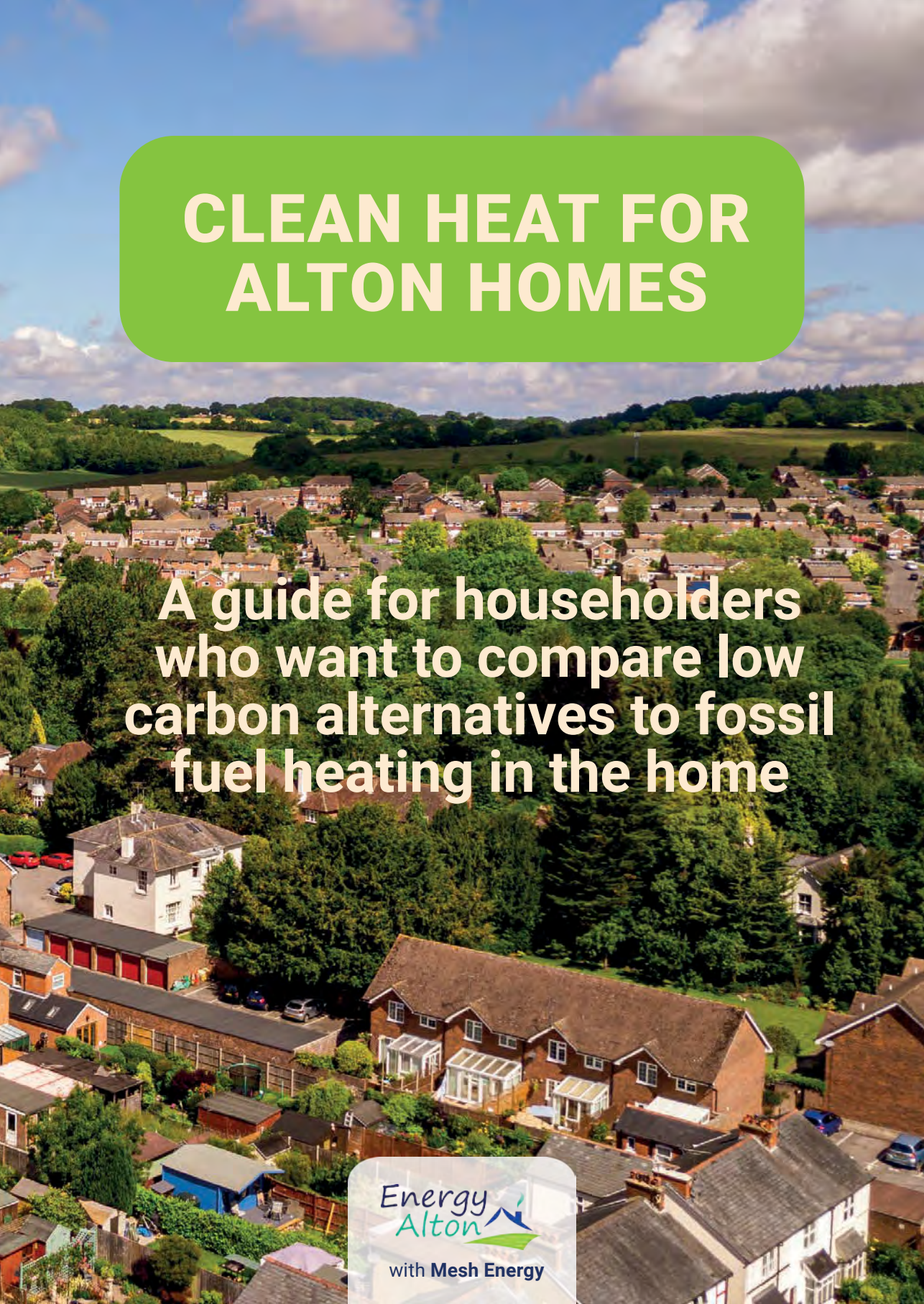
CLEAN HEAT FOR ALTON HOMES



A guide for householders who want to compare low carbon alternatives to fossil fuel heating in the home

Energy Alton

with **Mesh Energy**

FOREWORD BY
DAMIAN HINDS MP

This is an important and practical guide to heating our homes here in Alton and more widely in East Hampshire.

As shown by the world summit at COP26 in Glasgow, all communities here and abroad must act to reduce their carbon emissions including a rapid move away from gas, coal and oil to heat our homes.

I commend the volunteer team at Energy Alton and other local environmental groups who work 'hands on' in our towns and villages to help us all make changes that are so necessary.

ENERGY ALTON

Energy Alton is an award-winning community group run entirely by volunteers. Over the last ten years it has provided free home energy surveys and thermal images; organised exhibitions and green open homes events, run a drop-in energy advice shop and an energy advice clinic, installed solar PV on the roof of Alton Town Library (in a conservation area) as an exemplar project, handed out free loft insulation to 500 homes in Alton, held regular evening meetings on a wide range of topics and contributed to the EHDC Energy Strategy and Alton Town Council Climate Emergency Strategy and Action Plan.

In addition, we are now promoting community renewable energy projects with a 'Powering-Up' volunteer team.
We welcome your interest in our activities.

www.energyalton.org.uk

Design by Snap Designs (snapdesigns.uk)

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INTRODUCTION

You may be asking what you can do to reduce carbon dioxide (CO2) emissions through changing home heating to not rely on fossil fuels.

Heating our homes with fossil fuels, such as gas, oil and coal, causes around 14% of all carbon emissions in the UK ['UK housing: Fit for the Future?' Committee on Climate Change report, February 2019]. Many homeowners are keen to do all they can to reduce their energy use in the home and so cut carbon emissions.

Our UK Government is also taking action. It has committed to reducing net carbon emissions to zero by 2050. As part of that plan, no gas boilers will be installed in new homes from 2025. However, the biggest challenge is to change the old fossil fuel heating systems in current homes to 'clean heat' alternatives and ensure good levels of insulation.

Volunteers at Energy Alton have been advising residents about saving energy in the home for the last ten years.

We are pleased to present this guide to 'clean heat' options for heating systems. Our advice is intended to be impartial, relevant and up to date. It is based on the experience from 2020/21 surveys of five typical Alton homes. The five examples ranged from the late 1800's to 2000 and vary in design, size and heating system.

A team of independent energy consultants at Mesh Energy used the survey results to write reports for each of the five homes. Together the consultants and Energy Alton volunteers created this general guide on clean heat alternatives and some forms of insulation. It includes installers likely to be able to assist householders in the Alton area.

You may have heard about hydrogen replacing gas in a domestic boiler as a carbon-free fuel. This is still in the developmental stage. The viability of hydrogen providing low carbon domestic heating is uncertain and so hydrogen ready boilers are not included here.

