

## SHORTENILLS ENVIRONMENTAL EDUCATION CENTRE PV ARRAY

**Existing or Proposed Project:**

SOLAR - EXISTING – COMMISSIONED April 2001

BIOMASS – EXISTING – COMMISSIONED April 2004



**Location:**

SHORTENILLS ENVIRONMENTAL EDUCATION CENTRE, CHALFONT ST GILES, BUCKINGHAMSHIRE  
SHORTENILLS ENVIRONMENTAL EDUCATION TRUST

**Project Leader:**

**Description:**

PV array, doubling as a shelter, designed to highlight how sustainability can be built into everyday structures. Biomass boiler installed to provide space heating and hot water.



## Background

The Shortenills Environmental Education Centre has provided quality environmental education to the children of Buckinghamshire for over 50 years. Ever keen to highlight issues of sustainability, it was decided that some form of solar demonstration installation was required. The solution was the array above, which performs the obvious function of shelter, but also helps to offset some of the centre's electrical needs thanks to the embedded photovoltaic cells. Two years on, the centre decided to look at the possibility of utilising biomass to provide their space heating and hot water needs. The result was a biomass boiler installation in April 2004.

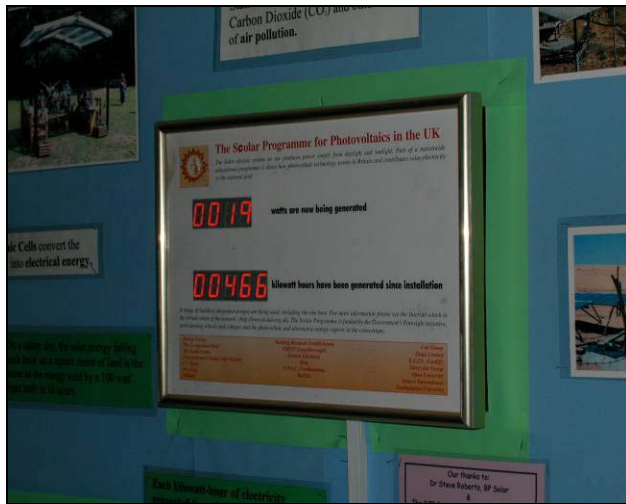
## The Technology / Scope of Project

### Solar Photovoltaic Pergola

The array is made up of 6 modules comprising 48 monocrystalline silicon cells connected in series. Each module has a 96 watt peak average output. The cells are encapsulated between two sheets of 4mm toughened glass. Each module is 2155mm x 500mm and the 6 are mounted in two sets of three each side of the roof of the canopy.

The electricity produced is exported back to the grid via a reverse cycle meter. On a sunny day the system produces enough electricity to offset the power requirements of several lights within the centre.

The system cost in the region of £11,000 and was funded by BP Solar (as part of their Solar Programme) and local company, Amersham plc. The installation was undertaken by Energy Equipment Testing Services (EETS) and includes a digital display in one of the classrooms for educational purposes, pictured below.



### Biomass Boiler

In 2003, after a site visit and energy audit by TV Energy, the Shortenills Centre decided to pursue the option of converting their heat source from oil to biomass. A feasibility study was commissioned and the results looked promising. The new biomass boiler proposed was an 80kW Veto boiler which would be housed in a new boiler house and directly fed with woodchips from an adjacent hopper. Econergy Ltd were contracted to conduct the feasibility study and subsequently to install and commission the new boiler.

The fuel for the boiler is sourced from a neighbouring wood owned by the Woodland Trust, Philipshill Wood, and the boiler uses approximately 56 tonnes per year.



*The Woodchip Boiler*



*Loading the Hopper*

### **Importance to the Thames Valley**

This project is important on a number of levels.

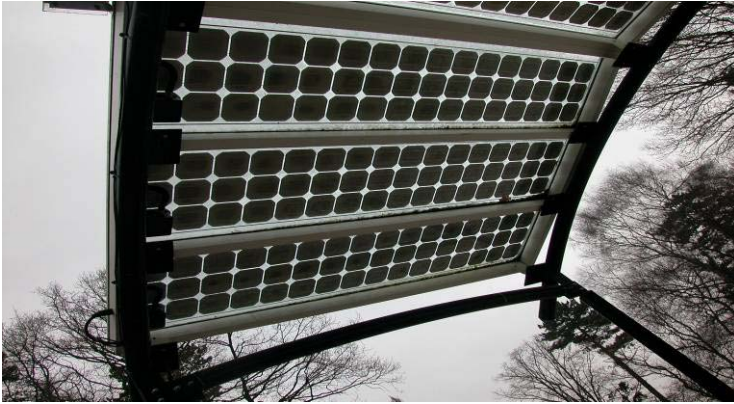
Firstly, it provides an introduction to solar technology for a whole generation of Buckinghamshire children, providing a valuable, working example of sustainable energy solutions.

Secondly, it demonstrates the ease with which PV can be built into everyday structures and how the result does not have to be bizarre or unusual. It is a working example for developers and architects that enables them to see at first hand the scope for integrating PV into the built environment.

Finally, this is the first small scale biomass heating installation in Buckinghamshire. It is an excellent example of the use of biomass fuel for heating and demonstrates a local solution for the fuel supply. By installing the system at Shortenills a wide spectrum of children from across the county will be introduced to biomass as a fuel in addition, to the large number of adults through the centre. This first installation will provide a base on which further replication can be built in other buildings across the county and the Thames Valley.

### **Future Plans**

The Centre is seeking to develop a new facility that will meet the needs of the 21<sup>st</sup> century. The Trust is currently seeking funding in this area. The immediate aim is to replace the accommodation blocks with more flexible and sustainable buildings. Outline planning permission has already been obtained for an ambitious earth-sheltered, passive solar heated education and catering block. It is also hoped to expand the number renewable energy projects on the site, with particular interest being expressed in wind energy.



## Other innovations

As well as incorporating energy efficiency, the centre has also fitted some cutting edge energy efficiency technology.

Infrared movement detectors have been fitted in the education blocks. These control the turning on and off of the lighting. If movement is detected in the building, then the lights come on, similarly, if there is no movement, then the lights will switch themselves off after a pre-set time, thus saving unnecessary use of electricity and money on bills.

A further innovative feature that has been installed are a number of SunPipes. The idea behind this installation is to pipe natural light from the rooftop into areas where light from windows can struggle to penetrate.

'Sunpipes' were first used approximately 4000 years ago when the Egyptians used light shafts and mirrors to bring daylight down into the centre of the pyramids. The modern version was patented in 1988 by Monodraught (a High Wycombe based company – 01494 897700), who recognised the energy saving potential applying this product to British rooftops.

The product works by reflecting and intensifying sunlight and even normal daylight down through a highly reflective silvered mirror-finish aluminium tube. A clear UV stabilized polycarbonate top dome seals the light pipe against the ingress of dust and a clear stipple finish polycarbonate dome at ceiling level evenly diffuses light into the room or space below. There is virtually no limit to the length or number of bends that a system can incorporate, making the product a highly versatile lighting option.

Pictures from Shortenills are below and the SunPipes are also installed at Maidenhead & District Housing Association's Integer homes at Alpine Close, Greenfields, Maidenhead (see case study on this site).



*The Sun-Pipes from the Outside of the Building.*



*The Effect of the Sun-Pipes Inside the Building.*