



CLASP

Cumbria Factsheet | Heat Pumps

An introduction to Heat Pumps

What are Heat Pumps?

Heat pumps absorb ambient heat from the environment and then increase and transfer that heat to the water (or air) circulating in your property’s heat distribution system. They do this in the same manner that a fridge extracts heat from its inside. Although the heat source they use is renewable; electricity is required to operate the pump. There are three types of heat pumps:

- **Ground Source** which absorb heat from the earth and involves the installation of a fridge sized unit inside your building and underground pipe work;
- **Air Source** which absorb heat from the external air and need an external floor space of 2m x 2m;
- **Water Source** heat pumps which absorb heat from water in a lake or river and involves the installation of a fridge sized unit inside your building and pipe work to the water source.

Heat pump heating systems work differently from ‘conventional’ central heating systems, generating lower heating temperatures (35-55°C). The systems are therefore more suited to connection to under floor heating systems or ‘low’ temperature radiators, and operated over a longer period of time. To ensure the system operates efficiently it is necessary to ensure the property is well insulated, double glazed and draught proofed. Without these measures it may be necessary to install a top up heating system for periods that are particularly cold. Heat pumps can also be used in air heating distribution systems and to pre-heat water before it enters the hot water heating system or to heat swimming pools. Ground source heat pumps need a large area to bury the collector pipes: potentially between 100 - 200m² if the pipes are laid horizontally; or 10m by 12m square for pipes to be installed vertically in deep boreholes. The boreholes can be anything between 15m to 120m deep.

Why should I install the technology?

Heat pumps can save money and reduce carbon emissions. A typical ground source heat pump system could cost from £9,000 to £17,000 to buy and install, and an air source heat pump £6,000 to £10,000, excluding the heat distribution system. Likely savings will vary depending on the type of heat pump installed and the fuel type it is replacing. Typical savings are detailed below.

Typical Ground Source Heat Pump System – 3 bedroom semi-detached house			
		Typical	Good
Typical savings per year	Replacing gas usage	£40	£70
	Replacing electricity	£420	£530
	Replacing Oil	£50	£160
	Replacing coal	£260	£370
Typical Air Source Heat Pump System – 3 bedroom semi-detached house			
		Typical	Good
Typical savings per year	Replacing gas usage	£130	£70
	Replacing electricity	£330	£530
	Replacing Oil	£40	£160
	Replacing coal	£175	£370

Source: Energy Saving Trust 2010

The Government is encouraging installation of this technology through offering a Renewable Heat Incentive (RHI). This is only available if you purchase [Microgeneration Certification Scheme](#) (MCS)

accredited equipment, and it is installed by an accredited MCS installer. The RHI is due to be introduced in 2011 in two phases. Further information is available from the [Energy Saving Trust](#) and [Department for Energy and Climate Change](#).

From 2012 the Government's proposed 'Green Deal' will provide householders and businesses loans for energy efficiency works, repayable through savings on energy bills, with additional help available for vulnerable people and buildings requiring extensive works. For more information visit www.decc.gov.uk

What permissions do I need?

Planning Permission

- Planning permission is required for all non domestic heat pump installations.
- Domestic installation of ground and water source heat pumps do not usually require planning permission and should fall within permitted development rights.
- Permitted development rights in relation to ground and water source heat pumps do extend to Listed Buildings; however, listed building consent is likely to be required. Pre-application consultation with the Local Planning Authority (LPA) is advised.
- Planning permission is required for all air source heat pump installations. Information would be required regarding noise and visual impacts to ensure that the amenity of nearby residents and businesses are not adversely impacted upon. Consider locating your air source heat pump to avoid reverberations from walls, proximity to windows and minimise its' visual aspects, by ensuring the chosen site is not prominent.

Building Control

Building regulations approval may be required depending upon the extent of the work being undertaken and the status of your contractor. Certain types of building work can be self-certificated as compliant with building regulations by a member of a Competent Person Scheme without the need to notify a Building Control Body.

Other

The Environment Agency should be consulted if an open loop system is planned for ground and water source heat pumps as water will be extracted, and returned to the ground. Such activity is subject to licensing.

