

# Greening your Home – an Introduction

## Passive Solar

New houses can and should be designed to take advantage of solar energy in the placement of windows, conservatories, etc. This can be done, for example, by putting most windows on the south side and designing airflow to promote natural cooling in the summer.

On many existing houses the opportunities are more limited but glazed porches and careful planning of ventilation can make a considerable difference.

[www.sustainablebuild.co.uk/PassiveDesign.html](http://www.sustainablebuild.co.uk/PassiveDesign.html)

## Heat Recovery

Hot moist air from kitchens and bathrooms can be ducted to a heat exchanger in the loft where it is used to warm incoming ventilation air before being safely exhausted to the outside. [www.genvex.co.uk/](http://www.genvex.co.uk/)

## Heating

The answer to the question “What heat source is best?” is never easy because circumstances vary so much.

### Efficient Use of Gas

Most people still have little choice but to use gas for heating. Here efficiency is the keyword. Replacing an old boiler with a modern condensing boiler will greatly improve efficiency.

As the current lifespan of a boiler is around 15 years, choosing a heating system with a high efficiency condensing boiler with the correct heating controls can make a huge difference to your heating bills over time.

Boilers account for around 60% of the carbon dioxide emissions in a gas heated home. By fitting a new high efficiency condensing boiler with full heating controls, you will significantly cut your home's carbon dioxide emissions and could save as much as £270 a year on your heating bill.

## Generating your own Electricity

**Photovoltaic (PV)** panels can produce a significant amount of power. This is grid linked so surplus electricity can be sold to the power company and bought back when the sun isn't shining.

However, PV panels are still expensive and only affordable if you can get a large grant. Current types also use large amounts of silicone and contain considerable 'embodied energy' that is energy used in their manufacture. New 'thin film' systems are being rapidly developed and the cost is set to fall dramatically in the next few years.

**Wind power** is not really viable in a suburban domestic situation, but it can be in a rural environment where there is space for a free-standing tower and few obstructions to cause turbulence.

## Solar Thermal

Solar water heating has become enormously more efficient and affordable over the last few years and evacuated tubes are already appearing on many roofs in our area.

A relatively modest system can provide all your hot water for more than six months of the year and contribute significantly on all but the darkest cloudy days.

## Wood burning stoves and sources of wood

Traditionally wood has been used for heating and wood, used efficiently, in a modern stove is a sustainable resource.

Open fires are extremely inefficient and wasteful of resources even to the point of making the room colder in some cases.

Whilst it is not possible for everybody to install a wood burner and there would not be enough wood to go round if they did, there is a vast amount of wood that is wasted. Enterprising collection from local builders and neighbours, coupled with a modern efficient stove could save an enormous amount of CO<sub>2</sub>.

## Wood Recycling

There is an awful lot of safely burnable timber that goes unnecessarily to landfill from building operations and garden work. For example, an old garden shed, old wooden fencing or timber from tree pruning.

Offering unwanted wood through Freecycle provides fuel for wood burners, saves recoverable energy from going into landfill and relieves many people of difficult to dispose of wood. Encouraging builders and other contractors to participate, could save even more energy and reduce their disposal costs.

Any wood which is not painted or saturated with creosote can be burned in a wood burner stove provided it is dry.

## Our house as an example

We, Richard and Frances Jannaway, live in a mid terrace ex-council house in Emsworth and have been planning to 'green' it for the last two years.

### Current situation

Like many other houses, we already have double glazing and 10cm of conventional loft insulation which we plan to top up with Ecowool (recycled plastic bottles) before the winter. In addition, cavity wall insulation will be installed in September and we have already changed our electricity supplier to Ecotricity because they invest in renewable energy.

### Future Plans

The next stage is to decide on the energy we want to use for heating. We have been considering two plans:

#### 1) The 'ideal' system

This is an extremely efficient heating system with

- a very big hot water tank known as a **thermal store** into which heat would be fed from
- a large wood burner to provide hot water, central heating and room heating in the living room
- a big solar thermal array (30 tubes) and
- a backup gas condensing boiler.

This super efficient system would provide 'free' hot water and central heating using little or no gas in the winter and plenty of 'free' hot water in the summer.

There were two problems with this system.

- The first is wood supply and space for storage and cutting to provide the fuel for a central heating system.
- The second is the cost, which would be around £12,000 for the complete system.

This ideal system would be better suited to a larger house and garden than ours with a larger family.

## 2) A more realistic system

The revised design, more appropriate for our house, situation and pocket consists of:

- new, highly efficient condensing gas boiler
- smaller solar array (20 tubes) with new hot water tank and
- small very efficient modern wood burner for heating the living room which could be plumbed into the hot water tank.

The cost of this system is about £6,000 in total. Gas use will be low as we will only need to run the boiler for a short time in the morning for central heating and to top up the hot water in winter.

### Two brands of solar thermal arrays are being considered

Both are basically the same type – evacuated tubes using ‘heat pipe’ technology

- The ‘**Apricus**’ arrays are those used by a local installer. See leaflets, demonstration set and website: [www.apricus.com](http://www.apricus.com)

This system will cost about £3,200 including a new ‘twin coil’ hot water tank and installation.

- The other brand is **Navitron**, which is considerably less expensive and available for DIY installation (approx. £1,200 for materials) with detailed support from the supplier. The quality is very similar to Apricus. See website: [www.navitron.org.uk](http://www.navitron.org.uk) for details. The installed cost should be around £2,500 at normal plumber’s rates including a new tank.

### Eco Centre

Cover’s Eco Centre in Chichester, Quarry Lane site has a wide variety of eco products and some installations, including wood burners, thermal stores, heat recovery system, solar tubes, photovoltaic panels, wood pellet boilers, eco paints, natural and recycled insulation.

## ***Eco Renovation in Bedhampton***

**Vida and Roy Henning** renovated a rundown 1960's bungalow, into a state of the art low carbon home. Vida emphasised how thorough eco renovation only makes sense if the property is run down because it is not a sustainable use of materials to scrap perfectly serviceable structures.

All round insulation is the first priority and Vida described how they used 'Warmcel' recycled newspaper insulation in the loft and under the wooden floor and 'Rockwool' blown mineral fibre in the cavity walls. New windows and doors were wood framed and double or triple glazed, they kept the existing PVC double glazed windows where they were serviceable.

The second priority was energy input. Here they have used solar thermal collectors for hot water and 3.44 kw Photovoltaic (PV) panels (grid linked, see above) to provide electricity. Roy said how the solar hot water collectors were very cost effective but he was not so sure about the PV panels. The panels were viable for them because they were extremely lucky to get a government grant of £16,000 towards the total £22,000 cost of the energy systems.

With electricity at very low cost, it made sense to heat with electricity, supplemented with a modern wood burner. The core of this system is an 'everhot' range cooker which runs on a slow steady electricity input and stores energy like a storage heater. Efficient electronically controlled storage radiators complete the system.

It is early days yet but it seems probable that their net bought in energy use over a whole year will be nearly zero.



*Pictures (generic pictures from 'Sunpowered Ltd, not Vida and Roy's house'): Top, photovoltaic panels Bottom: solar thermal collectors.*