



Renewable Energy: The facts.

Ground Source Heat Pumps

What are they, and what do they do?

The vast majority of us have a heat pump where we live. We just don't always know it. The common domestic fridge has a heat pump in it, and it works in a similar way to the large-scale unit used for heating a house.

The heat pump extracts heat from the air inside the fridge, and 'loses' the heat outside, at the back of the fridge. Check how warm the back of your fridge gets. This is an example of an 'Air Source' heat pump.

What about domestic applications?

One of the most commonly-available heat pumps for domestic use now uses the latent heat from the soil. The soil is an excellent heat store, and effectively stores heat from the sun at approximately 10-12 degrees Centigrade all year round. This type of heat-pump is known as a Ground Source heat-pump, because that's where it picks up its heat from.

What is so good about heat pumps?

Ground Source Heat Pumps can have a *coefficient of performance (CoP)* of 4 or more. That is, for each kilowatt-hour of electricity taken to run the pump, up to 4 kilowatt-hours of heat is produced.

Heat pumps will operate most efficiently when producing water at 30-40 degrees Centigrade. This temperature is ideally suited to under-floor heating systems, which run at a much lower temperature than radiators.

If you have to use radiators, they will need to be larger than you'd use with a normal boiler, because the flow temperatures will be far lower (a maximum of about 50 degrees C as against about 80 degrees C with a normal boiler).

Given the cost of the equipment, Heat Pumps are not as cheap as gas heating, but can be an economic form of heating in homes which are not connected to the gas main.

How is the heat collected?

In a Ground Source Heat Pump the heat is extracted from the soil by a '*ground loop*'. This is a length of plastic piping which can be buried in either a shallow trench or a deep bore-hole. The *ground loop* contains a glycol anti-freeze mixture. The heat collected is run through the *heat pump*, which raises the temperature from approximately 10-12 degrees to about 30-50 degrees.

Is it really a renewable technology?

Yes, in that it makes use of a heat-source (the earth) which will renew itself from the sun's heat. The environmental impact depends on where you source your electricity. If you use a renewable tariff, or even use your own renewable electricity, then the impact is limited.

Are there any other environmental considerations?

The refrigerants used in heat pumps are not the most environmentally-friendly materials, even though CFCs are no longer used. However, new materials are being developed which, it is hoped, will be more environmentally benign.

Will a heat pump really meet all my heating needs?

Because of the lower temperatures at which heat pumps operate, you will need a back-up form of water-heating, such as an immersion heater.

Can I get a grant?

Yes. The Low Carbon Buildings Programme (LCBP) currently offers grants for domestic installations. The LCBP free phone help-line is 0800 915 0990, and the web-site www.lowcarbonbuildings.org

For non-domestic installations contact Phase 2 of the Low Carbon Buildings Programme: 08704 23 23 13 or email info@lcbpphase2.org.uk

Local schemes offering further discounts may also exist. Contact your local Energy Efficiency Advice Centre on 0800 512012.

For further advice on this and other renewable energy technologies contact SYEC on 0114 2584574 or nick.parsons@syec.co.uk