



earth energy

reliable

sustainable

affordable

available

renewable ground source

brighter people,

cleaner future

Renewable Ground Source Heating & Cooling

# Cost Effective Renewable Energy for Buildings



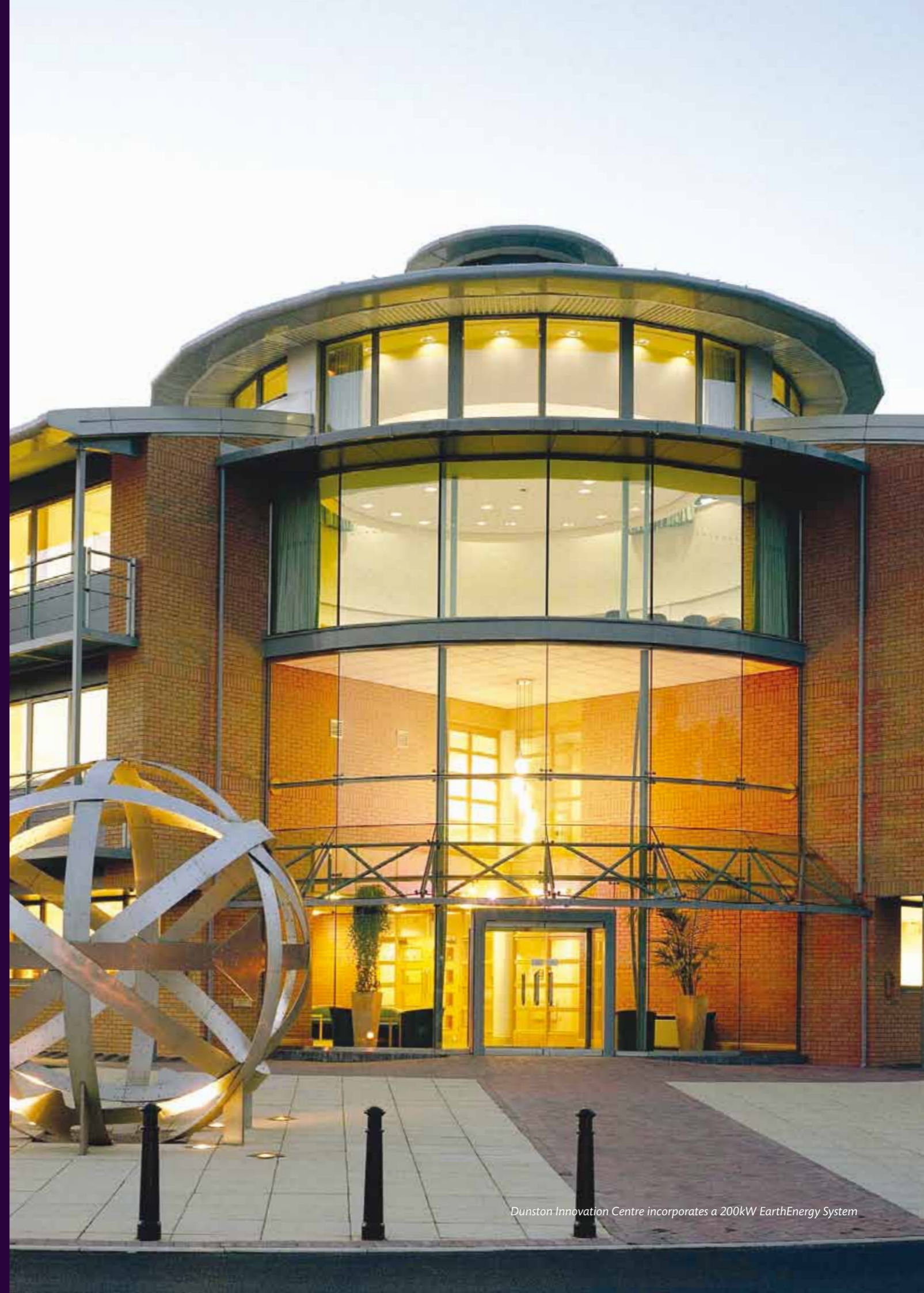
EarthEnergy Limited is the UK's leading geothermal company specialising in the design and installation of Ground Source Heat Pump Systems for building heating and cooling.