OUR THANKS

This guide was conceived by the team at Energy Alton in partnership with Doug Johnson and Jenny Wallace at Mesh Energy and five curious and supportive home owners in Alton. It has been made possible with financial support from Community Energy South (CES), Alton Town Council and East Hampshire District Council.

In particular my thanks go to Jenny Griffiths, Tim Woolman, Chris Chappell, Tony Cohen, Bob Booker, Andrew Sweeney, Jenny Wallace and Barry Sawyer.

DISCLAIMER

John Hubbard
Chairman - Energy Alton, August 2022

CLEAN HEAT ALTERNATIVES

There are four types of clean heat (low carbon) systems which can provide hot water and space heating in homes:

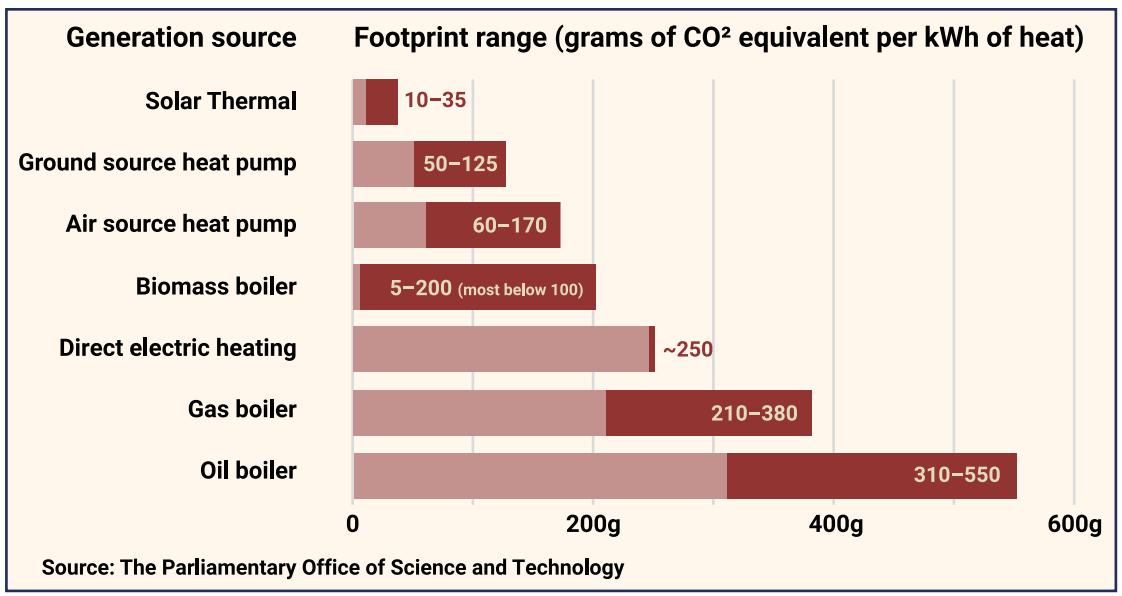
- Heat pumps; either Air Source Heat Pumps (ASHPs) or Ground Source Heat Pumps (GSHPs)
- Direct electric water and space heating
- Biomass (wood and wood pellet) boilers
- Solar thermal and solar PV systems - assisting one of the above

For most homes the practical choices are an Air Source Heat Pump or direct electric water and space heating. Our guide focuses on these. A further comparison, including typical cost, is in an appendix.

Lower carbon emissions also come from good insulation and using electricity from 100% renewable sources.

HEAT PUMPS

Heat pumps bring in heat from the outside, either from the ground or the air. The heat energy they deliver is at least 3 times greater than the electrical energy they use. It is low level of heat, though provides enough warmth to heat a well-insulated home. A heat pump typically costs the same to run as a gas boiler and less than an oil-fired boiler. Heat pumps are low carbon compared to gas heating, more so if you buy 100% renewable electricity from your energy provider. Good insulation is vital for heat pumps as the heat pump can be smaller (cheaper) and it reduces running costs.



Source: The Parliamentary Office of Science and Technology

USING AN AIR SOURCE HEAT PUMP (ASHP) FOR WATER AND SPACE HEATING

ASHPs are most efficient run at low temperatures e.g. 45°C. You can still control the heating to give you the warmth that you need. The system will automatically start earlier to reach and maintain your chosen temperature at the times you select. This compares to gas/oil systems that run at 65°C.

ASHPs need modern, double panel radiators (perhaps larger) and good loft and wall insulation.

A new unvented hot water tank and probably some radiator upgrades will be needed - an advisor or installer will do a room-by-room survey.

A suitable outdoor space is needed for the external fan unit; often near the house wall, although a connecting pipe can run to another location if needed. The external fan unit can be close to the house ('monobloc'), or much further away if 'split' with a compressor inside the house. Flexible insulated pipe can be buried to make the connection.

An ASHP fan unit needs a good air flow and must be at least 1 metre from the boundary.

The compressor and fan make a low hum, intermittently, when topping up the hot water.

An ASHP will heat water to around 45°C (more efficiently) without using an immersion element. An element is only needed in the hot water tank to run a short high temperature disinfection cycle weekly, to prevent any risk of Legionella, and as a back-up option.

ASHPs cost much more to install than gas boilers. A grant would reduce the additional cost; see Grants section. House buyers may value an ASHP having been installed, as well as better energy performance from enhanced insulation.

WOULD A GROUND SOURCE HEAT PUMP (GSHP) BE AN OPTION?

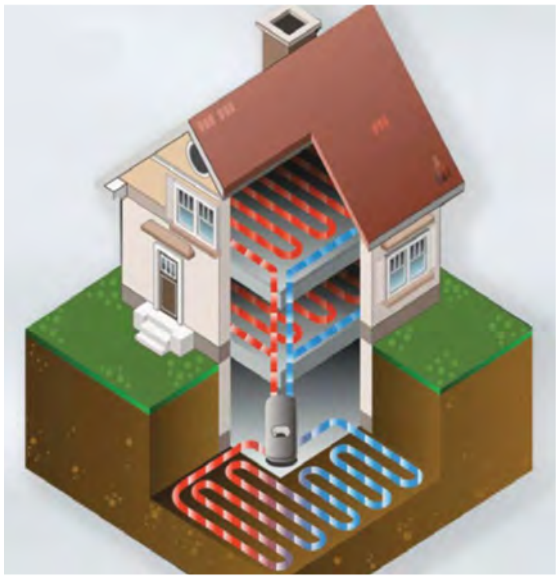
A GSHP draws heat from the ground instead of the air, either through tubes laid horizontally in loops buried about a metre below the surface, or tubes in one or more bore holes drilled vertically downwards. For a large house this could be 300 m long horizontal loops, or 3 bore holes each 100 metres deep.

