



# GR Edwardes Ltd

Electrical, Plumbing & **Renewable Energy**

## *Guide to Ground Source Heat Pumps*





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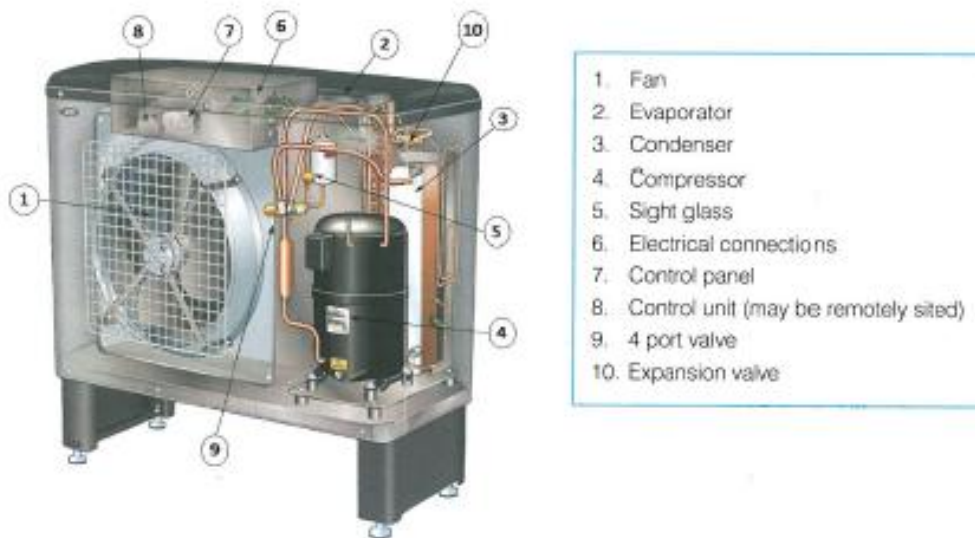
## **1. What is a Ground Source Heat Pump?**

A ground source heat pump system is made up of ground loops (a network of water pipes buried underground) and a heat pump at ground level. These ground loops extract heat from the ground which can be used to heat your home, heat your hot water or both.

## **2. How do heat pumps work?**

A ground source heat pump circulates a mixture of water and antifreeze around the ground loops, absorbs heat from the ground and then passes through a heat exchanger into the heat pump. The ground stays at a fairly constant temperature under the surface, so the heat pump can be used throughout the year – even in the middle of winter.

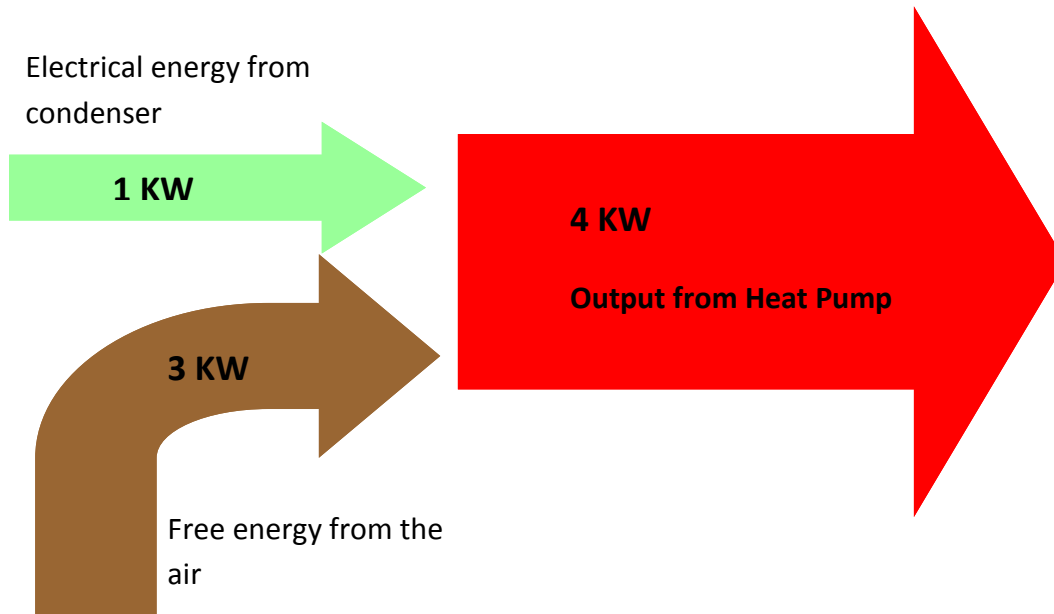
### **2.1 What is inside an Air Source Heat Pump?**



