

# Extended Victorian House

## East End Road, Charlton Kings



2015



NUMBER OF BEDROOMS: 4

OCCUPANTS: 2 

### CONSTRUCTION:

Early Victorian cavity walls with solid brick and modern cavity wall extensions

### KEY FEATURES:

A well-insulated detached Victorian house with Micro CHP heating system and solar technologies.

### Measures installed

Micro combined heat and power (CHP)

Solar photovoltaics (1kWp system)

Solar thermal water heating

Cavity wall insulation (and some External wall insulation)

Double and triple glazing

### Carbon savings and potential benefits

Space heating with Feed in Tariff eligible electricity generation

Lifestyle changes to benefit from free electricity and Feed in Tariff payments

Free hot water and Renewable Heat Incentive payments

Improved thermal comfort and heat retention

Elimination of unwanted draughts

## The home & occupants

This 4 bed detached Victorian House in Charlton Kings has been lived in by the current owners for 30 years. This family home demonstrates how the changes and improvements made over a period of time have taken the house from being cold and

expensive to run to being a warm and comfortable home with low energy bills and with a low environmental impact.

## What they did

Shortly after moving into the house the owners found that they had a number of improvements to make to help in ensuring that their new home was habitable, particularly in the winter months.

Although the house is Victorian which usually means the construction is solid brick, this house is an early example of cavity wall construction. An initial job was therefore to get the cavity walls insulated which certainly helped in making the house warmer. They also fitted a gas central heating system which provided them with heating until 2004.

### What is Micro CHP?

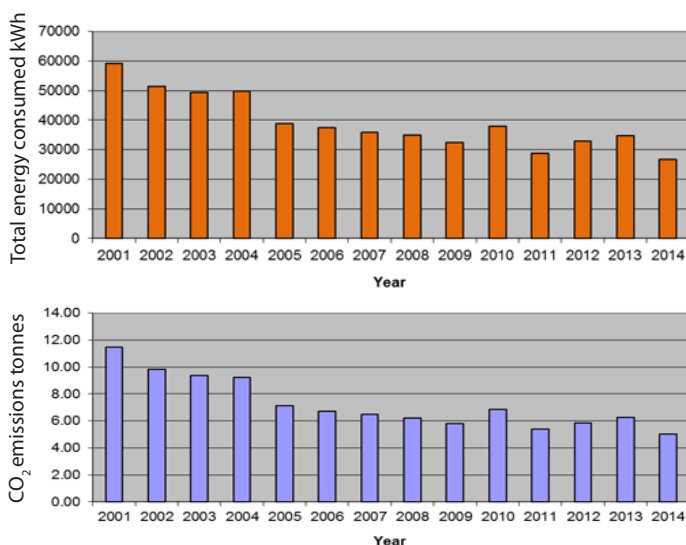
Micro combined heat and power systems (Micro CHP for short) are similar in size to conventional boilers and typically powered by mains gas or LPG. As well as generating heat that can be used in central heating and hot water systems, it also generates a small amount of electricity (an approximate estimate of 1 unit of electricity for every 6 of heat produced). This electricity can then be used in the home helping the homeowner to reduce electricity import and cost, as well as being eligible for the governments 'Feed in Tariff' scheme.

"There is no question that the improvements we have made have resulted in the house being more comfortable, and the savings speak for themselves."



## Micro CHP

In the early 2000s the owners were becoming increasingly concerned about the future impacts of climate change, and wanted to see what else they could do to 'do their bit' within the improvements that they wanted to make to their home. The gas boiler was getting old by this time and needed to be replaced. Whilst looking for an alternative, they came across a trial of Micro CHP being run by the energy company EON who were looking for applicants. The Whispergen CHP was installed in 2004 in the garage and has been supplying heating and hot water (when the solar thermal requires a top up!) ever since. Having a keen interest and knowledge of heating controls, a thermostatic system was also integrated and has been improved upon ever since. The owners noticed reduced energy costs straight after the installation, and now also benefit from the 'Feed in Tariff' scheme which provides them with a small income based on the electricity that the CHP generates as part of its operation. Although there is also a gas fire and wood stove in the house, these are generally only ever needed and used if it is very cold for a sustained period of time.



The owner of this house has kept detailed energy records since 2001 which show how the energy efficiency and renewable energy improvements have reduced the amount of energy they use over a year from around 59,000kWhs (gas and electric) to under 27000 in 2014. A reduction of over 50% which is also reflected in annual Co2 emissions which have dropped from 11.45 to 5 tonnes over the same period.

## Solar technologies

In 2002 the owners installed a 1kWp solar PV system on the roof of the house. Although by today's standards this is quite a small system, they generate a healthy 900kWhs of electricity a year from this, and it also demonstrates just how reliable solar technology is. It is now 13 years old and is still going strong, with just a replacement inverter required in year 12 for its upkeep.

A solar thermal system has also been added which provides the majority of the homes hot water requirements with typically only a small amount of top-up required in the afternoon to ensure that there is enough hot water for the day.



*Solar technologies and external wall insulation*

## Fabric improvements

In 2013, the existing kitchen and utility area at the back of the house which was not of cavity wall construction and one of the coldest parts of the house was re-built. As part of the re-design the owners insisted that the walls and roof be well insulated as well as fitting new triple and double glazed window units. Some of the other, older double glazed units have also been replaced with modern, more efficient replacements.

The only other area of the house that had not benefitted from the cavity insulation was a first floor bathroom which was of solid brick construction. Insulating or re-building this area internally would have been an expensive and complicated building job, and the external insulation that was added, a Celotex insulation board has improved the comfort in this room greatly. It is almost impossible to see where the wall has been externally insulated, something the owners are very pleased with as they were concerned that the insulation would affect the overall appearance of the house.

## What are the next steps?

When the owners were replacing the old double glazing with modern replacement glazing around a third of the cavity wall insulation, a polystyrene beading product - similar to what you might find in a bean bag, came out during the insulation process. They are now looking into the possibility of topping this up to help in preventing cold spots around the house (where the insulation is missing).

They are also looking to further improve some areas of loft insulation, insulating in the eaves of the house as well as ongoing refinements to the heating controls - an aspect of particular interest for the owner. The owner commented, "Juggling multiple energy sources to get the best out of them is quite a challenge!"

### **If I could offer one piece of advice it would be...**

**"Modern thermostatic controls for your heating system, including those with a web interface, are a good investment. A 1°C reduction in room temperature can save 10% in fuel costs."**