The equipment requires more space than for a ASHP but will make no hum outdoors and last longer.

GSHPs are not suitable for most smaller houses because of the space required to lay the tubing or drill a bore hole.

A vertical borehole might be possible in a medium-sized garden or driveway though only where there is at least 1.5 m wide access for a drilling rig.

GSHPs are more expensive to install than an ASHP, though grants for GSHPs can be larger.



DIRECT ELECTRIC HEATING SYSTEMS

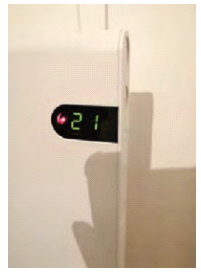
Electricity powers the most common forms of low carbon space and water heating. In the UK much electrical power comes from renewable sources such as solar, wind and biomass. As such energy generation becomes more efficient, and energy providers compete, choosing 100% renewable electricity becomes easier.

Many hot water tanks that provide domestic hot water (DHW) have an electric immersion heating element, though this can be an expensive way to heat DHW for taps unless controlled carefully. There is no grant for direct electric heating systems.

Let's consider a) modern electric heaters/panels for space heating which could typically be combined with an immersion heater to heat a domestic hot water tank, then b) look at electric boiler options which provide DHW from a hot water tank and space heating through conventional wet radiators.

ELECTRIC HEATERS AND PANELS

Storage heaters heat brick-like material during the night. They discharge the heat during the day. This uses low-cost electricity at night e.g. Economy 7. The discharge of that heat through the day can be set to fast or slow. New thermostatic controls provide a controllable flow of heat during the day. Daytime electricity is charged at a higher daytime rate. Installation costs are far less than for a heat pump and you won't need to install pipes and radiators. However running costs will be higher than for heat pumps.



Radiant panels use an element to heat the air. This warms a room quickly by convection and by radiation. They are fairly cheap to install and are only turned on when needed. They are more expensive to run than heat pumps.

Oil-filled radiators are a middle ground. The oil heats and cools quicker than storage heaters. They are cheaper to run compared to radiant panels, though still more expensive than heat pumps.

Infrared panels emit infrared (IR) radiation, like the sun does, to warm our skin. We feel the warmth directly from a panel or re-radiated from nearby objects, walls etc which heat the air. IR panels are relatively low power and affordable.

As for other heating options, you should carefully assess effectiveness and costs.

ELECTRIC BOILERS OR ELECTRIC COMBI BOILERS

Electric boilers can replace a gas or oil boiler to heat a hot water tank for domestic hot water and to provide space heating.

Electric combi boilers or flow boilers, heat water on demand, which may suit small/medium homes. A combi/flow boiler is compact and cheap to install and service. It does not need a hot water tank for DHW. It may not supply an adequate flow for large homes.

Electric boiler and electric combi/flow boilers are relatively cheap to install and maintain, though more expensive to run, than a gas boiler or a heat pump.

BIOMASS (WOOD AND WOOD PELLETS)

Some homes have a wood burning stove for heating specific rooms. Biomass boilers are a large version of a stove with a back boiler.

They burn logs, woodchip or pellets to provide heat through a wet radiator system and also domestic hot water throughout a house. The size of the equipment and fuel storage make them impractical for many homes.

Provision of a suitably large flue (chimney) and regular maintenance of biomass boilers, will be designed to improve the efficiency and control the emission of particulates.

Grants should be available, though the grants may favour heat pumps where they can be fitted.

SOLAR THERMAL AND SOLAR PV PANELS

SOLAR THERMAL PANELS

Solar thermal panels transfer heat from daylight to provide some hot water in the home. They need large hot water tanks and rarely provide enough energy to heat a home in winter, though they can supplement the heating of domestic hot water from a heat pump.

SOLAR PHOTOVOLTAIC (PV) PANELS

Solar PV panels generate electricity, not heat. They do not provide enough electricity to fully power a heat pump or a direct electric heating system.

Solar PV panels can supplement the electricity used to heat domestic hot water in a hot water tank. A solar diverter can be installed which uses excess electricity to power an immersion heater to heat hot water in your tank. This electricity would otherwise be exported to the grid. This can be cost-effective, though it does need a hot water tank with an immersion heating element. You can also now install batteries to store excess electricity - to provide some domestic hot water heating at night and to power other appliances.

KEY RESULTS FROM THE FIVE HOMES SURVEYED

This section summarizes the recommendations given to five different householders in Alton on how best to:

- reduce their heating energy costs
- reduce their carbon emissions
- take advantage of grants currently available.

OBSERVATIONS FROM THE FIVE HOMES SURVEYED

The five homes are typical in size, age and original design to the majority of homes in Alton. Over time homes and families change. The recommendations for similar housing types could differ depending on house upgrades and the heating demand from the occupants.

When considering what you can take from the following advice to different householders, please note:

- Heat pumps are viable in many homes in Alton. They can cut carbon emissions, especially if the electricity used is from 100% renewable sources. They are currently much more expensive to install than gas central heating - approximate price ranges are suggested in the Appendix. Prices of heat pumps should reduce as sales increase and more installers compete. Grants make them more affordable - see Grants section.
- Government grants via the Boiler Upgrade Scheme (BUS) reduce the cost of a typical Air Source Heat Pump installation by £5,000. The BUS runs to 2025 - see Grants section.
- Improving home insulation is very beneficial to reduce the cost of clean heat options. Heat pumps work at lower temperatures (around 45°C compared to 65°C) so it is helpful to reduce heat loss through walls, ceiling, floors, windows and doors as far as possible.
- Comparing different systems depends on the price of energy now and in the future. Today 100% renewable electricity is slightly more expensive than electricity generated from a mix of sources including fossil fuels. If the cost of fossil fuels rises in the future, then the relative cost of clean heat options powered by electricity - which will increasingly be generated from renewable sources - will become more attractive.
- As 100% renewable electricity becomes cheaper, direct electric heating may be a low carbon option to consider. This is especially so for flats or terraced houses where a heat pump may not be viable, provided the running costs can be afforded in the long term.

