

DRILLTALK

JUNE 2011

NEWS AND VIEWS FROM THE UK's No.1 WATER WELL DRILLING COMPANY

THE BOREHOLE BONUS

Already have a borehole? You're halfway to a low cost heating system

HERE'S GREAT NEWS for anyone who already has a water borehole installed on their property—this same borehole can also be used to harvest underground heat, slashing the cost of installing a ground source heating supply for your home or business.

MAKE PUNISHING FUEL BILLS A THING OF THE PAST

If you live in the countryside you probably use oil or LPG for central heating—and today that's bad news.

For many years heating oil stood at around 20p a litre, but early in 2011 prices had spiked to

over 70p. With unrest in the Middle East, it is hard to predict how high crude oil prices might rise—but the prophets of doom are winning the day.

Given the cost of oil today, its upwards price trend, and the uncertainty of future supplies, many people are looking at ways of reducing their running costs to eliminate the use of oil altogether.

The best pathway to low running costs is ground source heating—using warmth from the earth to power a heating system.

This renewable energy source brings the benefits of low cost heating and hot water. It also reduces your carbon footprint.



WE'LL SLASH YOUR HEATING BILL DRAMATICALLY

Your existing borehole water supply can become dual purpose, to provide ground source heat, as well as continuing to supply water.

This considerably reduces the cost of installation—as you will imagine, equipment and the means of harvesting below-ground heat do not come cheaply. But the payback period continues to improve as the cost of oil rises.

The game has changed, and economics are firmly on the side of ground source heat (GSH) systems.

YOU ALREADY HAVE AN INVESTMENT IN GSH

Your borehole actually provides half of an 'open loop' ground source heat collection system: Water drawn from the borehole passes through a heat pump which extracts and boosts the ground's stored heat.

The beauty is that, for every kilowatt of electricity used to power the system, four kilowatts can be returned, and the pump is sized to deliver warmth both for central heating and domestic hot water.

EXTRACTING HEAT FROM THE GROUND

The open loop system is one of the most efficient ways to provide ground source heating—water is taken from the existing borehole and returned back via a secondary borehole.

Water is passed through a heat exchanger, and is returned to the ground albeit in a chillier state. The water itself is not affected or contaminated in any way. So there are no environmental concerns.

Continued on back page...

Hosepipe bans likely, forecasters warn

AFTER THE DRIEST March in England and Wales for fifty years, April was reported as the hottest for 350 years.

Water shortages seem inevitable, so in some areas gardeners can expect hosepipe bans, and farmers may face restrictions on extracting water from rivers.

But at the moment anyone who has a private borehole water supply is not likely to be affected. **M**



INSIDE:



GETTING MORE FROM MOTHER NATURE

How a Monmouthshire couple reduced their energy consumption by 40%



YOUR GUIDE TO GREEN TECHNOLOGY

Releasing the ground's stored solar energy



WATER BURSTS

News splashes on some of our latest contracts

GETTING MORE FROM MOTHER NATURE

How a Monmouthshire couple reduced their carbon footprint—and slashed their heating oil bills

REDUCING THEIR CARBON footprint is something that Colin and Fay Mansell take very seriously, and have put directly into practise in their home in Usk, Monmouthshire.

Fay, who is a past Chair of the National Federation of Women's Institutes says: 'I believe that climate change is the biggest challenge facing society today. To help address this we launched the WI Carbon Challenge, where everyone has the opportunity to reduce their carbon footprint by 20% and play their part in tackling global warming.'

Colin adds: 'The world's dependence on oil is damaging and risky, and from our own immediate point of view, our home with its oil fired heating was part of the problem.'

So in autumn 2006, Fay and Colin started work to reduce the energy consumption of their 1997 four-bedroom home.

We are saving around 40% on the cost of oil. And as prices continue to rise, that figure can only improve

Solar panels were installed on the roof of the house to supply domestic hot water, along with photovoltaic panels for electricity.