Is this the correct option for my home/business? What to do next?

- Try and identify how much energy you use for space heating each year.
- Ensure that your property is well insulated to make the most of the heat pump's efficiency; this may include wall, floor and loft insulation, double glazing and draft proofing.
- Consider re-designing your heating system incorporating under floor heating and 'low' temperature radiators.
- Ensure that there is room for the heat pump unit.
- Get quotes from [REAL Assurance Scheme](#) registered installers. If you wish to be eligible for RHIs, make sure your supplier and equipment is [MCS accredited](#).
- Ask for an estimate of the amount of energy generation your heat pump will produce in writing from your installer as well as a quote for the works before you sign a contract to install the equipment.
- Contact your local planning and building control departments to see if you need planning permission.
- Check if your property insurance will cover the heat pump.
- Consider changing to a renewable energy supplier to minimise the environmental impact of the system.
- Get the system installed and start saving both money and carbon!

What should I ask my supplier?

- About the compatibility of your current heating method with the proposed heat pump system. If you wish the heat pump to generate hot water, talk with your installer to fully understand what impact this will have on the heat pump's efficiency and savings.

- Whether they will apply for planning permission, if needed and if any of the installation needs to be inspected by building control.
- Where will the new wiring and plumbing run and how that affects those rooms.
- What maintenance will be required.
- The life expectancy and warranty of the system, its parts and the installer's workmanship.
- About the arrangements needed for installation. i.e. access for any digging machinery required, will there be any disruption to you electricity and water supply and for how long.
- About the controls – you need to understand how they work, so you can use the system effectively.

Case Study 1 – Domestic Ground Source Heat Pump, Kings Meaburn

A Viessmann-Vitocal 300 ground source heat pump was installed in a converted three bedroom stone bank barn. It's ground loop consists of 7 loops of 50m each.

The conversion included high levels of insulation, underfloor heating, mechanical heat recovery ventilation system and solar hot water panels.

The heat pump serves both the space heating and hot water needs. It is low maintenance and the wood burner in the living room is rarely used to top up the space heating.

As this installation is 5-6 years old it is not eligible for RHI.



Case Study 2 – Fell View School, Caldbeck Air Source Heat Pump

(courtesy of Encompas Ltd, Carlisle)

The school, set in a beautiful rural location, has no mains gas supply and insufficient space to accommodate additional oil storage tanks.

Underfloor heating linked to an 8kW NIBE air source heat pump was installed in the School's Sure Start Centre.

Case Study 3 – Water Source Heat Pump – Holiday Cottage on Loweswater

(courtesy of Artic Air, Ltd, Whitehaven)

In 2009, two adjacent traditional Lakeland cottages had Dimplex 11KW heat pumps installed, linked to a closed water loop system laid in the nearby Loweswater.

The cottages use standard radiators to distribute the heat.

Visit case studies like this during the annual [Cumbria Green Build Festival](#).

For case study information from across the North West visit the Climate Change North West online map. <http://www.climatechangenorthwest.co.uk/northwest-map.html>

Where can I find out more information?

Energy Saving Trust 0800 512 012 www.energysavingtrust.org.uk	Microgeneration Certification Scheme www.microgenerationcertification.org	Department for Energy and Climate Change www.decc.gov.uk
Centre for Alternative Technology 01654 705989 www.info.cat.org.uk	Cumbria Action for Sustainability 01768 210276 www.cumbriagreenbuild.org.uk	REAL Assurance Scheme www.realassurance.org.uk



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Cumbria Action for Sustainability. Registered Charity 1123155 Company No: 6492907

Registered Office: The Office, Mardale Rd, Penrith, CA11 9EH. Tel. 01768 210276 Email. office@cafs.org.uk

Please note: the information provided in this factsheet is guidance only, for use at the client's discretion. We in no way guarantee that should the information be acted upon, that planning permission would be granted or refused. It is recommended that you consult with your local planning authority to ensure that local planning requirements are fully addressed prior to any renewable energy installation