices, concern over climate change and the introduction of the RHI have led to a significant growth in the market for biomass boilers in the UK. The most common biomass fuels are pellets, chips and logs.

Wood pellet boilers are the most commonly used in domestic properties. Prices for these boilers start from about £12,000. Biomass pellets are manufactured from compressed sawdust. Compared to other biomass fuels, the pellets have a high energy density, low moisture and ash content. Purchasing pellets with the ENplus standard will guarantee the quality of the pellets. If space is limited, the boiler can be supplied with a hopper which is refilled with 10kg bags of pellets. It is more expensive to buy pellets in 10kg bags and labour intensive refuelling the boiler. If a pellet store can be built next to the boiler, larger deliveries can be made by lorry. A typical store can accommodate several tonnes of pellets, supplying the boiler for a few months. Bulk buying will reduce the cost of the pellets.



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Larger buildings might consider using **wood chips** as the fuel for a biomass boiler. The cost of wood chips is less than for pellets and it may be possible to source a supply more locally. If you have your own wood supply it is possible to chip your own wood. The moisture content of wood chips is higher than for pellets and the energy content lower. A more complex fuel delivery system is required for a wood chip boiler, which increases the price compared to a pellet boiler. **Biomass log boilers** are also available. This might be a suitable option for households who have a supply of wood they can cut into logs and season. Although a biomass pellet boiler with a fuel store requires little attention, a biomass log boiler will need manually refuelling at least once a day with heavy logs.

Normally the rated output for a biomass boiler system is lower than would be specified for a gas boiler system. Biomass boilers tend to operate more continuously and may have a large accumulator tank storing hot water. This can supply the extra water required during the peaks in demand. The space required by the boiler, fuel store and accumulator tank means biomass boilers are better suited to larger dwellings or locating in an outbuilding.



OTHER TECHNOLOGIES

Passive Flue gas heat recovery

A mains gas or LPG boiler can lose significant amounts of heat through the flue. Zenex industries developed the gas saver which is a small unit installed above a gas boiler. Water feeding into the boiler passes through a heat exchanger in the Gas Saver. This preheats the water going into the boiler, saving energy. It also reduces the time a householder has to run the tap before hot water comes through. The savings are dependent on the type of boiler installed. The system is particularly effective with combination boilers and older non-condensing boilers. Baxi offers Gas Saver units and a similar product called the RecoFLUE is produced by Vaillant.

Micro Combined Heat and Power (mCHP)

A micro Combined Heat and Power boiler is able to generate electricity as well as produce hot water. Since electricity is more expensive than gas, this will save the householder money. Also peaks in electricity demand tend to correspond to the times when most households are running their central heating systems. Therefore uptake of mCHP boilers would reduce demand on the electricity grid. However, this has yet to become a mass market technology for domestic properties.

The Baxi Ecogen mCHP boiler was launched in 2010 and has main gas and LPG models. It uses a Stirling engine to generate electricity and a high-efficiency boiler to supply heat, producing up to 25kW of heat and 1kW of electricity. The cost of the Ecogen is considerably more than a conventional boiler, however it has also been possible to claim the Feed-in tariff for electricity generated by the boiler.

More recently Flow launched another mCHP boiler on the market. At the time of writing the company offered an innovative finance model. Residents

switched their energy supply to Flow Energy and could pay for the boiler upfront or via a finance deal. Although Flow received the Feed-in tariff, the residents received a monthly payment for a period of five years. This could pay off the loan or provide a reduction on their energy bill. After the five years is over, they were able to continue to use the electricity generated by the boiler for free.

ÖkoFEN have developed two mCHP biomass boilers which use Stirling Engines to generate electricity. The Smart_e boiler has a thermal output of 9kW and an electrical output of 600W, while the e-Max has a 55kW heat output and between 3.5 and 4.5kW electrical output. At time of writing, the boilers were not eligible for either the FiT or RHI and prices started from about £40,000.

Heat Batteries

Sunamp have developed heat batteries which use a phase change material to store heat and produce hot water when required. The SunampPV unit is able to store excess energy from a solar PV system as heat in a similar way to a solar immersion device. Households with electric heating can replace a hot water cylinder and immersion heater with heat battery. This is more compact than a hot water cylinder and has lower heat losses.