### **2.2 How is the heat generated?**

The central component of a heat pump is the compressor which is the hardest working component. This is usually driven by an electric motor, although gas engine driven compressors are also available. As heat is absorbed from the heat source the 'working' circulating fluid (refrigerant) evaporates changing from liquid to gas. This vapour is then compressed causing it to heat up. The heat from this process is absorbed via a 'heat exchanger' into your homes heating system which means the vapour loses its heat and condenses back into a liquid. This is then circulated through the heat source once more.

### 2.3 Heat Pump Efficiency



The diagram above shows the amount of energy needed to create a larger amount of heat energy. Heat pumps take free energy from the air and convert them to the heat distribution system.

### 3. What are the key benefits of heat pumps?

Heat pumps are already well established across Europe and are becoming more popular in the UK. As well as low running costs and reduced carbon dioxide emissions, heat pumps have other benefits:

- **Integration**- Heat pumps can be incorporated into many UK homes. They are more suited to newer highly insulated properties and are not always suitable for flats. Once installed and connected to the heating and hot water circuits they are fully automatic. Heat pumps are also easily integrated with solar hot water systems to provide a comprehensive heating and hot water system.
- **Versatility** - Water source heat pumps need a source of water such as a lake, river or stream and air source heat pumps simply need the outside air.
- **Fit & Forget**- Very little maintenance is required if a well designed heat pump system is installed properly. Equipment should operate automatically with very little noise.
- **Reliability**- Heat pump components have long life expectancies and high reliability. Life expectancy for the pump is around 20 years.
- **CoP**-Heat pumps give out more energy (heat) than they use (electricity), sometimes much more. If a heat pump has a 'coefficient of performance' (CoP) of four that means at a given point in time it is generating 4 units of its own heat for every unit of electrical energy used. However, the average system efficiency of the whole system over the year, including any top-up electricity for water heating will be less than the quoted CoP.

Heat pumps can be used to provide all the heating and hot water needs for your home, or they can be installed to provide only some of your home's heating and hot water to work alongside an additional heat source for example a boiler, electric immersion heater or wood stove for the coldest days.

#### **4. Is a heat pump suitable for my home?**

Heat pump systems can be integrated into most heating systems but will be more cost effective in some homes than others. Before installing a heat pump consider:

##### ***Energy efficiency first***

Heat pumps work most efficiently in a highly insulated building so ensure you improve the energy efficiency of your home before you install a heat pump.

##### ***Your current heating system***

Heat pumps are most likely to save money and carbon dioxide when they are used to replace electric, Oil, LPG or coal heating systems. Heat pumps work better with slow response, low temperature heating systems such as under-floor heating rather than conventional wet radiator systems. Low temperature heating systems work better in buildings with a high 'thermal mass'. If your home heats up and cools down quickly, a low temperature heating system is unlikely to provide the heating you require and a heat pump may not be the best option for your home.

##### ***Disruption & Mess***

Installing an air source heat pump will cause little disruption and mess to your home, installation is typically only 1-2 days.

##### ***Getting Connected***

Heat pumps need high electrical currents to start up. You will need to check (or we can on a site survey) that your electrical supply is up to the job. Some heat pumps are available with a 'soft start' option to minimise this effect. A heat pump is usually connected to its own breaker in the fuse board.