POINTS TO NOTE WHEN READING THE FOLLOWING RECOMMENDATIONS FOR THE FIVE HOUSEHOLDERS

- Prices quoted are industry averages for Spring 2021 and are a guide only. Always obtain competitive quotations from suppliers before starting on an installation.
- Running costs and expected savings are based on typical Spring 2021 tariff values of 15p/kWh for electricity and 4.2p/kWh for gas. To consider the effect of the current significantly higher energy tariffs, the savings expected for insulation would be proportionately higher. Comparing the potential costs of electric heating with the costs of gas central heating is unfortunately not straightforward.
- The grant used to reduce the capital cost was the Renewable Heat Incentive, which ceased in March 2022. See Grants section for the current grants.
- Surveys used RdSAP, a widely used method of assessing the energy performance of existing dwellings; the same method is used to generate Energy Performance Certificates.
- We have not included installation costs in all examples of installations because conditions vary. Again, please obtain your own quotations from suppliers
- The figures shown for reductions in carbon emissions relate to emissions from heating and hot water. The average household carbon emissions for heating a typical 3 bed house in the UK, using gas and electricity is 2.7 tonnes each year (2017). [energysavingtrust.org.uk/significant-changes-are-coming-uk-heating-market]

PROPERTY 1

TWO BEDROOM SECOND FLOOR FLAT IN YORK MEWS

A two-bedroom, top floor flat (built 1980s), uninsulated, apart from 75mm of loft insulation. Space and hot water heating is provided by direct electric devices.

BUILDING FABRIC IMPROVEMENTS:

- Increase mineral wool loft insulation to a depth of 270mm
- Install wall insulation to internal walls to a depth of 100mm by a professional installer to meet building regulations for fire safety.

HEATING & DHW SYSTEM IMPROVEMENTS:

The lowest capital cost and potentially the lowest 20-year cost option would be to replace the direct heaters in the single flat with high retention night storage heaters and to insulate the existing DHW cylinder

A second option at this property is to retrofit an ASHP system to serve the flat. This option while being more expensive does offer the most significant carbon reduction.

An ASHP could be installed for all the flats in the block though buy-in would be required from all leaseholders who would all need to agree to the shared investment.

Home improvement	Feasible	Proposed	Capital Cost after grant	Annual running cost saving	Payback years	Annual CO2 saving, tonnes
Loft insulation (270mm mineral wool)	✓	✓	£760	£140	5.4	0.46
Internal wall insulation (100mm PIR)	✓	✓	£3,000	£800	3.8	2.77
High retention night storage heaters	✓	✓	£3,850	£443	8.7	0
DHW cylinder insulation	✓	✓	£30	£37	0.8	0.26
Communal ASHP for block – costs & benefits to a typical householder	✓	✓	£15,170	£760	20	1.13

PROPERTY 2

FOUR BEDROOM DETACHED HOUSE OFF GREENFIELDS AVENUE

The property is a four-bedroom, detached house originally built in 1974. Since then, double glazing, cavity wall insulation and 270mm loft insulation has been installed, improving the property's thermal performance; as well as solar PV. A modern combi gas system boiler provides both space and domestic hot water heating.

BUILDING FABRIC IMPROVEMENTS:

Building Fabric has been improved to good level. Further improvements would offer diminishing returns

HEATING & DHW SYSTEM IMPROVEMENTS:

This is an energy efficient house. The alternative to keeping the existing gas boiler is to retrofit an ASHP 'split' system; an external unit at the end of the garden, an internal unit and adding a hot water cylinder. A room-by- room study would also ensure radiators were sized appropriately for the lower running temperature of the ASHP.

SOLAR TECHNOLOGY

The suitable roof space of this property has already been filled with solar PV, additional solar PV or solar thermal panels are therefore not feasible

A solar diverter controller would allow excess solar generation to displace gas or reduce the load on an ASHP to heat water, saving around £90 annually.

Home Improvement	Feasible	Recommended	Capital cost after grant	Annual running cost saving	Payback years	Annual CO2 saving, tonnes
Further building fabric improvements	✓	✗				
ASHP	✓	✓	£6,620*	£80	82	2.53
Solar Diverter Immersion Control	✓	✓	£400	£90	4.4	0.091
Solar Thermal	✗	✗	Recommend by RDSAP output but no suitable roof space available			

PROPERTY 3

THREE BEDROOM TERRACED HOUSE ON BUTTS ROAD

A three-bedroom terraced house built around 1860 with solid walls to the front with an extension added in 2019 at the back, without deep loft insulation. Space and domestic hot water heating are provided by a modern gas combi boiler.

BUILDING FABRIC IMPROVEMENTS:

- Add 270mm deep mineral wool loft insulation
- Retrofit double glazed front windows
- Add draught exclusion to the front

Adding internal wall insulation to just the solid front wall is possible but would not significantly reduce energy demand.

HEATING & DHW SYSTEM IMPROVEMENTS:

The best alternative to keeping the existing gas boiler is to retrofit an ASHP 'monobloc' system; an external unit in the garden and adding a hot water cylinder – a close fit under stairs. The running cost will be higher than the current gas heating by approximately £290 per annum. A room-by-room study would also ensure radiators were sized appropriately for the lower running temperature of the ASHP.

SOLAR TECHNOLOGY

Solar PV panels could be fitted. A solar diverter is then an option if an ASHP is installed since the ASHP and the solar diverter would need a DHW tank.

Installing solar thermal panels would not be preferable to PV panels.

Technology	Feasible	Recommended	Capital cost after grant	Annual running cost saving	Payback years	Annual CO2 saving, tonnes
Internal wall insulation	✓	✗	£800	£14	57	0.072
Loft insulation (270 mm)	✓	✓	£400	£110	3.6	0.57
Double glazing	✓	✓	£1,800	£30	60	0.72
ASHP	✓	✓	£5,110 + radiators	-£290	None	1.08
Solar thermal	✓	✗	£2,800	£26	108	0.013
2.1 kWp Solar PV	✓	✓	£4,800	£280	17	0.258

PROPERTY 4

THREE BEDROOM SEMI-DETACHED HOUSE

A three bed, semi-detached house built in the early 1900s extended at the rear in 1980. The windows are double glazed, the original cavity walls are insulated. Space and domestic hot water heating are provided by a modern gas combi boiler. A wood burning stove has been installed.

BUILDING FABRIC IMPROVEMENTS:

- Install loft insulation to a depth of 270mm is recommended, this is a very cost- effective improvement.
- 90mm PIR (rigid thermal) Solid floor insulation is recommended, either by taking up the existing slab or installing over the top.

HEATING & DHW SYSTEM IMPROVEMENTS AND SOLAR TECHNOLOGY:

The best alternative to keeping the existing gas boiler is to retrofit an ASHP 'monobloc' system; an external unit outside the kitchen and adding a hot water cylinder – this would be a close fit under the stairs. A room- by-room study would also ensure radiators were sized appropriately.

The ASHP is more expensive option but reduces CO2 emissions. Running costs would be approx. £10 p.a. more to run than the current gas heating.

Given a hot water cylinder, 6 PV panels (2.1kWp) could be fitted, with a solar diverter. Installing solar thermal panels would not be preferable in terms of payback.