COMPARING THE TECHNOLOGIES

The table that follows provides a means of comparing these options against a number of relevant criteria and provides additional information about the efficiency of each option.

When recommending any option, consider:

- A combination of options may be relevant in some cases.
- Seek specialist advice as necessary, for example from the Energy Saving Trust or an MCS accredited installer.
- Insulation, other energy efficiency measures, and energy advice will complement the technology and may be needed to access relevant grants.
- Any system must meet the needs of the householder, including any special needs, particularly if they are vulnerable or fuel poor.

It is important to factor in any Feed In Tariff (FIT), Export Tariff (ET) or Renewable Heat incentive (RHI) payments into any decision to install or replace a heating or generation system. It is also essential that you carefully consider the rules around eligibility. At the time of writing, the details around these schemes and their up to date tariffs are available on the Ofgem website at www.ofgem.gov.uk/environmental-programmes/



SECTION 5

RENEWABLE & NEW TECHNOLOGIES

New and renewable technologies

for rural homes

<div> <div></div> <div>No</div> </div> <div> <div></div> <div>Maybe</div> </div> <div> <div></div> <div>Yes</div> </div>	Available now	Suitable for single dwelling	Space heating	Hot water	Can be retrofitted	Controllable	Meet all household heating needs	Potential to generate surplus electricity	No planning permission required	No fuel storage required	No fuel loading required
Solar photovoltaics (PV)	Yes	Yes	Maybe	Maybe	Yes	No	No	Yes	Maybe	Yes	Yes
Wind Turbine	Yes	Yes	Maybe	Maybe	Yes	No	Maybe	Yes	No	Yes	Yes
Hydroelectric Turbinet	Yes	Yes	Maybe	Maybe	Yes	No	Maybe	Yes	No	Yes	Yes
Air Source Heat Pump (wet) (ASHP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Maybe	Yes	Yes
Air to Air Source Heat Pump	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Maybe	Yes	Yes
Ground Source Heat Pump (GSHP)	Yes	Maybe	Yes	Yes	Yes	Yes	Yes	No	Maybe	Yes	Yes
Water Source Heat Pump (WSHP)	Yes	Maybe	Yes	Yes	Yes	Yes	Yes	No	Maybe	Yes	Yes
Solar thermal	Yes	Yes	No	Yes	Yes	No	No	No	Maybe	Yes	Yes
Wood Burning Stove	Yes	Yes	Yes	No	Yes	No	Maybe	No	Yes	No	No
Biomass Boiler	Yes	Maybe	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Passive Flue Gas Heat Recovery	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Micro CHP	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Maybe	Maybe
Heat Battery	Yes	Yes	Maybe	Yes	Yes	No	Maybe	No	Yes	No	No

SECTION 6

HELP WITH INSULATION, ENERGY EFFICIENCY AND PAYING BILLS

This section looks at the range of help that is available in the form of grants and advice for insulation measures and energy efficient heating systems, as well as other sources of help for off-gas households in relation to their energy bills. Some grants will meet 100% of the costs for low income and vulnerable households, while others target those who can afford to make a contribution to the cost.

GRANTS FOR INSULATION AND ENERGY EFFICIENT HEATING SYSTEMS

Nest

Nest is the main Government-funded scheme to tackle fuel poverty in Wales. Nest expects to help up to 15,000 households each year with energy advice and support every year and aims to install energy efficiency packages to over 4,000 eligible households. Please note that some changes will be taking place to the scheme from September 2017, primarily the addition to eligibility criteria of householders on a low income with a qualifying health condition.

Eligibility

To qualify for an energy efficiency package under Nest, householders must meet all the following criteria:

- the householder or someone they live with receives a means tested benefit
- the property is privately owned or privately rented
- the property is very energy inefficient with an Energy Performance Certificate rating of E, F or G

Measures available

A whole house assessment is carried out to determine the best combination of home improvements. These could include, for example,

- loft or cavity wall insulation
- solid wall insulation
- new boiler
- central heating
- renewable technologies

Householders who do not qualify for a full package of measures by meeting the eligibility above should still be able to receive help through Nest in the form of:

- Advice on money management and income maximisation
- Referral for help for home improvements at no cost or low cost through other schemes, where possible

More information is available on www.nestwales.org.uk or **0808 808 2244**.