#### **5. Integrating with existing heating system**

Heat pumps are most efficient if they provide heat over a long period of time to a heating circuit that runs at a lower temperature (usually around 35-55°C) than conventional systems. To benefit from this lower temperature output your home will need to be reasonably 'air tight' and well insulated. (The energy saving trust can offer you free advice on how best to insulate your home as well as tell you about any grants available for energy efficiency measures).

Heat pump systems can be particularly effective when used to run under-floor heating. This will allow the pump to work at a consistent level over a period of time and to provide sufficient heat while operating at a lower temperature. If it is necessary you can use a secondary heating source to raise the temperature in some rooms such as the living room or even throughout your entire home. This can be done by using a conventional heating system or individual room heaters. A pellet wood stove or traditional log burner would do this without adding to your carbon foot print.

It is important that the heat pump is sized correctly and this is why we carry out all our own design work in house to give you peace of mind. Over or under sizing the heat pump can increase running costs and reduce operating efficiency. This will mean the pump may be prevented from operating continuously resulting in more intensive 'stop-start' heating which will in turn increase running costs.

## 6. Costs and Savings

The cost of a professionally installed heat pump will vary, a typical heat pump fully designed, installed and commissioned by G R Edwardes Ltd will cost between £4,000 and £7000.



The running cost of any heat pump will depend on several factors such as the size of the installation, insulation levels of the property and the heating pattern of the house. For a typical 3 bedroom semi-detached house with reasonable insulation levels, the annual cost of providing space and water heating would be around £640. This is based on current electricity prices and a standard tariff. Using an Economy 10 or Economy 7 tariff may give slightly lower running costs depending on the heating pattern, the control strategy and the thermal performance of the building.

At current fuel prices, these running costs are unlikely to deliver financial savings compared to most gas heated systems. Savings are much more favourable when replacing an oil, coal, LPG, or electric heating system, although the payback period may still be long in some cases.

We carry out all the design work and present a performance expectation of every system, which we compare with your existing energy bills to ensure that you achieve the maximum benefit.

## 7. The Renewable Heat Incentive (RHI)

In March 2011, the UK government announced the details of the Renewable Heat Incentive (RHI), which is the first of its kind in the world. The incentive is designed to provide financial support that encourages individuals, communities and businesses to switch from using fossil fuel for heating to renewables such as wood fuel and solar by paying householders or businesses for the heat that they produce through the use of renewable technologies such as air source heat pumps.

There are two phases to the introduction of the RHI:

**Phase 1:** Introduced Renewable Heat Premium Payments (RHPP) scheme to households and also introduced the RHI to non-domestic installations in the industrial, business and public sectors.

**Phase 2:** The domestic element of the RHI was introduced in 2014. Anybody who has had an eligible technology such as solar heating since 15<sup>th</sup> July 2009 will be eligible for the RHI.

## **8. The Renewable Heat Premium Payment**

The Renewable Heat Premium Payment (RHPP) scheme is a one off grant designed to help towards meeting the costs of installing renewable technologies in your home, until the Renewable Heat Incentive (RHI) is introduced for domestic customers.

An extension to the RHPP scheme was announced by the Department of Energy and Climate Change on 26th March 2013 and has been extended until the end of March 2014, ahead of the Renewable Heat Incentive (RHI) scheme for householders. There will also be a competition for registered social landlords to bid for funds to install renewable heat technologies.

### **Changes**

As part of the Department of Energy and Climate Change's desire to further support the growing market for domestic renewables, the Government has considered new data available on installation costs/recent feedback from industry and has decided to increase the voucher levels. For Air Source Heat Pumps this voucher is now £1,300.

You can apply for a RHPP voucher by simply visiting [www.energysavingtrust.org.uk/RHPP](http://www.energysavingtrust.org.uk/RHPP) and following the on screen instructions. To be eligible for the RHPP, new applicants from 20th May 2013 will be required to undertake a Green Deal Assessment before submitting a claim for payment for their voucher. The assessment is designed to help you, the consumer, choose the most appropriate new technology for your home and circumstances.