EarthEnergy is a rapidly expanding, well-funded national company, jointly owned by the GeoScience Group and Renewable Energy Systems (RES) a subsidiary of Sir Robert McAlpine.

Our professional team has a proven track record of designing and installing Ground Source Heat Pump Systems in a wide variety of building types from houses and village halls to new schools and hospitals.

- Feasibility Studies
- Thermal Conductivity Testing
- Ground Modelling
- Turnkey Design and Installation

EarthEnergy operates a fleet of geothermal drill rigs, based in Sir Robert McAlpine's 34 acre plant yard in Kettering. These rigs incorporate automated rod handling and fully integrated guarding making them easy to operate in a safe manner and fully compliant with HSE best practice guidelines.

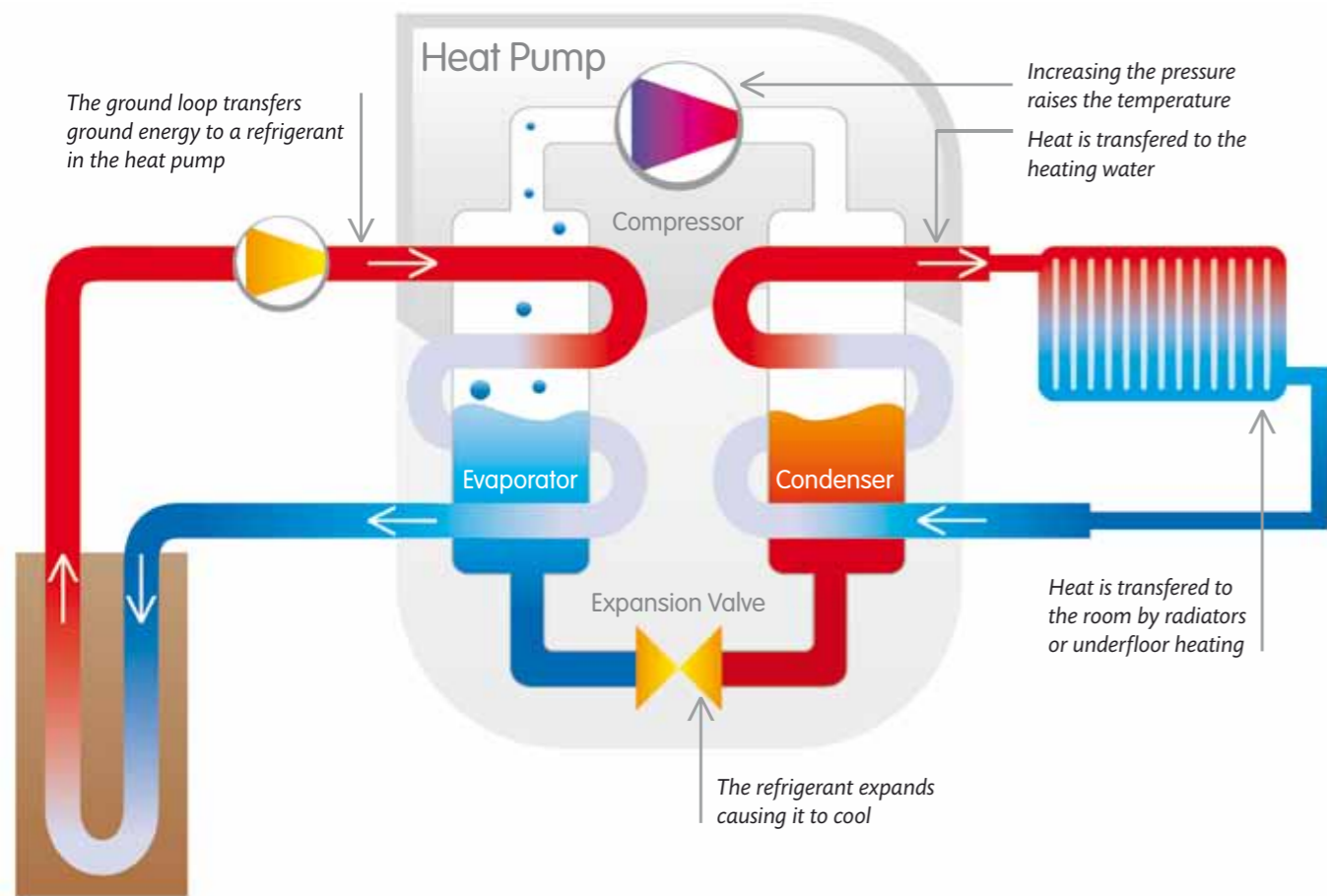


*Dunston Innovation Centre incorporates a 200kW EarthEnergy System*

# Ground Source Heat Pumps

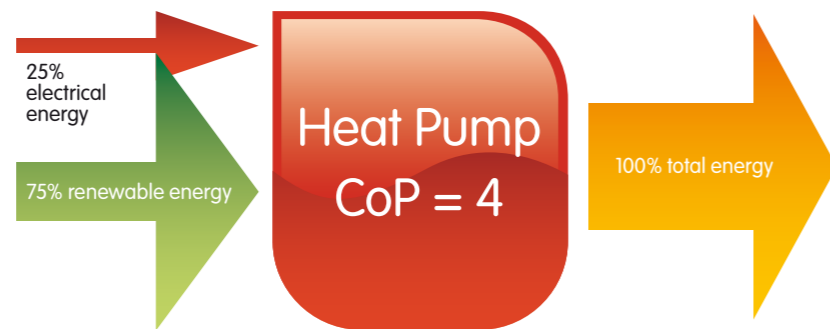
EarthEnergy Systems circulate water through pipes buried in the ground. The temperature of the water in the pipes is lower than the surrounding ground and so it warms up slightly. The returning water is chilled back down by a heat pump, where it is used to heat up a refrigerant.

By compressing this 'warmed' refrigerant the temperature is further increased before being transferred to the building heating system. The heating water output from the heat pump is typically 45°C - 55°C. This process can be reversed, using the ground as a heat sink, to provide cooling water for the building. Alternatively, air or water can be used as the heat source using an appropriate heat pump.



## Carbon Reduction

A Ground Source Heat Pump with a coefficient of performance of 4 means that three-quarters of the heat energy supplied into the building is renewable energy from the ground.



Coefficient of performance (CoP) for a GSHP

## UK Geology

The diversity of UK geology is unique, ranging from hard granite in Cornwall and Scotland to stiff clays and sands in the South East. The physical and thermal properties of the ground vary significantly and must be properly considered in the design and construction of the ground loop.

EarthEnergy has been installing systems in the UK since 1994 and our extensive experience and library of geological records enables us to assess the ground conditions and provide fixed lump sum quotations.

Design Engineers create a computer model of the proposed ground loop heat exchanger for the exact location of the site ensuring feasible solutions are presented even at the earliest stages of a project.

## Thermal Conductivity Testing

EarthEnergy offers a comprehensive thermal performance testing service that predicts the thermal performance of a borehole based on thermal conductivity, thermal resistance and specific heat capacity, well beyond simple thermal conductivity measurements.

Generally the procedure is to inject heat at a constant rate into the borehole, whilst monitoring the temperatures. Uniquely, an EarthEnergy test includes monitoring of the borehole whilst cooling down, in order to overcome the limitations of the standard method.