Technology	Feasible	Recommended	Capital cost after grant	Annual running cost saving	Payback years	Annual CO2 saving, tonnes
Solid floor insulation	✓	✓	£1550	£43	36	0.25
Loft insulation (270 mm)	✓	✓	£350	£25	14	0.146
ASHP	✓	✓	£8,190 + radiators	-£10	None	2.35
Solar thermal	✓	✗	£2,800	£28	100	0.14
2.1 kW Solar PV	✓	✓	£4,800	£210	23	0.194

PROPERTY

5

THREE BEDROOM SEMI-DETACHED BUNGALOW

A three-bedroom semi-detached bungalow built in 1972, without cavity wall insulation and with only 150mm loft insulation. Space and domestic hot water heating are provided by an oil boiler installed in 2004 with a hot water cylinder.

BUILDING FABRIC IMPROVEMENTS:

- Install cavity wall
- Increase loft insulation to a depth of 270mm
- Insulate the floor to a depth of 50mm

HEATING & DHW SYSTEM IMPROVEMENTS:

The best alternative to an oil boiler is to replace it with an ASHP 'monobloc' system and an external unit under the kitchen window. As well as replacing the hot water cylinder radiators would need to be upgraded to operate at the lower running temperature of the ASHP.

OTHER MEASURES

Solar PV is an option but because of the limited roof space only 2.1KWp is possible

Solar thermal would not be a better solution than ASHP with or without Solar PV.

Install LED lighting.

Technology	Feasible	Recommended	Capital cost after grant	Annual running cost saving	Payback years	Annual CO2 saving, tonnes
Cavity wall insulation	✓	✓	£300	£50	6	0.24
Loft insulation (270 mm)	✓	✓	£400	£24	17	0.115
Suspended floor insulation	✓	✓	£885	£70	12	0.335
ASHP	✓	✓	£8,170 + radiators	£200	40.9	2.66
Solar thermal	✓	✗	£1,700	£45	37.8	0.026
LED lighting	✓	✓	£48	£26		0.024

BUILDING FABRIC IMPROVEMENTS
(LOFT, WALLS, FLOORS, DOORS & WINDOWS)

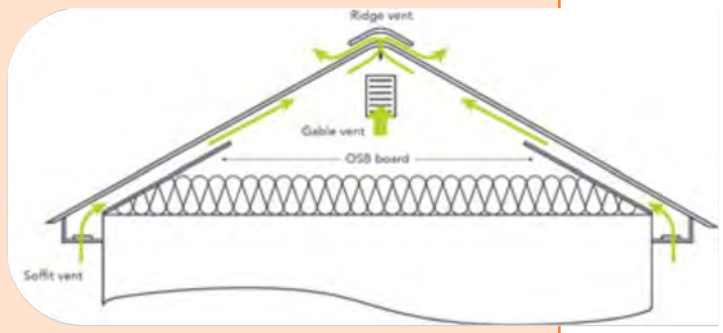
Once a home is well insulated, any heating system you are choosing can be smaller and so cheaper to buy and run. It often pays to insulate lofts, walls & floors, and replace old doors and windows.

Fabric improvements are particularly important when considering ground or air source heat pumps, as they operate most efficiently at low flow temperatures (35 – 45°C). To ensure comfort and efficiency, the heat emitters (radiators or underfloor heating) in each room must be able to meet the peak heat demand of the room using low flow temperatures.

LOFT INSULATION

Mineral wool loft insulation is a cheap and cost-effective improvement, often suitable for DIY installation. Aim to have a depth of about 270mm to ensure the best outcome. Layers should be laid at right angles to one another to reduce air flow between layers. There may be a small loss of loft space for storage, once loft boards are raised above the insulation supported on loft legs/stilts.

It is important to keep the loft space above the insulation well ventilated, cool and dry. This diagram shows how woodfibre (OSB) board or similar can be used to maintain effective ventilation to the loft space.



CAVITY WALL INSULATION

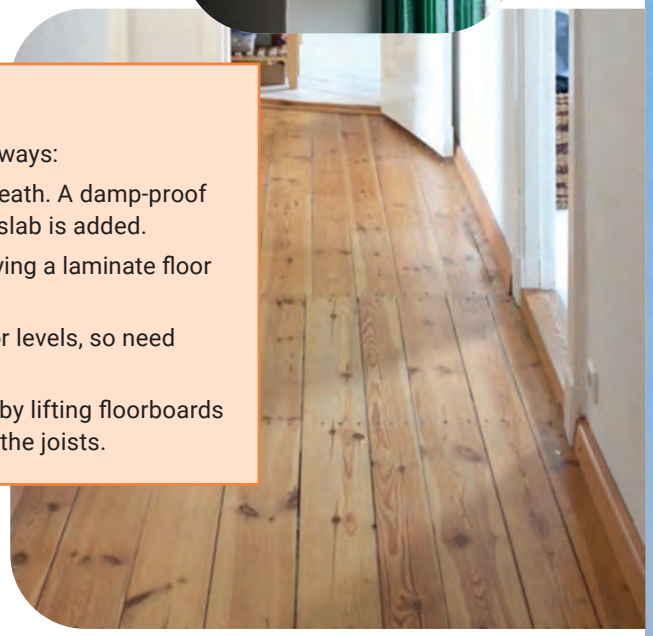
Homes built after 1980 will have insulation built into the walls. Homes built between 1920 and 1980 usually have a double wall built with an empty cavity between the inner and outer wall. This cavity can be filled with insulation which is not expensive. Installers will check there is no exposure to driving rain and the wall is sound with suitable provision for ventilation.

SOLID WALLS

Homes built before 1920 usually have a solid double wall with no cavity. To insulate these you need a thick layer of special plasterboard fitted to the outside or inside of the walls. Both require a professional install.

External wall insulation is most effective, is less disruptive, but costs more. There may be grants for this in the future.

Internal wall insulation is cheaper, but you lose room space and will have to redecorate. Pipes, radiators, windowsills, sockets etc may have to be re-set.



FLOOR INSULATION

Insulating a solid floor can be done in one of two ways:

1) Taking the floor slab up and excavating underneath. A damp-proof membrane, underfloor insulation and a concrete slab is added.

2) Installing board on top of the floor slab then laying a laminate floor on top. This is the least disruptive.

Both forms of solid floor insulation may raise floor levels, so need attention to doors, skirting boards, pipes etc.

Suspended floors (floorboards) can be insulated by lifting floorboards and suspending mineral wool in netting between the joists.

DOORS, WINDOWS AND FIREPLACES

Replace old and leaking double glazing.

Draughts make people feel cold. Draught exclusion is cheap, simple to install and should lead to cost savings.

