



Renewable energy case studies

for country homes, estates, listed
properties and historic houses

St Giles House



St Giles House is the ancestral home and centre of business of the Ashley-Coopers, the Earls of Shaftesbury.

Built in 1651, the home rests in a large park through which the River Allen flows, feeding a seven-acre lake as it winds its way towards the small parish village of Wimborne St Giles.

isoenergy was asked to work with contractors and mechanical engineers to provide a large scale renewable energy solution to the property, without affecting the building or local ecosystem.

Key features:

- Spatial heating and hot water are provided by two 45kW ground source heat pumps, with energy collected from a near-by lake using a closed-loop array of 3000m.
- To supplement the ground source system a solar thermal and solar PV array were designed and installed by isoenergy.
- The solar photovoltaic array generates enough revenue throughout the year to offset the running of the heat pumps.



Plant room



Solar thermal system on the roof



Ground mounted solar photovoltaic system

Mill House

A fast moving stream flows through this site, and the property relied on LPG Gas for heating and hot water.

isoenergy oversaw the installation of an Archimedes' screw micro-hydro system to generate electricity for the house and out buildings. Surplus generated electricity is sold to the grid.

In order to cut our client's running costs isoenergy installed a Viessmann master and slave heat pump system totalling 30kW. The system is backed up with an LPG boiler.

Heat is extracted from the stream via a submersible heat exchanger. This comprises 5 stainless steel plates, with 15m² heat transfer surface area.

The exchanger is tailor-made for the project and collects energy for heating and base load hot water with immersion heaters, powered by the Archimedes' screw, to top up the granary out building. The heat pumps also supply the main property heating and base load hot water with gas and immersion top up.

isoenergy installed river level sensors to protect the heat pumps and Archimedes screw from low flow during dry periods. A fish pass was also installed.



Plant room



Archimedes screw



Whithurst Park

The owners of this large mansion, fashioned on an 18th century fort, came to isoenergy looking for a renewable heating alternative to burning oil for fuel.

Key features:

- Spatial heating and hot water for the main house and pool provided by a 80kW heat pump system collecting energy from the nearby lake.
- Isoenergy installed a closed-loop system to collect energy for the two heat pumps.
- The system was docked to an existing oil-fired boiler for back up.



Two heat pumps in the plant room



Lake containing the heat collector array

Manor House

This Manor House is a Grade I listed property located in Northamptonshire.

The house is set in a 1700 acre estate with the lakes fed by the River Cherwell.

Key features:

- isoenergy installed two 45kW heat pumps at the main house for the heating and to preheat the hot water. An additional 18kW unit was installed to provide high temperature water.
- The heat pumps collect energy from the lake through 2700m of submerged pipe collectors.
- Whilst routing the flow and return pipework, a long forgotten escape tunnel for priests was rediscovered and used to hide the pipes without disrupting the lawn.



Three heat pumps in the plant room



Lake containing 2.7 km of collector pipe

Northamptonshire Manor House



The manor house is a 17th Century house that was rebuilt after a fire in the mid 20th Century.

The house is used as a private residence and the owners were keen to reduce energy costs by installing a renewable heating solution.

Key features:

- Isoenergy installed a 44kW ground source heat pump system.
- Energy is collected from the nearby lake through 1800 meters of collector pipe array.
- A 18kW solar thermal system was installed to pre-heat hot water.
- Heat from the heat pump is used for all the heating in the house and for 800 litres of domestic hot water.



Plant room



Lake containing the collector array

Lower Mill House

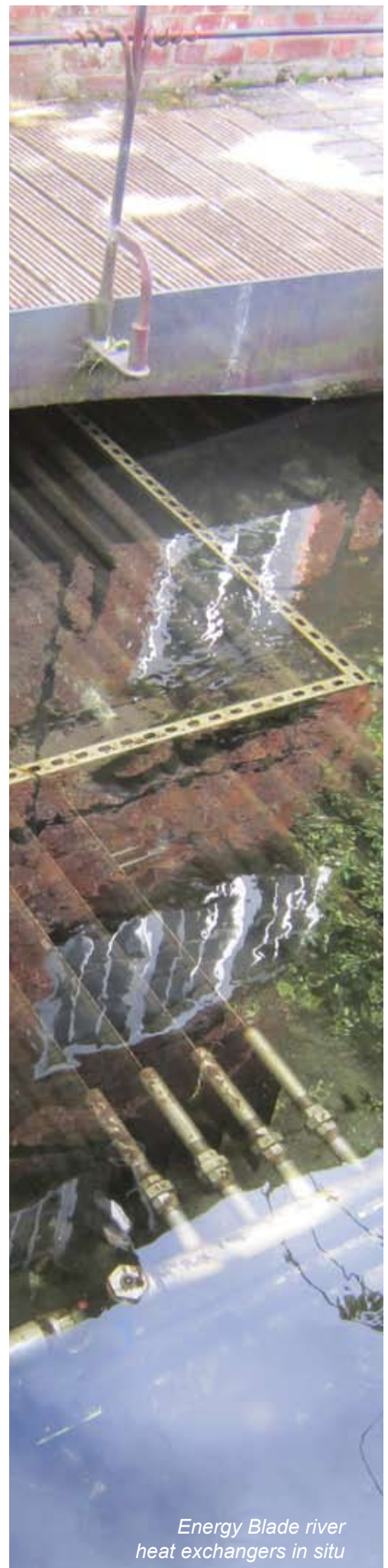
Lower Mill House is an existing family house on the site of a once working water mill. Initial investigation identified the nearby river as a potential heat source for the heat pump.