'The major problem to address though was the central heating, as this was our largest demand on energy. So, to eliminate our use of oil for central heating we decided to install a ground source heating (GSH) system.'

'We were well placed—our property was built with under-floor heating, which is ideal for the lower temperatures involved: While water circulates at around 60°C from an oil boiler, GSH systems run at a lower temperature, normally 50°C.'

At the heart of their GSH system is a heat pump: it uses heat from under ground at 10°C and bumps it



"WE OPTED FOR GSH WHEN SOLAR ROOF PANELS WERE NOT ENOUGH"
COLIN AND FAY MANSELL

up to 50°C. Although powered by electricity, the heat pump is highly efficient. Typically for every kilowatt of electricity used to drive it, over 3 kW is returned in usable energy.

To extract the solar energy from the ground, two boreholes each 87 metres deep were drilled into the driveway in front of the house.

Says Colin: 'Using this vertical system to harvest the heat was certainly the best method. Had we specified a horizontal collector, huge trenches would have had to be dug to install looped pipework—'slinkies'. We did not have space to do this, and in any case the disruption would have been colossal. Also, slinky systems are not as dependable, as they can become exhausted.'

In this 'closed loop' system, water does not come into direct contact with any underground water: fluid is circulated around separate pipework contained within the borehole, and conducts energy from the earth to the heat pump for domestic heat.

'The boreholes themselves are hidden below the driveway, and cannot be seen. It took just a week to drill them, and there was very little mess from the drilling operations.'

Colin and Fay's 8.5 kW heat pump delivers sufficient energy to heat the whole house and has now been in operation for three winters. They are very pleased with the results.

Monitoring equipment has been installed by the Energy Saving Trust as part of their heat pump field trial. This has enabled Colin to monitor accurately the overall performance of his system. 'We are getting an overall system efficiency of over 3.0, which is one of the best in the Government trial.'

Colin says it is essential to look at the total picture—getting the right electricity tariff being important. And as a bonus, the need for an annual service to the oil boiler has vanished—the heat pump does not require regular attention.

'While payback was not our main consideration,' Colin tells Drilltalk, 'we are saving around 40% on the cost of oil. And as prices continue to rise, that figure can only improve.'

Comfort levels within the home are good, and moving to energy-efficient heating has not involved any compromises at all.

They are convinced that this was a very worthwhile project, and it has achieved their objectives. **M**

EXTRACTING ENERGY FROM THE GROUND GREEN TECHNOLOGY

THERE ARE A number of ways to benefit from the solar energy stored underground. Yes, we admit that we are biased—our business was founded on drilling boreholes—but we sincerely believe they are the most dependable and satisfactory option.

Vertical borehole systems are quick and neat to install, and can be drilled in confined spaces—under a front drive or in an urban garden.

Once the drilling is completed, there is little evidence of their presence.

There is nothing new about ground source heat (GSH) systems, they are well proven and have been in use in continental Europe for over 40 years. With today's emphasis on renewable energy, they are now increasingly being used in the UK.

Pumps are reliable—manufacturers say 15-20 years life—and unlike a boiler do not require regular servicing.

The efficiency compared with most other heat sources is unchallenged—each kilowatt of electricity used to power the heat pump can return up to 4kw of usable heat.

However, matching the heat requirements of the house, precisely assessing the borehole requirement, and engineering the boreholes to a high standard are all important elements of a successful heating system.



SPOT THE BOREHOLE: THIS HOME BY OAKWRIGHTS USES GROUND SOURCE HEATING WITH BOREHOLES CONCEALED UNDER THE DRIVEWAY

Here are the possibilities:

OPEN LOOP BOREHOLE SYSTEM

Water is taken directly from the borehole, passed through the heat pump, and returned to the ground, normally via a second borehole. This is a highly efficient way of gaining heat, as the temperatures harvested are higher than other underground systems.