Use sealer in gaps and cracks and use draught excluders for doors and loft hatches. You can buy special balloons (a 'chimney balloon') to reduce heat loss through a chimney above an open fireplace when not in use.

ELECTRICITY TARIFFS

Many energy providers now offer renewable energy tariffs. Some are 100% renewable, while others use a mix of renewable and non- renewable energy. You can also get nuclear- free or carbon-offsetting green tariffs, where suppliers pay towards environmental schemes reducing carbon emissions on your behalf.

Renewable electrical energy is from solar, wind, biomass or nuclear sources. 'Renewable' gas tariffs are achieved by carbon offsetting – paying towards carbon saving schemes where an additional amount of carbon emission is saved due to the payment. It is worth checking what sources your current energy provider uses.

More information is available here: **energyalton.org.uk/ energy-advice/ energy-tips/renewable-energy/ choosing-a-green-energy-tariff/**

Mainly suitable for direct electric heating e.g. storage heaters, an Economy 7 type electricity tariff may reduce costs as the price of off-peak electricity is reduced between certain times.

SUPPLY UPGRADES

Heat pumps / electric boilers require provision for typically 16-32 Amps / 50-100 Amps, additional electric current. Installing items requiring such additional current, needs approval from the Distribution Network Operator (SSE) and potential upgrades to the main fuse (owned by SSE) and meter connections owned by your supplier. Upgrades are straightforward and not expensive. SSE approval for upgrades follow the Electric Vehicle connection procedure: **www.ssen.co.uk/Connections/ EVconnections/**

NEXT STEPS FOR HOUSEHOLDERS

- **Get specific advice** - see **Where to get advice on clean heat alternatives** below
- **Identify any grants available to you** - see **Grants** on the next page
- **Obtain quotations for clean heat alternatives** - see the **List of some local installers**

WHERE TO GET ADVICE ON CLEAN HEAT ALTERNATIVES

Government Endorsed Advice is available from **www.simpleenergyadvice.org.uk**
You can compare clean heat options under 'Make Your Home Greener' and see the personalized advice under 'Plan Home Improvements' and 'Learn about home energy grants'.

You can also look up recommendations in your Energy Performance Certificate (EPC). To find your EPC online, see **www.gov.uk/find-energy-certificate**

The Environment Centre (tEC, Southampton) offers heating and insulation advice, also advice to make keeping warm affordable for homeowners in Hampshire. Tel 0800 804 8601. See links under 'Save Money' and 'Go Green' at **environmentcentre.com/advice-and-support**

Energy Alton offers free home energy surveys and thermal imaging surveys; see Energy Advice > Our Services at **energyalton.org.uk**

Also visit **energyalton.org.uk** for independent advice on how to lower your energy bills by

- reducing heat loss through walls, roof, windows and floors
- choosing suitable heating systems
- effective lighting
- avoiding damp, condensation and draughts.

Petersfield Area SuperHomes, is a non-profit service offering tailor-made, whole-home retrofit assessments. The assessments, developed by the National Energy Foundation, identify the best ways to insulate and heat your home. A retrofit assessment is a first step to lowering your home's carbon emissions and might lead to your home being rated by the National Energy Foundation as a SuperHome. Assessments will be at a discounted rate according to means. Further information is at **https://petersfieldcan.org/superhomes**

Local Energy Advice Partnership (LEAP) is a free service to help people keep warm and reduce their energy bills without costing them any money, especially those on low incomes, with health conditions or who are vulnerable. Visit **applyforleap.org.uk** or freephone 0800 0607567 (9:00-17:30 Mon-Fri).

Retrofit Assessors offer advice for a fee. They undertake a survey of your home, produce a detailed floor plan, a condition survey and occupancy assessment. This is based on nationally agreed standards (RdSAP data).

Search **www.trustmark.org.uk/find-a-tradesman** for 'Retrofit Assessors'.

Retrofit Coordinators will assess and then project manage a retrofit for a fee.

Search the Trustmark website as above.

GRANTS

THE ENVIRONMENT CENTRE (tEC, SOUTHAMPTON)

tEC offers advice on grants for homeowners. Tel 0800 804 8601 and see links under 'Save Money' and 'Go Green' at **environmentcentre.com/advice-and-support**

BOILER UPGRADE SCHEME

The Boiler Upgrade Scheme (BUS, formerly referred to as the Clean Heat Grant) is a government scheme administered by Ofgem helping existing domestic and small non-domestic properties change to low carbon heating systems. The Boiler Upgrade Scheme replaces the Renewable Heat Incentive (RHI) for systems commissioned from April 2022 and runs to April 2025.

The installer applies for the BUS grant; £5,000 off the cost and installation of an air source heat pump, £6,000 for a ground source heat pump. £5,000 for a biomass boiler will only be available in rural locations and in properties not connected to the gas grid.

Installers need to be MCS accredited and you need a valid Energy Performance Certificate (EPC) with no outstanding recommendations for loft or cavity wall insulation (unless an **insulation exemption** applies).

Further information on the BUS will be at **www.simpleenergyadvice.org.uk/grants**

ENERGY COMPANY OBLIGATION (ECO) - FOR INSULATION

EHDC ECO Flex funding pays for necessary insulation for those eligible (receiving benefits/low income/disability) in the EHDC area – see **www.easthants.gov.uk/energy-company-obligation-eco** .

Companies listed as installing installation at **www.easthants.gov.uk/eco-funding-external-organisations** offer a form to complete before installation to confirm eligibility. If you are eligible the company can then claim the cost of the installed insulation.

GRANTS CLOSING 2023 OR CLOSED

WARMER HOMES

The Warmer Homes scheme, can provide a range of fully-funded energy-efficiency and heating improvements for eligible households (owner occupiers and private rental tenants only) with household incomes under £30k or in receipt of a means-tested benefit, and with an Energy Performance Certificate (EPC) rating of D, E, F or G.
Funding is due to continue to March 2023, although it is available on a first come-first served basis, and there may be a waiting list.

Tel: 0800 038 5737 or see **www.warmerhomes.org.uk/programme**

DOMESTIC GREEN HOMES GRANT (GHG) – CLOSED SINCE MARCH 2021

Until March 2021 homeowners in England could apply for a voucher towards the cost of installing energy efficient and low-carbon heating improvements, typically up to £5,000 for up to two thirds of the cost of qualifying improvements.

DOMESTIC RENEWABLE HEAT INCENTIVE (RHI) - CLOSED SINCE 31 MARCH 2022

The RHI scheme is run by Ofgem. It offered a government subsidy for seven years from the installation of a clean heat system by an MCS accredited installer. Each system had a different tariff, including rate and payment cap, based on the likely installed cost. The rates are reviewed each quarter and then confirmed for the 7 years of the scheme. Quarterly payments increase in line with inflation.

www.ofgem.gov.uk/environmental-and-social-schemes/domestic-renewable-heat-incentive-domestic-rhi/applicants/

The Domestic RHI ended on 31 March 2022, replaced by the Boiler Upgrade Scheme.

