

People Exploring Energy Smart Homes

## 4 - Seymour St, CB1 3DH

**Debbie Whitfield, CHS** – Debbie says:

CHS Group owns and manages over 2,500 homes for rent and shared ownership. We run a broad range of high-quality services in Cambridgeshire, offering people more opportunities to achieve what they want and a better quality of life.

Our 80 years of **experience** means we can take both the long-term view and a fresh look at issues which cut across traditional boundaries. We take pride in our capacity **to innovate** and create new opportunities and choices.'

This project is focused on a particular housing archetype - the almshouse - and seeks to establish a **complementary and replicable** set of measures which significantly **reduce energy use and CO2 emissions**.



The challenges to **low carbon retrofit** presented by this property typify many of the issues prevalent in this housing type: uninsulated solid wall construction; poor quality single glazing; sensitive architectural character etc.

Our findings will inform the remainder of CHS's historic properties and will therefore be widely applicable to other social landlords or building owners with similar stock.

### Project Approach

This project is focused on a mid-terrace, one-bed almshouse property.

Our approach to **energy saving** and **CO2 reduction** is to follow a **lean-clean-green hierarchy**:

**Lean:** seeking to **minimise heat losses** from the property's **thermal fabric and ventilation method**;

**Clean:** to supply **residual space and water heating** using replicable, **low carbon technology**; to **minimise lighting and appliance energy loads**;

**Green:** and finally to consider **micro-generation** using proven, **renewable energy systems**.

### Energy Smart Measures

#### Space heating strategy

Heating is provided by mains gas via a micro CHP unit and new radiators. **Heat is recovered** from **exhaust air** via the use of **mechanical ventilation** with **high efficiency heat recovery unit**.

#### Water heating strategy

Hot water will be provided by mains gas via a **micro CHP unit** and new hot water cylinder.

### Overview

Period: **1913 Victorian, local conservation area**

Type: **Mid-terrace Almshouse**

Years in residence: **newly-occupied**

Wall type: **Solid brick**

Cost of measures: **£115,000**

### Key features

- + lean-clean-green: minimise heat loss, low carbon technology, renewable energy
- + heat recovery: exhaust air, high efficiency
- + micro CHP unit
- + solar photovoltaic (PV) panels
- + heat recovery ventilation (HRV): summer bypass, natural ventilation
- + airtightness: vents, chimneys blocked, air barrier
- + service void: windows, doors sealed, cavities filled
- + continuous insulation: junctions assessed
- + insulation: solid floors, windows, roof
- + heat saving thermal blinds
- + whole house modelling: SAP extension sheet
- + windows: high performance, secondary glazed
- + intelligent heating controller: save energy, improve comfort, monitor, learn occupant preferences
- + energy monitoring: simple, easy user interface

### Renewable energy generation

Onsite electric production by **0.7 kWp solar photovoltaic (PV) panels** and low carbon electricity production via gas fired micro CHP unit.

### Space cooling

**Heat recovery ventilation (HRV) with summer bypass** combined with **natural ventilation** for summer period. **Night purging** during heat waves.

### Ventilation

**HRV and additional natural ventilation** by opening windows during summer as required.

### Airtightness

All existing **vents and chimneys are blocked up**.

New **air barrier** created by OSB board at ceiling level with taped joints and perimeters taped to masonry walls and plastered over.

**Service void** created below this to eliminated penetrations. **Windows, floors, junctions and all penetrations sealed** with proprietary air tight tapes, membranes and grommets. All voids such as cavities are filled to mitigate thermal bypass.

### Minimising thermal bridges

**Continuous insulation** maintained throughout. Geometric thermal bridges minimised.

**Junctions assessed** include: Ground floor junction, external corner, party wall, party roof, party floor, eaves, verge, window jamb, head and sill, door jamb, head and threshold. Internal insulation has been returned on party walls.

### Modelling strategy

**Whole house modelling** was undertaken in **SAP**, with the use of **extension sheet**. Dynamic simulation was used to assess the impact of our proposed micro CHP heating system with the results fed back into the SAP extension sheet.

### Insulation strategy

The existing **solid floor is insulated** with a thin layer of **aerogel laminated chipboard** to achieve a U-value of 0.54 w/m<sup>2</sup>K – The existing solid walls are **dry lined internally with a high performance aerogel laminated board** to achieve a U-value of 0.15 w/m<sup>2</sup>K.

In order to be sympathetic to the architectural character of the area, the existing **sash windows** were replaced with a **modern high performance** version that replicates the same appearance and have a whole window U-value of 1.1 w/m<sup>2</sup>K.

Window performance is further improved by **secondary glazing** and innovative **heat saving thermal blinds**. The existing **roof insulation is topped up** with blown insulation to achieve a u-value of 0.1 w/m<sup>2</sup>K.



### Other relevant retrofit strategies

An **intelligent heating controller** designed to **save energy and improve comfort**.

The system controls both central and water heating, **reducing energy consumption** by automatically **monitoring and learning occupant behaviour and preferences**.

It also provides an **easy to use and simple user interface** as well as covering all **energy monitoring** requirements.

We propose to carry out additional monitoring of the innovative **heat saving thermal blinds**.

### Professional Contacts

**Architect:** ECD Architects, Studio 3 Blue Lion Place, 237 Long Lane, London SE1 4PU; [www.ecda.co.uk](http://www.ecda.co.uk)

**Contractor:** Roalco Ltd, Ardleigh House, Dedham Road, Ardleigh, Colchester, Essex CO7 7QA; [www.roalco.co.uk](http://www.roalco.co.uk)

### Products

**Thermal insulation:** Spacetherm C Insulated chipboard to floors; Spacetherm F drylining to the internal of the external walls; Rockprime loft insulation to pitched roof; Celotex rigid insulation to flat roof.

**Double Glazing:** Pilkington Legacy vacuum glazing.

**Heating/hot water:** Baxi Ecogen 24 HE micro combined heat and power unit.

**Ventilation:** Whole house EnergiVent Q MVHR

**Intelligent controls:** Wattbox