



The Minus 7 hybrid energy harvester is a new, innovative and highly effective renewable energy system that provides hot water and heating for buildings. It's up to 60% cheaper to run than a gas boiler helping to future-proof against the rising cost of fuel in line with government strategy to provide low carbon solutions and affordable warmth.

The system is designed to keep a property at a comfortable temperature of at least 21 °C even in the worst case scenario of mid-winter. The system is capable of servicing up to four apartments at once making it highly suitable for housing associations or commercial buildings.

It's been classified as a 'solar-assisted, heat pump system' within the National Calculation Method (Standard Assessment Procedure). It is made up of several innovative, well designed and meticulously well thought through elements: a water-to-water heat pump, a large solar thermal collector and a thermal store. It harvests, processes and stores energy resulting in a very high performance system.

### **An innovative type of roofing**

One of the innovative parts of the system is that the primary source of heat harvesting is the roofing system - which means that no bolt-on solar collectors are required. The roofing system is made of weather-tight, interlocking, endothermic tile planks. The tile planks are made from an aluminium extrusion, dressed in a powder-coated, hard-wearing finish. The roofing system is flooded with a heat transfer fluid which absorbs heat energy and solar thermal energy, harvesting both day and night. Although there is no direct solar gain at night the system still harvests heat energy by means of an endothermic process absorbing at least 130 watts per m<sup>2</sup> per hour. A 20m<sup>2</sup> roof would harvest up to 14.0kWh in the daytime and as much as 2.6kWh as a steady state process.

### Using heat pump technology in an unexpected way

The Minus 7 system is the answer to the problems being experienced with heat pumps in the heating industry. Air or ground source heat pumps are load-demand connected to the building all the time, whereas the Minus 7 system heat pump element is decoupled from the building demand. The heat load is delivered by a 42KWh thermal store, not the heat pump. The heat pump is by-passed when solar heat energy is available. In essence, the system controller is programmed to minimise the operation of the heat pump module in favour of solar thermal. This is a step change.

### Overcoming the issues of heat pumps

The Minus 7 system is different to other systems. The water to water source heat pump is able to cope with high humidity and low air temperatures right down to  $-5^{\circ}\text{C}$  without ever having to resort to 'reverse cycling', as the heat pump extracts energy from a second thermal store dedicated to providing this energy supply. This is different to air source heat pumps that have evaporator air handling units that are prone to icing up, requiring energy to thaw out, reducing efficiency. The Minus 7 system overcomes this problem and maximises efficiency.

### Thermal store

The Minus 7 system uses a well insulated  $3.6\text{m}^3$  thermal store (a capacity of 3,600 litres), providing 42KWh of heat energy. The storage medium is water which is an excellent medium for heat transfer. It uses an ultra efficient 70W pump.

### A true hybrid

The system can harvest heat energy from various sources such as a back boiler fitted to a log, or multi-fuel, burner, or other 'waste' heat, which means it can be used in a variety of commercial buildings. It's fully autonomous and the solar energy processor intelligently prioritises harvesting heat from lower carbon energy heat sources. This means that the heat pump, which requires electricity to run, is always a secondary, or even

tertiary, source of heat.

### Mini-district heating

The system can be set up as a mini district heating system capable of delivering up to 200kWh/day. Apartments connected to the system do not require individual conventional gas boilers - reducing maintenance and service charges.

Fully UK manufactured, the roofing component is expected to last for more than 50 years and the solar energy processor will last for more than 20 years. All components are fully recyclable at end-of-life.

“We developed the Minus 7 system as we wanted to create a visually pleasing renewable energy system that was highly efficient and provided low cost heat and hot water for end users,” says Mark Wozencroft, Managing Director, of Minus 7. “It’s our mission to make renewable energy a sensible investment that will be beneficial to customers, provide affordable warmth, cut carbon emissions and reduce humanity’s negative impact on the environment. This is the time for our product to gain recognition and for it to transform the renewables market.”

**For more information and sales visit [www.minus7.co.uk](http://www.minus7.co.uk) , tel 01922 419405 or email [info@minus7.co.uk](mailto:info@minus7.co.uk)**

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