Nest is complemented by the area-based scheme, Arbed.



Arbed

Welsh Government Warm Homes Arbed is the Welsh Government's area-based energy efficiency and fuel poverty scheme. Individual householders cannot apply for inclusion in an Arbed scheme. If properties in the client's area are included in an Arbed scheme, they will be contacted directly by their local authority.

Home Improvement Loans

The Welsh Government's Home Improvement Loans scheme enables short to medium term loans to be provided to owners of substandard properties who pass affordability criteria and who are restricted by other sources of finance.

The scheme is run by local authorities in Wales. The minimum loan amount is £1,000 up to a maximum of £25,000 per unit of accommodation.

Further information is available from your local authority website

Energy Company Obligation/Help to Heat

Since January 2013, the Energy Company Obligation (ECO) has placed obligations on larger domestic energy suppliers to provide support to fund energy efficiency measures for eligible households. ECO is coming to an end in March 2017, to be replaced by a transitional period of 18 months for a new 'Help to Heat' scheme until 2022. Contact Nest, Resource Efficient Wales or the Energy Saving Advice Service to check eligibility.

Local Schemes

Many local authorities have a range of grant and discount schemes that are designed to meet their priorities. Local authorities and social housing providers are obliged to meet the Welsh Housing Quality Standard for their own housing stock, which includes improving the thermal comfort of the homes. Local authorities are also able to fund improvements to private sector properties.

They may combine ECO funds from energy companies with their own funds to offer a range of enhancements to grants or to extend the eligibility for help. Although it is increasingly rare, some local authorities may also offer grants or low interest loans for renewable technologies. Information will be available on the local authority website.

Some **charities** will also assist eligible households with the cost of energy efficiency measures.



HELP WITH BILLS

Help is also available to meet fuel bills. The Government makes **Winter Fuel Payments** of between £100 and £300 to older people. **Cold weather payments** are paid to certain benefit claimants if the average temperature is below 0°C for a period of seven days. Some energy companies operate **trust funds** that can assist customers having difficulty paying their bills, and there are other charities that can help.

MAINS GAS EXTENSION SCHEME

Gas Distribution Networks provide funding to some householders to connect to the mains gas network, as either a full or part payment towards the cost of a new connection. The offer applies to existing homes only, for householders currently living there who either receive qualifying benefits, would need to spend 10% or more of their income to heat their home to defined levels of comfort or who live in an area designated for support by the energy regulator. The first thing to do is to apply to your gas distribution network for a quote. For most Welsh households, this will be Wales & West Utilities although National Grid do extend into some parts of the Welsh border. Go to the **Wales and West Utilities Website** or **National Grid Website** to apply for a quotation.

ADVICE

In addition to the advice provided by the Nest scheme, there are two other main sources of advice in relation to energy efficiency.

Resource Efficient Wales

Resource Efficient Wales is a Welsh Government service providing people with a single point of contact for support on using resources (energy, materials and water) more efficiently.

Contact: <http://resourceefficient.gov.wales> or **0300 123 2020**

Energy Saving Advice Service

The Energy Saving Advice Service is a Government-funded telephone advice service offering impartial advice to households. The service can direct callers to a wide range of support to reduce energy consumption and fuel bills. Contact: **0300 123 1234**

PAYMENTS FOR GENERATING ENERGY

Feed-in Tariffs

If you generate your own electricity, for example with solar panels or a wind turbine, you can apply to get payments from your energy supplier, called a Feed-in tariff. As well as the generation tariff, you can also sell any extra units you don't use back to your electricity supplier. This is called an 'export tariff'. The amount you will get from the generation tariff varies depending on when you applied to the scheme. More information is available on <https://www.gov.uk/feed-in-tariffs/overview>

Domestic Renewable Heat Incentive

Homeowners, private landlords and social landlords with biomass boilers, solar water heating or certain heat pumps can claim money towards renewable heating costs in their property for seven years. The amount paid is based on the amount of renewable heat generated by the heating system.

More information is available on <https://www.gov.uk/domestic-renewable-heat-incentive>





Gweithredu dros Gartrefi Cynnes
Action for Warm Homes



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