LIST OF SOME LOCAL INSTALLERS

Information correct at August 2022

CHOOSING AN INSTALLER

Once you know what types of heating or insulation you are interested in, an internet search may help you find installers beyond those below. **Inclusion in this list is not a recommendation** - please note the disclaimer in the Introduction to this guide.

The Trustmark website may help to find installers, though currently many suitable suppliers are not listed at www.trustmark.org.uk/find-a-tradesperson

Ensure a heating installer is **Microgeneration Certification Scheme** (MCS) accredited (check their entry in the list at mcscertified.com/find-an-installer) so that you qualify for grant funding, confirm how any grant application would be made with an MCS certificate, and note how warranties and maintenance will be handled. Beyond an installer's warranty a manufacturer's warranty should cover manufacturing defects.

To provide a quotation for a heating system, installers should do a room-by-room heat loss assessment to size heating units and recommend any radiator and control upgrades. The assessment may also quantify benefits of enhancing insulation, to complement Energy Performance Certificate (EPC) recommendations.

After installation a heating system installer should show you the day-to-day operation and outline the maintenance requirements and maintenance services available, to complement their response to warranty issues for any defects in workmanship or materials within the first 12 months from handover.

Professional installers of insulation should follow a process to avoid any risk of condensation, damp or fire.

Name	Biomass	GSHPs	ASHPs	Solar thermal	Insulation	Other	Accreditation
ECS Plumbing & Heating Unit 9, The Stoneyard, Alton Lane, Four Marks, Hants GU34 5AJ 01420 571 000 www.ecsplumbing.co.uk	✓		✓			Servicing Underfloor heating	Trustmark **MCS** RECC* Gas SAFE
Green Square Guildford Eco Store, 22 High St, Bramley, Guildford, Surrey GU5 0HB 03333 707 707 www.greensquare.co.uk	✓	✓	✓	✓			Trustmark **MCS** RECC*
Source Heat Pumps Unit 3a Upton Park Farm Old Alresford, Hants SO24 9EB 0845 4597 204 www.sourceheatpumps.com		✓	✓				**MCS**
Hello Renewables 11 Florence Road Fleet, Hants GU52 6LG 01252 943135 www.hellorenewables.co.uk		✓	✓			Solar PV Battery Storage	Trustmark **MCS** RECC*
JEM Energy Centaur House, Ancells Bus' Pk, Ancells Rd, Fleet GU51 2UJ 01252 900 052 www.jem-energy.co.uk			✓	✓		Solar PV Battery Storage	Trustmark **MCS** F-Gas HIES
J K Heat Pumps Moushill Rough, Sandy Lane, Milford, Godalming, Surrey, GU8 5BL 01483 851501 www.facebook.com/jkhpsltd jkhps.co.uk			✓			Servicing	**(tbc)**
Design Heat Winchester 5 Bar End Rd, Winchester SO23 9NT 01926 867 564 www.designheat.co.uk		✓	✓			Servicing Underfloor heating	**MCS** OFTEC Gas SAFE

Name	Biomass	GSHPs	ASHPs	Solar thermal	Insulation	Other	Accreditation
Elite Renewables Unit 14 Redlands Centre, Cousldon, Surrey CR5 2HT 0208 706 0056 www.eliterenewables.co.uk		✓	✓	✓		Solar PV MVHR** Air Con. Architecture (PASSIVHAUS)	Trustmark **MCS** RECC* GSHPA Gas SAFE
A Greener Alternative Showroom: Hanger 4, Shoreham Airport, West Sussex, BN43 5FF 01273 455 695 www.agreeneralternative.co.uk	✓	✓	✓	✓		Servicing Underfloor heating	**MCS** HETAS OFTEC Gas SAFE HIES
H2ECO Unit 3a Glenmore Business Park, Holton Heath, Poole, Dorset BH16 6NL 01202 918 486 https://h2-eco.com			✓	✓			Trustmark **MCS** RECC*
SA Energy Fareham Innovation Centre Unit 3 Meteor Way Fareham PO13 9FU 01329 595283 www.sa-energy.co.uk		✓				Solar PV Battery Storage	**MCS** RECC*
South Coast Insulation Services Unit 12A, IO Centre, Stephenson Road, Segensworth, Fareham, Hants PO15 5RU 01329 822 845 scisltd.co.uk					Cavity wall insulation Internal & external wall insul'n Loft insulation		Trustmark
InstaGroup Insta House, Ivanhoe Road, Hogwood Business Park, Finchampstead, Wokingham, Berks RG40 4PZ 0800 526 023 www.instagroup.co.uk					Cavity wall insulation Internal & external wall insulation		Trustmark SWIG CIGA Membersof the NIA, REA
Stamfield Property Services 14a Sheeplands Farm, Twyford Rd, Wargrave, Berks RG10 8DL 0800 567 7805 www.stamfieldpropertyservices.com					Cavity wall insulation Internal & external wall insulation		
The Warmer Group 17 Haviland Road, Ferndown Industrial Estate, Wimborne, Dorset BH21 7RZ 0800 716 846 www.thewarmergroup.co.uk					Cavity wall insulation Loft insulation		Trustmark CIGA KIWA

* Renewable Energy Consumer Code (RECC) Members are found at www.recc.org.uk/scheme/members

** MVHR = Mechanical Ventilation and Heat Recovery

APPENDICES - INSULATION & HEATING OPTIONS COMPARED

APPENDIX 1 FABRIC FIRST - REDUCING THE ENERGY TO BE USED FOR HEATING

Choosing alternatives to fossil fuel heating should be complemented by a fabric first approach, seeking to reduce heat lost from the building through windows, doors, walls, floors and ceilings. Reducing heat loss through insulation and minimising drafts will reduce the electricity or biofuel required, minimise the size/cost of installing a new heating system and reduce running costs and carbon impacts.

Potential for reducing heat energy input should be found from an Energy Performance Certificate (EPC) or similar energy survey. Energy Alton offers free Home Energy Surveys. These can suggest which insulation measures such as the following could be applied and ways to reduce draughts. Typical costs and savings will be included in a recent EPC. EPCs can be viewed at **https://find-energy-certificate.digital.communities.gov.uk/find-a-certificate/search-by-postcode?lang=/&property_type=domestic**

A specialist survey would be required to confirm the costs and benefits of external or internal wall insulation – see the List of some local installers above.