Key features:

- isoenergy installed a 58kW ground source heat pump with Energy Blade plate heat exchangers submerged in the river.
- The heat pump provides spatial heating through underfloor heating and radiators. It also provides 800 litres of domestic hot water for the property.



Heat pumps in the plant room



Energy Blade river heat exchangers in situ

Fairlight Estate



Plant room

The owners of this Victorian Gothic revival mansion approached isoenergy to provide a renewable heating solution for the large country estate to cut carbon emissions and reduce dependency on oil.

Key features:

- Phase one - provide heating for the Main House (Fairlight Hall) and the pool.
- Phase two - provide heating for the Stables, the Art Barn and recital rooms.
- Phase three - Future Studios, Guest rooms, and Staff accommodation.
- An 80kW ground source heat pump system was installed to reduce fuel costs.
- An air source heat pump was installed to heat the pool.



Walled garden



Gothic mansion

The Manor of Dean

Isoenergy was asked to replace the Elizabethan Manor's costly and inefficient oil fired boiler during a total refurbishment. Improved efficiency, fuel bills and environmental credentials were driving forces towards a renewable energy solution.

Key features:

- Spatial heating and hot water for the main house provided by a 60kW ground source heat pump system.
- Heat is collected by a 2800m horizontal collector array installed in an adjacent paddock. After completion of ground works the site was restored to its original condition.



Ground works in progress



Ground works after completion

Preston Farms



The owners of this grade I listed manor house approached isoenergy for a renewable heating solution. The building suffered from poor insulation which needed to be addressed to improve efficiency.



Original plant room showing two boilers

Key features:

- Loft insulation via 100mm Thermafleece Wool battens.
- Renovations to sash windows to levels permitted under listed buildings restrictions to reduce drafts.
- Lifestyle changes to make use of existing wooden window shutters.
- Spatial heating and hot water for the main house and heating for the indoor pool via two 40kW ground source heat pumps.
- Heat collected from a 1700m horizontal collector array located in an adjacent paddock.
- Outdoor pool heating provided by a 14kW air source heat pump.
- The existing oil boilers at the property were re-used and docked to the system providing a back-up supply should it be required.



Now with one boiler for back up and two heat pumps



Horizontal collector array ground works in progress

Moated Manor House

A grade II listed moated manor house originally dating from 1600 with a Palladian façade added around 1710.

Key features:

- Spatial heating and hot water for the main house provided by a 40kW heat pump and biomass boiler.
- Heat is taken from a closed-loop collector in the adjacent field.
- Spatial heating and hot water for ancillary buildings is provided by a 14kW air source heat pump.





Chilworth Manor

A ground-source heat pump installation at a house, plus another heat pump for the barn using a borehole.

Key features:

- isoenergy installed a 80kW ground source heat pump system connected to an array of ground loops buried in horizontal trenches 1 metre deep.
- The heat pump provides spatial heating through radiators. It also provides 600 litres of domestic hot water for the property.
- isoenergy also installed a smaller heat pump for heating and hot water in the barn conversion.



Chilworth Manor



Ground loop array as soon on Google Earth before the grass regrows



Heat pumps in the plant room

Castle House

Castle House is a 17th Century building originally designed as a hunting lodge in Dorset. The owners approached isoenergy for help in reducing their heating bills.

Key features:

- Installed a 60kW ground source heat pump system.
- Energy collected from 4 km of horizontal ground loop array in a near by field.
- Installed a solar thermal system to heat the outdoor pool.



Laxton Hall



Laxton Hall is a grade II listed property currently used as a residential care home set in its own parkland.

The house used to be heated by two oil-fired boilers and used around 80,000 litres of heating oil a year to heat the property and its hot water.

Key features:

- Isoenergy installed four ground-source heat pumps to create a 170kW system.
- Heat is collected by an array of 10 km of ground loops buried as horizontal trenches which lie one metre deep and three metres apart.
- The heat pump provides spatial heating through radiators. It also provides 1600 litres of domestic hot water for the property.

A video of the ground loop array being installed is available on the iso.co.uk website.



Plant room showing heat pumps and back up boiler



Location of the ground loop array



Four heat pumps installed

Chalcot House

A ground-source heat pump installation at a house in Wiltshire.

Chalcot House is a grade II* house in a quiet rural environment. The heat pump provides energy for spatial heating and domestic hot water systems at the property including the domestic staff cottage.