If you are lucky enough to already have a borehole water supply and its flow of water is adequate, then all you need is the second borehole, halving the cost of groundworks.

CLOSED LOOP BOREHOLE SYSTEM

Boreholes are drilled, and a single pipe is looped in and out of them, with an antifreeze fluid delivering heat to the heat pump. Underground heat is transferred through the walls of the pipe to the fluid, which itself never comes into contact with ground water. The depth, and number of boreholes needed will depend on the type of soil and the requirement for heat—for example clay subsoil can transfer over three times more heat than light, sandy soil. A professional assessment is essential to balance the ground source collection system to the heat requirement.

TRENCH SYSTEMS

Be prepared for massive disruption if you choose to install a horizontal collection system. They involve creating trenches to a depth of around two metres over a huge area of ground—think about World War 1 trenches! Then hundreds of metres of coiled pipes are laid in the trench to supply the heat pump.

This is fine if you have a handy field nearby, but if you have a large enough garden it will be destroyed. Typically around 80 metres of trench are dug to supply an 8kw heat pump.

But if you don't have the available land, it is not even a possibility.

Beyond this these horizontal systems can exhaust the available underground heat, and in springtime a 'permafrost' can appear over the area of the trenching.

YOUR NEXT STEP TO MONESAVING

Providing a complete service, WB+AD Morgan will arrange for heat loss and hydrogeological ground surveys, engineer the boreholes whether you are in town or country, install and commission a heat pump, connect to your existing or new central heating and domestic hot water systems.

To find out more about this expert package, call 01544 267980 or visit findingwater.co.uk **M**



MONITORING HEAT DELIVERY AND SAVINGS

HEAT PUMPS

This is the heart of the system. Heat pumps are familiar to us all: refrigerators, freezers and aircon units all use heat pumps to reduce temperature.

But heat pumps for GSH work the other way round, to increase warmth: Low heat from the ground is boosted to a higher

temperature for use within the home heating and hot water system.

Whatever the outside temperature, at depths of 10 metres or more, underground temperatures average around 10°C summer and winter alike, and the heat pump boosts this to 50°C or more

The heat pump is the size of a fridge, and runs quietly. The most common units deliver 8-11kW, but calculating the precise size for a given situation is important, as one that is oversized will not run efficiently.

WATERBURSTS

NEWS SPLASHES ABOUT SOME OF OUR RECENT CONTRACTS



Institutional remedy

WE WERE CALLED in to sort out the borehole system at a government institution. A CCTV survey showed broken pipes deep underground, and bio-fouling.

We used mechanical scrubbing, plus chemical treatments to zap the bacteria which was causing the fouling. Then, to prevent surface water re-entering the borehole, we raised the level of the casing above ground and backfilled the old sub surface chamber with tonnes of concrete and completed as an above ground finish within a neat GRP enclosure.

Hot news for village hall

WE'VE DRILLED A borehole to provide ground source heating and water at St Margaret's village hall in Alderwasley in Derbyshire. Now with its new underfloor heating system and the availability of water, there's no more shivering under wall mounted electric heaters, and cups of tea—unlimited.



Water, water everywhere...

FOLLOWING TEWKESBURY FLOODING in 2007, Severn Trent have taken positive steps to protect their Mythe Treatment Works from flooding.

A £5.5 million permanent flood barrier project involves the installation of a combination of above- and below-ground sheet pile walls, a concrete wall, earth embankments, drainage ditches and dewatering boreholes.

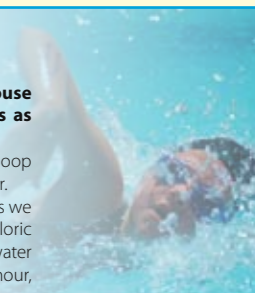
We have created six shallow boreholes to help clear water away—an essential element of the grander scheme.

Dancing on water

HEAT WAS NEEDED for a swimming pool within a large house on Clapham Common. This is unusual in that the pool doubles as ballroom! Its floor lowers to become the pool.