Energy Alton 'Energy tips' on insulation are available at **energyalton.org.uk/energy-advice/energy-tips/insulation/**

INSULATION

Option	Suitability	Aspects of feasibility	Typical price*	Comments
Loft Insulation	For well ventilated lofts with no damp or condensation problems. Any loft boards need to be raised on legs.	Easy to fit (DIY) using rolls of mineral wool insulation up to the required 270 mm depth. Loft legs enable boards to be re-fitted over this depth of insulation.	£500 to £1000 (Example £25 per 5.6m roll)	Ensure good ventilation to avoid condensation. [Energy Alton web Tip]
Cavity Wall Insulation	Most 1920s-70s homes have cavity walls; many are already filled.	Installers inspect the cavities first to ensure the fibre or beads will spread when injected from the outside.	£1,000 to £5,000	Resolve any damp issue first. [Energy Alton web Tip]
Internal Wall Insulation	Suits solid walls without existing penetrating or rising damp. Useful savings from thicknesses of 100 mm. Some floor area lost.	Need to re-attach internal fittings e.g. skirting, sockets and re-decorate. Breathable insulation or a vapour barrier avoids condensation on cold walls. Professional installation will ensure fire safety.	£8,000 to £11,000 (Approx £60/m2)	Check installation is covered by a SWIGA 25 year guarantee / similar. [Energy Alton web Tip]
External Wall Insulation	Suits solid walls with good access.	May need planning permission.	£10,000 to £17,000	Check guarantee cover. [Energy Alton web Tip]
Underfloor Insulation	Suitable for suspended timber floors.	Unless using a robot sprayer, floorboards are lifted, mineral wool is suspended in nets between joists.	Wool £2,000 to £5,000 Spray £4,000 to £7,000	
Solid Floor Insulation	Suitable where i) a concrete slab can be re-laid over insulation, or ii) where insulation is laid on top.	i) Floor taken up, excavated, damp-proof membrane laid, 90mm of PIR insulation, topped with a concrete slab. ii) PIR insulation laid on slab, new flooring on top	£2,000 to £10,000	For new flooring on top of insulation, check the effect of a raised level.

Typical Prices for insulation are suggested here partly from referring to https://energysavingtrust.org.uk/energy-at-home/reducing-home-heat-loss/

Prices from installers are likely to vary according to supply conditions and specific installation requirements - it is advisable to seek a range of quotations.

APPENDIX 2 COMPARING HEAT PUMPS AND DIRECT ELECTRIC SPACE & WATER HEATING

HEAT PUMPS

Option	Space / DHW htg	Space needed	Other aspects of feasibility	Ease of use	Grant eligibility	Note on emissions
Air to water heat pump Typical price*: £8k (8kW) to £9k (12kW) + cylinder £1k +radiators £2k - £5k Life*: 17 yrs	Space heating & DHW	Outside space with good air flow, with a connection from the external unit to HW cylinder through a wall or buried pipe.	A suitable (new) hot water cylinder with an immersion element. Expansion vessels or header tanks are also needed. Efficient models operate at low radiator temperatures, typically requiring an upgrade to older radiators and/or (new) underfloor heating. External space is needed > 1m from the boundary, where a low fan noise would not be a nuisance.	Normal. Though heating less intensively the pump is set to run for longer so heat levels are more stable.	Boiler Upgrade Scheme	Carbon emissions come from any non-renewable electricity used. 'Refrigerant' will be contained at end-of-life.
Ground to water heat pump Typical price*: £12k (8kW) to £13k (12kW) + cylinder £1k +radiators £2k - £5k Life*: 22 yrs	Space heating & DHW	Large (garden) area for laying a horizontal ground loop or access (1.5+ m wide) for drilling a vertical bore hole.	New hot water cylinder integrated with or additional to a heat pump buffer cylinder. The length of horizontal or vertical ground loop depends on the amount of heat needed. If space is limited, a vertical borehole can be drilled if ground conditions suit, typically 90–160 m deep. Expert advice is required to confirm the suitability for drilling a bore hole - typical cost £12-14k. GSHPs particularly suit underfloor heating if feasible.	Normal. Though heating less intensively the pump is set to run for longer so heat levels are more stable.	Boiler Upgrade Scheme	Carbon emissions come from any non-renewable electricity used to run the heat pump. 'Refrigerant' will be contained at end-of-life.

DIRECT ELECTRIC HEATING

Option	Space / DHW htg	Space needed	Other aspects of feasibility	Ease of use	Grant eligibility	Note on emissions
Storage heaters Typical price*: £10k - £15k +wiring £5k Life*: 15 yrs	Space Heating only. Separate DHW system needed.	Deep radiator spaces on internal walls	A suitable current supply needs to be connected to each storage heater location. Metering needs to separate readings for Econ 7 or similar tariff so night-time input is priced lower.	Control of charging & slow release of stored heat is basic.	(None)	Carbon emissions come from any non-renewable electricity used.
Radiant panels Typical price*: £3k to £5k +wiring £4k Life*: 15 yrs	Space Heating only. Separate DHW system needed.	Suitable internal wall spaces for radiation and convection.	Suitable mains electricity connections need to be made to each radiant panel location.	Panels suit quick control to quickly respond to needs.	(None)	Carbon emissions come from any non-renewable electricity used.
Infrared panels Typical price: ? (No data) Expected life: ?	Space Heating only. Separate DHW system needed.	Suitable internal wall or ceiling spaces for a radiant effect.	The suitability of IR panels which heat people & walls/floors (cf. sun), not air like other systems, needs confirmation. Wiring to each infrared panel location can be straightforward.	Panels can be controlled to quickly respond to needs.	(None)	Carbon emissions come from any non-renewable electricity used.
Electric combi boiler Typical price: ? (No data) Life: ?	Space Heating and DHW	Compact – can replace an existing gas combi boiler.	No flue required. No hot water tank is required. Suitable current electric supply needs to be connected to the electric combi boiler.	Normal timed heating. DHW on demand.	(None)	Carbon emissions come from any non-renewable electricity.

* 2020 Heat Pump and Direct Electric Heating price and expected life data from CCC Supporting Research 'Assumptions Log – Development of trajectories for residential heat decarbonisation to inform the Sixth Carbon Budget (Element Energy)'[**www.theccc.org.uk/publication/development-of-trajectories-for-residential-heat-decarbonisation-to-inform-the-sixth-carbon-budget-element-energy/**]

Prices from installers are likely to vary according to supply conditions and specific installation requirements - it is advisable to seek a range of quotations.

For further information please go to the Clean Heat Alton Project web page at

www.energyalton.org.uk/clean-heat

or contact us at

www.energyalton.org.uk/contact and **07811 462 659**

Energy Alton

See our website **www.energyalton.org.uk** for information about events, other projects, to sign up for our newsletter or for an energy survey.