

People Exploring Low Energy Homes

## Mill Way, Grantchester CB3 9NB 3QP

**Ian Steen** – Ian says:

Since reading ‘Limits to Growth’ the report published by the Club of Rome in the 1970’s, I have been designing low energy buildings and my first and subsequent buildings won awards including awards for energy conservation.

Matters are now more serious and I am motivated by terror. Bryn Llynas’s book ‘6 Degrees’ sets out what might happen if global warming really gets going. Some of what he writes is bound to happen and we have to confront this appalling prospect.

Dealing with existing housing stock is vital and my own house is a work in progress. I insulated it internally 25 years ago.

More recently I built a house in Scotland that requires only 2.5kW to heat when it is freezing outside. It is zero carbon for heating. This high performance is achieved by using very high levels of insulation, and draught proofing with a heat reclaim ventilation system.



### Low Energy Measures

The design of the office is driven by the desire for simplicity and a tempered environment. Insulation values are well in excess of those required when the building was constructed in 1990.

Low maintenance finishes; block internal walls, tiled floors and plywood ceilings do not require regular painting. The tiled floor enables underfloor heating to work efficiently.

The dense block walls, which are not plastered, and the tiled floor provide **high thermal admittance** which maintains a tempered environment in the summer months.

**Underfloor heating** enables the spaces to be uncluttered and by providing radiant heat from the floor, **maintains optimum comfort in winter.**

**Walls:** Internal finish is a dense internal block with a 100mm **mineral wool insulated cavity**. The external block is a polyurethane filled light weight insulating block which is rendered externally. This gives a high level of insulation.

**Roof:** lined internally with ply and supported by exposed rafters is insulated with 200mm mineral wool insulation.

**Windows:** double glazed with low-E units and air-sealed throughout.

**Renewable energy:** A year ago I commissioned a **ground sourced heat pump** and 4kW of **Photovoltaic panels** on a southfacing roof.

#### Overview

Age, Type: **1990, Office Studio**

Walls, Floor area: **Insulated block cavity, 90 sq m**

Timescale of project: **Ongoing**

Cost of ground source heat pump: **£10,000**

#### Energy usage

After: **150 kW** per sq m pa electricity (projection)

Before: **92 kWh** per sq m pa electricity (2010)  
**22 litres** per sq m pa oil (2010)

#### Key features

+ insulation: walls, floor, roof

+ high thermal admittance, tempered environment

+ windows; double glazed, air-sealed throughout

+ floors: pamment tiles

+ underfloor heating system: optimum comfort

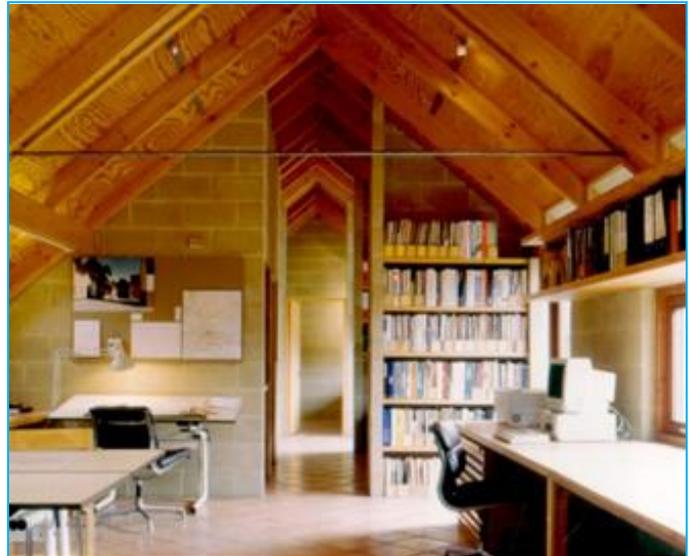
+ ground source heat pump

+ photovoltaic cells

+ low flush toilets

+ energy efficient appliances

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## Professional Contacts

**Architect:** Ian Steen [steenian@gmail.com](mailto:steenian@gmail.com)

**Builder:** Gatward Brothers

## Products

### Insulation

**Walls:** 100mm dense block,  
100mm mineral wool cavity,  
100mm polyurethane foam filled insulating block

**Roof:** 200mm mineral wool insulation.

**Floor:** suspended concrete insulated with 50mm polystyrene foam, part with an additional 60mm polyurethane foam.

Covered with pamment floor tiles for appearance, durability and to increase thermal transmission.

**Windows:** Double glazing throughout

### Heat and light

**Underfloor heating system:** Originally heated by an oil fired condensing boiler in house supplying low temperature hot water to under floor heating – now this has been replaced by GSHP.

**Ground source heat pump (GSHP):** IVT Greenline 6kW Heatpump with 2 x 200m pipes buried horizontally at a 1 metre depth in the garden, £10,000 including the ground works.

**Solar Photovoltaic (PV) system:** Sharp Electronics 3.96kW with Fronius IG TL Inverter, £12,000

**GSHP and PV system:** both supplied and installed by Ice Energy [www.iceenergy.co.uk](http://www.iceenergy.co.uk) 01865 882202