G R Edwardes Ltd will be able to arrange a Green Deal Assessment for you and will guide you through the process of claiming your RHPP. Please contact our office for further information.



## 9. Maintenance



Heat pump systems typically come with a 10 year manufacturer's warranty. You can expect them to operate for 20 years or more, however they do require regular scheduled maintenance. A yearly check by you and a more detailed check by G R Edwardes Ltd every 3 -5 years can ensure that any problems and inefficiencies are picked up and rectified before the warranty period runs out.

Any heat pump system installed by G R Edwardes Ltd will be left with a maintenance schedule detailing the checks that need to be made to ensure that the heat pump is working properly.

One of the yearly checks that you will be required to do is to check that the air inlet grill and evaporator are free of leaves or any other debris. Any plants that have grown near the heat pump will also need to be removed.

To prevent the heat pump from freezing in cold weather it has a 'crank case' heater to give the system a 'kick start' and anti-freeze is used within the distribution system for all pipe-work. The levels of the anti freeze is a check that will be carried out by G R Edwardes Ltd during a service of your heat pump.

## 10. Microgeneration Certification Scheme



G R Edwardes Ltd are members of the Microgeneration Certification Scheme (or MCS) which demonstrates that we can install to the highest quality every time, using MCS certified products that have met rigorous testing standards. All MCS approved products will come with a guarantee for a set period of time, which we will clearly explain to you when commissioning your heat pump system. We will also leave copies of all the guarantees with you in your handover documentation pack.

## 11. Renewable Energy Consumer Code



All MCS certified installers must belong to an office of Fair Trading backed consumer code of conduct programme. G R Edwardes belongs to the Renewable Energy Consumer Code which covers consumers' interests, such as protection against excessive deposit payments and workmanship warranties. You can find the RECC consumer guide at: [www.recc.org.uk](http://www.recc.org.uk) or you can contact us directly and we will be able to send a copy to you.

## 12. Deposit and Workmanship Warranty Insurance Scheme

All RECC members must provide protection for deposits and advance payments that they take from domestic customers. G R Edwardes Ltd has access to an insurance scheme known as the 'Deposit and Workmanship Warranty Insurance Scheme'. This scheme is designed to provide protection for payments

made before works have begun, just in case the company ceases to trade before we deliver the goods to you.

The Deposit and Workmanship Warranty Insurance Scheme has been arranged between RECC and the insurance scheme administrator (DAWWI). Once we receive your contract we register it with the scheme administrator and you will then receive an insurance policy by post.

For further information on this scheme you can visit: [www.qanw.co.uk/pg-homeowner](http://www.qanw.co.uk/pg-homeowner).

### **13. Quotation**



We provide a full design and quotation service which is tailored to your individual site, as all sites are different and there are thousands of alternatives. We believe it is important to discuss your requirements and quote accordingly, providing you 'the customer' exactly what you would like. We offer our best prices to all of our customers, this way everyone is happy and there is no pressure put on you to make a decision. We rely on our highly trained team of renewable energy experts to provide the best pricing service and quality on the market.

G R Edwardes Ltd will not provide you with a quotation until all the areas of uncertainty have been identified and resolved and we are confident that we can meet every aspect of your requirement. We will however be able to provide you, at an early stage, with a budgetary estimate so you can make an early assessment of the level of funding that will be required.

G R Edwardes Ltd follows a very clear and simple process in order to be able to give you an all-inclusive and accurate full turn-key quotation for your heat pump installation.

1. **Initial Evaluation.** Based upon the information you provide G. R. Edwardes Ltd will assess the suitability of your site and proposed project for a heat pump system. If there are any areas of concern we will discuss these with you and ensure they can be addressed before proceeding to the next stage.
2. **Site Survey.** A full site survey may be undertaken by a member of the G R Edwardes Ltd team to both ensure that the site is suitable and to obtain all the information that will be required to generate a complete quotation and subsequent planning and funding applications, if applicable.
3. **Analysis.** We will analyse all the information gathered from you, and possibly the site survey, and fully cost any special items that have been identified during the process. We will then produce a complete quotation for a turn-key installation including the heat pump unit, electrical installation, plumbing alterations, ground works etc.