A previous contractor had attempted to drill boreholes to supply an open loop ground source heating system, but failed as these would not deliver water.

WB&AD Morgan's expert engineers had no such problem: At 150 metres we found the aquifer, then acidised the borehole with 2 tonnes of hydrochloric acid to open up the underground fissures to enable a free-flowing water supply. The borehole now comfortably supplies nearly 6,000 litres per hour, the heat pump delivers 45kw of heat to the house and the pool.



Thirsty chickens

WE PROVIDED AN upgraded water supply to Thinghill Grange Poultry Farm in Herefordshire, for their 230,000 bird poultry houses.

Both borehole water and mains water is fed into a 150,000 litre holding tank guaranteeing continuity of supply, with booster pumps delivering the water to the poultry houses.

The result is improved water pressure and increased flow, with reliability and ease of use. Now, despite the site capacity being nearly doubled, they can clean the site in less time that they did with the old system

Better yet, Thinghill report that they are saving approximately £1,000 on a six week cycle thanks to our improvements.

Continued from front page...

THE BOREHOLE BONUS

The flow of water needed to feed the heat pump is similar to a running tap, so should not affect your borehole's capability to supply water for its domestic or irrigation purposes.

WHAT'S INVOLVED

We will drill a second borehole to return the water to the ground. Cheaper to engineer, this second borehole is a simpler requirement and does not require a water pump to be installed.

This water is passed through a heat pump that connects into your heating system, to replace the existing boiler.

Of course, we need to assess that your house and its central heating system is suited to a GSH system—happily, most are—and your existing borehole needs to be checked to ensure that it is capable of providing an adequate water flow.

Having taken water from the ground at around 10°C the heat pump normally delivers water at around 50°C, while a conventional oil boiler works at a higher 60°C. But in practise many central heating installers put in radiators bigger than are actually required in order to meet a 'guaranteed' temperature—this gives an operating margin for GSH. And if you are lucky enough to have underfloor heating, that is best of all.

IS YOUR HOUSE SUITABLE?

It needs to be reasonably warm using its present oil boiler. If it is double glazed and well insulated it should be alright. But if you shiver through the winter and have to put on an extra jumper to keep warm, retro-fitting a ground source heating system is unlikely to be efficient.

But before any work proceeds, a survey needs to be done to produce a Standard Assessment Report which will define how much warmth a heat pump would need to provide.

For more information call 01544 267980 or visit findingwater.co.uk



GENERATE INCOME AS WELL AS HEAT

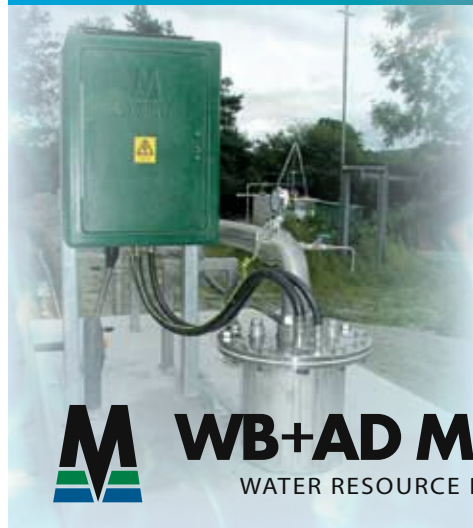
THE ATTRACTION OF ground source heating has just got better—the Department of Energy & Climate Change announced in March 2011 that it is paying incentives to encourage renewable energy.

This means it is quite possible to have a subsidy of up to £1,450 a year, guaranteed and tax free, index linked, for 23 years. This is available to domestic users. It does of course make the payback on investment even more attractive.

Figures given here are as understood at the time of going to press, May 2011, but you should check the current situation regarding figures and qualifying criteria before committing to any installation.

You will find a link to this on our website findingwater.co.uk

Water, heat and more...



- Water well drilling for homes, farms and industry
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