Key features:

- Isoenergy installed a 44kW ground source heat pump system.
- Heat is collected by an array of 3,300 metres of ground loops buried in horizontal trenches approximately 1 metre deep and 3 metres apart.
- The heat pump provides spatial heating through radiators. It also provides 1000 litres of domestic hot water for the property.



Plant room



Underriver House



Underriver House is a grade II listed country home in Kent. The owners were keen to move away from their reliance on fossil fuels and wanted to install a renewable energy system to provide heating and hot water for the house.

Key features:

- Isoenergy installed a 40kW heat pump system to provide heating and hot water for the house.
- Energy is collected from 1800m of pipe in a horizontal ground loop array.
- The heat pump provides all spatial heating and 900l of hot water to the house.



Heat pump during installation



Sarum Chase

Sarum Chase is an urban manor house in North London. The owners wanted to install a renewable heating system to heat the house. However, being in an urban area, there was insufficient space for a horizontal ground loop array for a heat pump. Instead, isoenergy suggested an array of vertical boreholes to collect heat for the heat pump.

Key features:

- Isoenergy installed a 60kW Ground source heat pump system to provide all the spatial heating for the house, domestic hot water and heating for the pool and spa.
- Energy is collected from an array of 16 vertical boreholes.
- The ground source heat pump system is docked to gas fired boilers for back up.





Little Naish is a Grade II listed former gardener's cottage in Somerset which was the subject of an extensive restoration and extension project. The heat pump provides energy for spatial heating and domestic hot water systems at the property.

Key features:

- isoenergy installed a 17kW ground source heat pump system.
- Heat is collected by an array of 1200 metres of ground loops buried in horizontal trenches located in a paddock near the house.
- The heat pump provides spatial heating through underfloor heating and radiators.
- The heat pump also provides 500 litres of domestic hot water for the property.



Tanks in the plant room awaiting insulation



Ground works in progress



Building the manifold pit

Holmdale

Holmdale is a grade I listed country house in Surrey. The owners wanted to install a renewable heating system in their home. As the house has ample space, a ground source heat pump was the best solution to provide all the heating and hot water for the property.

Key features:

- Isoenergy installed a 120kW heat pump system to provide all the heating and hot water required in the property.
- Energy for the heat pump is collected by a horizontal ground loop array in a field.



Location of the ground loop array



Slot-trench ground works



Elmdon Lodge



Elmdon Lodge is a house in a rural part of Essex that was heated by an oil-fired boiler which was failing. The replacement heat pump is connected to three 110 metre boreholes, drilled by a partner company. The heat pump provides energy for all spatial heating and domestic hot water systems at the house.

Key features:

- isoenergy installed a 17kW ground source heat pump.
- Heat is collected by 660 metres of ground loops in three vertical boreholes.
- The heat pump provides spatial heating through underfloor radiators of varying type. It also provides 500 litres of domestic hot water for the property.



Location of the bore hole array one year after installation



Heat pump and buffer tank in the plant room

Broadhurst Manor

Broadhurst Manor is a grade II* listed building in Sussex that has undergone extensive refurbishment and modernisation. The house was previously heated by oil fired boilers, one of which the owners wanted to replace with a more renewable heating solution. Isoenergy was asked to design and install a system which would help them to achieve this goal.

Key features:

- Installation of a 60kW ground source heat pump system for the main house.
- Heat is collected from a nearby lake using a horizontal array with 2.4 km of pipe collector.
- The system is docked to an existing oil fired boiler as back up and for extra heat during peak demand.



The Old Barn



A large scale refurbishment of a period building that was perched on an idyllic village corner, but did not have space for a ground source collector array. Isoenergy specified the use of air source heat pumps to provide heating and hot water for the house.

Key features:

- The installation of 2 x 11kW air source heat pumps. Slim-line tanks were utilised to fit into the tight space of The Old Barn.
- The attractive silver heat pumps have become a talking point and interesting feature of the garden.
- The compact pumps provide consistent, reliable heating and hot water whilst only taking up a few metres of garden space.
- The system has been complimented for its reliability and quiet running.



Plant room



The two heat pumps



Ground works in progress

Old Alresford House

Old Alresford House is an historic Georgian mansion, set in 35 acres of gardens and parkland in rural Hampshire. The current owners of the house approached isoenergy to install a renewable heating system for the house and pool.

Key features:

- Isoenergy installed an 80kW ground source heat pump to provide all the special heating and hot water for the house.
- The heat pump also heats the outdoor swimming pool in the swimming season.



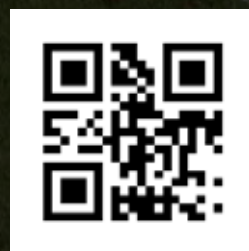


For more information...

visit www.isoenergy.co.uk

ISOenergy
sustainable energy systems

**The Stables
Meath Green Lane
Horley Surrey
RH6 8JA**



t: 01293 821345 e: energy@iso.co.uk