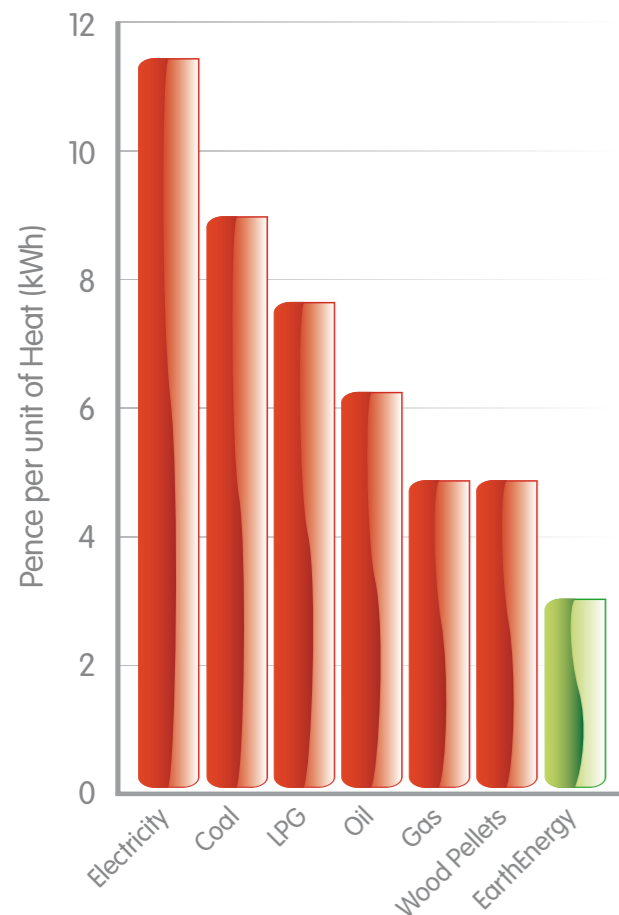
# Housing

Working closely with Registered Social Landlords, EarthEnergy has a long track record of installing Ground Source Heat Pump Systems in housing.

EarthEnergy systems are an affordable way to address fuel poverty in existing housing stock with no mains gas available; reducing fuel bills, improving the quality of life of tenants and significantly reducing carbon emissions.

New housing developments can readily incorporate EarthEnergy systems to meet planning obligations for on-site renewable energy and achieve compliance with Building Regulations and the Code for Sustainable Homes.

EarthEnergy systems are specifically designed for UK housing and are capable of providing all the heating and generating domestic hot water in excess of 60°C, giving protection against Legionella without using supplementary direct electric heating.



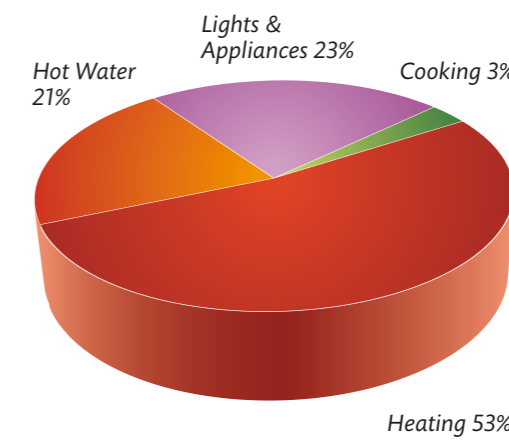
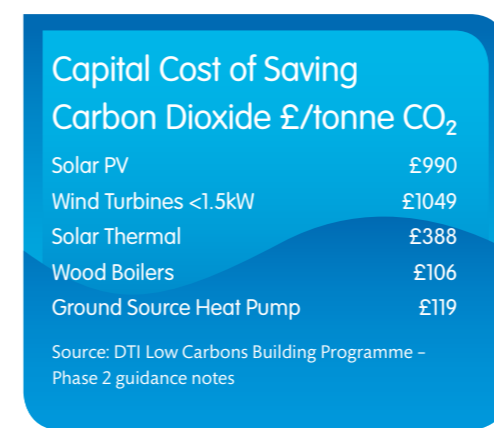
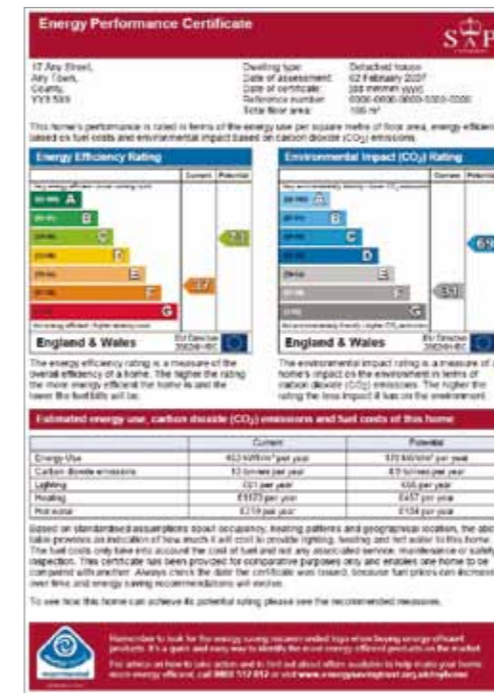
## The benefits