Once you've had chance to review your quotation you will want to discuss any issues with your G R Edwardes Ltd account manager and make any changes that you think are needed. You are then ready to progress to the next step.

## **14. Ordering**

Once you have obtained planning permission, and secured whatever funding you are entitled to, you are ready to place your order for your air source heat pump and its installation.

G R Edwardes Ltd will confirm your quotation, including any amendments that may have become necessary following the planning process, and provide you with re-validated written full quotation and estimated installation date for your system. If you are happy with the quotation and wish to proceed then all you need to do is sign the order confirmation and send it back to G R Edwardes Ltd along with your deposit, which is usually for 25% of the total value.



It is a mandatory part of the REAL scheme that we give you a **7 day cooling-off period** after you have placed your order, during which time you may cancel with no loss. Whilst this does provide you with some protection against making a hasty decision, it does mean that we cannot actually start work until 7 days after you place the order unless we have written consent from you (an agreement that can be sent out if you require a quick turn-around.)

G R Edwardes Ltd will endeavour to keep you fully informed of any changes in the expected delivery date and will work closely with you to ensure that all aspects of the installation proceed as smoothly as possible.

## **15. Delivery**

G R Edwardes Ltd holds stock of all the items required for a system installation at its warehouse facilities and G R Edwardes Ltd will arrange for all the required items to be delivered to the site as close to 9AM as possible on the first day of installation or as otherwise discussed.

G R Edwardes Ltd offer free delivery for all systems and we do not offer a self collect service as the materials are of high value and are impossible to insure due to them being a glass product.

## **16. Installation**

The installation comprises of multiple different aspects and it is possible that these will be undertaken by different engineers, possibly on different days. G R Edwardes Ltd will however always seek to minimise the disruption at your site and will discuss and agree with you the dates and method of each aspect of the installation.

The key steps in the process are:

1. **Electrical.** G R Edwardes Ltd will supply and install all the electrical components that enable the heat pump to be connected to your heating system.
2. **Mechanical.** G R Edwardes Ltd will supply and install all the components that enable the heat pump system to be connected to the heating and hot water system.
3. **Components.** The system will be delivered to your site and installed as required.
4. **Commissioning.** Once all the elements are in place the system will be commissioned and will start to generate heat and save you money.

## **17. Next Steps**

If, having read this guide, you are interested to progress your air source heat pump enquiry with G R Edwardes Ltd, then these are the most important next steps:

1. Review carefully the information in this document, and on G R Edwardes Ltd's web site [www.gredwardes.co.uk](http://www.gredwardes.co.uk)
2. Let us know by phone 01308 422637, email to [info@gredwardes.co.uk](mailto:info@gredwardes.co.uk) or by filling in the enquiry form at the back of this brochure that you wish to proceed.
3. Review the RHPP information: [www.decc.gov.uk](http://www.decc.gov.uk)
4. If you live in a sensitive landscape area, e.g. an AONB or conservation area, then we strongly recommend that you talk to the local planning authority for guidance on your proposed installation.
5. Also discuss your plans with your immediate neighbours to make sure they are happy with what you have in mind.
6. G.R. Edwardes Ltd will then work with you to progress your enquiry and assist you with your planning.
7. If however you decide that you do not wish to progress your enquiry, then please send us an email saying so to [info@gredwardes.co.uk](mailto:info@gredwardes.co.uk) and we will try not to disturb you again.

***For more information or to book a free no obligation site survey  
contact us on 01308 422637***

***or***

***You can find more information and even see how much you could save with our  
[savings calculator](http://www.gredwardes.co.uk) at [www.gredwardes.co.uk](http://www.gredwardes.co.uk)***