



SOLAR PHOTOVOLTAIC

These briefing papers describe sustainability actions at the University of Bradford as part of the development of our Ecovercity programme.

These papers are developed through The Sustainable Education Directorate together with the University staff and students featured inside, and are part of our commitment to improving communication around Ecovercity.

Comments and feedback are welcome and should be sent to: ecoversity@bradford.ac.uk

What is a Solar Photovoltaic Array ?

The term photovoltaics is used to define the direct conversion of light into Electricity. This is typically done using solar cells, which are comprised of a thin piece of semiconducting material treated with impurities to create two layers with an imbalance of electrons between them. When light is absorbed by the cell, energy from the photons creates a flow of electrons in the semiconductor, generating an electrical current that is subsequently harnessed by metal conductors attached to the cell.

Why did the University install a PV Array ?

The University was refurbishing the old Refectory to create a new computer cluster room as part of the ESCALATE Centre. The windows fronting onto Great Horton Road are South facing, which means that in sunny weather the room experiences considerable heating from sunlight, hence there was a need to shade the windows without reducing daylight. This was achieved by creating shading (other examples of external shades can be seen on the front of the IPI building on Norcroft Brow). Such shades are known as Brise Soleil. Tony Sweeting in the Estates Department realized that as the University was having to pay for the cost of shades they could make the shades out of solar panels- which would not only block the sunlight but also generate electricity.

Isn't that expensive ?

Well solar panels are expensive and typically the electricity they produce is more expensive (about 12p for a kWh) than electricity bought from the National Grid (currently 8p kWh from coal and gas generated electricity). The cost of the solar panel shade was £44,000 but half of that was paid for by the Government from a grant under the Low Carbon BP. This meant the net cost to the University was £22,000 which was cheaper than the £25,000 it would have cost to install standard Brise Soleil -with the added bonus of generating our own electricity and reducing our electricity bills.

How long have they been working ?

Two solar Arrays comprising 30 Eco-Energy panels were installed and wired up in March 2009 (about 30 square metres). The Arrays are angled at about 10 degrees. They have a power rating of 6kW. The electricity generated is used to provide power to the ESCALATE Centre

How much electricity have they produced ?

As the amount of solar radiation varies day to day and throughout the year the amount of electricity will vary. Hence more electricity will be generated in the Summer than Winter and on sunny days than cloudy days. The solar cells however still produce electricity when the sun isn't shining. As a result of seasonal variations the maximum level of solar availability ranges from 0.47kWh/m²/d-1 during the month of December, to 4.84kWh/m²/d-1 in July.

The panels have around a 16% conversion efficiency. There is a display panel on the F floor link corridor which shows the amount of electricity generated in real-time, and in total, since the panels were installed. Latest data shows that in the first 6 months of operation that a total of 2963 kWh has been generated (worth around £252, saving 1.5 tonnes of carbon).

A second Photovoltaic Array (30kW) is planned for the refurbished communal building, with the support of grant-aid. Other schemes are being considered for other buildings on Campus.

Further Information

For further information or communication on Ecoversity or this briefing paper email ecoversity@bradford.ac.uk

For more detail on Ecoversity:
www.bradford.ac.uk/ecoversity