- On-Site Renewable Energy
- Low running costs
- Low CO<sub>2</sub> Footprint
- Unobtrusive – not visible externally
- No flames or combustible gases
- No emissions or noise nuisance
- No fuel handling/storage requirements
- No fire/explosion hazard
- Doesn't require planning permission
- Only requires electrical infrastructure
- Available 24 hrs a day 7 days a week
- Long lifetime
- No reduction in performance over time

# Energy Performance Certificate

By 2009, all buildings in the UK that are constructed, sold or rented out will require an Energy Performance Certificate, in accordance with the European Energy Performance of Buildings Directive.

A Ground Source Heat Pump System can halve the energy consumption of a typical new house and provide the householders with the lowest running costs available.



Heating and hot water generation account for over three-quarters of the energy used in a typical home.

Incorporating an EarthEnergy system is probably the most cost effective way of meeting carbon reduction targets and reducing energy bills.

“At least 60% of the energy for every new secondary school in England will have to come from on-site renewable sources from 2008.”

Government announcement August 2007

“Ensuring, where practicable, that buildings occupied by us are designed, constructed and operated to optimise their environmental performance.”

Environmental Policy Statement of the Chancellor of the Exchequer’s Departments and Agencies.

## Public Sector

EarthEnergy has been very active in promoting installations within educational facilities in the UK and have installed systems in over 50 primary and secondary schools across the country.

A Ground Source Heat Pump System is a very cost competitive means of heating a school building and can be used as an educational resource with real time monitoring of renewable energy delivered into the building.

EarthEnergy systems incorporate design and construction practices that ensure the performance and robustness of the system for the duration of the design life and beyond.

## Commercial Buildings

Whether trying to meet planning requirements for on-site renewable energy or tenant demands for ‘greener’ buildings, EarthEnergy can make a significant, cost effective, reduction in the carbon footprint of any development.

EarthEnergy systems can be used for both heating and cooling in conjunction with various distribution systems including fan coils, chilled beams, underfloor heating, radiators or distributed heat pumps. Hybrid systems can combine heat pumps with boilers and chillers to meet renewable energy targets without excessive cost.

EarthEnergy can offer a financing package to provide the necessary capital, with heat (and cooling) energy purchased through a combination of metering and fixed standing charges.



## Local Expertise Nationally

EarthEnergy's Regional Managers and installation teams across the country provide a truly national service giving our customers the confidence that they will receive the best level of service available.

EarthEnergy offers a full turnkey design and construction service for Ground Source Heat Pump Systems and undertakes initial feasibility analysis and thermal testing of ground conditions.

Take a look at what our satisfied customers have to say...

EarthEnergy is a fully accredited designer and installer of Ground Source Heat Pump Systems under the Microgeneration Certification Scheme, a signatory to the Renewable Energy Association REALITY code of practice and a founder member of the Ground Source Heat Pump Association.

"We looked at various options to achieve the 10 percent renewable energy requirements including solar and biomass but Ground Source Heat Pumps were the easiest and most cost effective way for us to meet the 'Merton Rule' specification. Grange Primary was the first school we used Ground Source Heat Pumps in and it's quickly become apparent that this is the cheapest and easiest way of achieving renewable energy requirements."

Kwasi Ofori-Amoako, Ealing Council



"I have now received the hard copies of the report and would like to take this opportunity to thank you and your team for your assistance. We are delighted to have found a company with clear customer service focus able to deliver an exceptional service that exceeds customer expectation."

Steve Canning



"For too many years we have endured the problems associated with solid fuel heating – the dust, ashes, getting the coal in, etc. The obvious benefits of cleanliness, it being so eco-friendly and lack of pollution of the atmosphere, together with the low running costs, will be greatly appreciated by us pensioners."

Richard Fisher, Penwith Resident



## Local Expertise Nationally

With over a thousand systems already installed, EarthEnergy Limited is the most experienced ground source specialist in the UK.

EarthEnergy offers a full design and construction service for Ground Source Heat Pump Systems and undertakes initial feasibility analysis and thermal testing of ground conditions.

 **Head Office**

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