

REal Alternatives

Renewable Energy Systems on the Isle of Wight

Case Study I

GROUND SOURCE HEAT PUMP SHORWELL VILLAGE HALL



Shorwell Village Hall dates from 1920s and relies solely on electricity for heating and hot water. Being situated in a rural area mains gas is not an option. Having looked at all the types of renewable energy systems available it was felt that a Ground Source Heat Pump would be the most appropriate for this site.



Heat pump

The Heat Pump replaces electric storage heaters and single bar room heaters. It heats the Hall via a series of new high efficiency radiators. Installation was completed in January 2008.

"The community has been really pleased with the support we have received from all our partners to install this new heating system, which not only reduces our carbon footprint, but helps to make the village hall a more welcoming and viable community facility for the 21st Century."

**Denis Russell,
Shorwell Village Hall Committee.**

How does it work?

Heat Pumps convert low-grade heat into usable heat through compression. The system extracts heat from the ground which is used to evaporate a refrigerant circulating in the Heat Pump, creating a gas. This gas is compressed in a compressor creating heat. Heat is transferred into the building through a traditional 'wet' central heating system. Due to the high efficiency of the system, the Heat Pump produces 3-5kW of heat for each 1kW of electricity consumed.



Ground loop pipes



Radiators inside the hall

Technical Details

The ground array consists of 300m of pipe in three trenches. The pipe is filled with a glycol/water mix, circulated under ground to absorb latent heat and transfer it to the heat pump.

The unit is a Waterkotte 8Kw Ground Source Heat Pump, heating 9 Vogel and Noot high efficiency radiators. There is very little maintenance required.

Economic Analysis

Heat pump system, including ground loops	£9,850
Radiators – supply and installation	£3,000
Total running costs – existing system (electricity)	£680
Total running costs – heat pump	£195
Annual savings	£485
Payback (electricity price at installation date)	20 years
Payback (predicted electricity price at 5 years)*	12 years
CO2 emissions – existing system	1,200 kg
CO2 emissions – heat pump	325 kg
CO2 savings	875 kg p.a.

* based on 12% real rate of rise of electricity prices

Benefits

- A more comfortable environment for Hall users
- Reduced fuel charges
- Low maintenance costs
- Increased lettings and viability for the Village Hall
- Reduced maintenance of building fabric as condensation problems are removed
- No visual impacts so good for sensitive landscapes and urban environments

Project Details

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