

PV



in The Built Environment

January 2000

UK Activities for Task VII of the IEA Photovoltaic Power Systems Programme

This newsletter is the fourth in a series designed to inform those interested in Building Integrated Photovoltaics (BiPV) of recent activities associated with the IEA Task VII – PV in the Built Environment. It summarises the latest developments in building integrated photovoltaic systems including activities undertaken in the UK under the DTI PV programme, actions on-going within Task VII and some major international projects and programmes.

PV in Non-Building Structures

Photovoltaic (PV) modules can be incorporated in Non-Building Structures such as bus shelters, street lights and sound barriers. The potential for using PV in Non-Building Structures in the built environment is large, even in a modern society where the electricity network is well developed. The cost of a small PV supply can be less than the cost of extending and connecting a nearby electricity supply cable. Designs for PV systems integrated into Non-Building Structures need to consider a range of criteria such as shading, orientation, visual impact and technical requirements. Past experience has also shown that theft and vandalism can be a problem for the introduction of PV in these kinds of applications. A selection of three non-building products is briefly described below. These illustrate the versatility of PV in the urban environment.

PV illuminated bus timetable

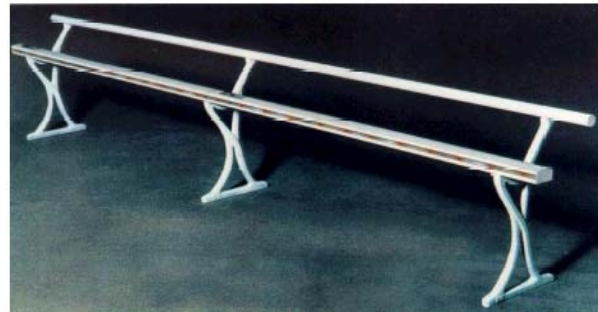


A stand-alone PV powered illuminated bus timetable is made very energy efficient through the application of a movement sensor that activates the lighting and energy efficient lighting by LEDs. The PV is glued to the top part of the timetable and is so small that it is not very vulnerable to theft.

Bus information system by Ebo Scherpenzeel Beheer BV

PV Pedestrian safety handrail

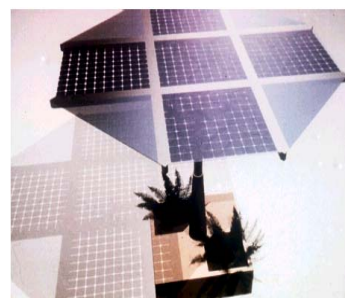
This handrail is powered by 10 Wp PV a-Si modules integrated in the shape of the steel profile. With an interesting aesthetic appearance, this is designed to be placed in pedestrian streets, bridges, etc. for protecting people from car traffic. By using LED lights the energy consumption is significantly reduced.



PV powered walk street fence (NEDO)

PV Umbrella

The structure can be inclined from 0 to 20 degrees, to respond better to the local solar conditions, and give optimum shading. The umbrella consists of a steel structure capable of supporting a maximum of five photovoltaic panels of one square meter each. The design of the large square base, besides counterbalancing the structure, also offers the placement of several accessories such as the seats that hide the batteries, a table, planters, and a small light fixture. The project allows the use of coloured fabric or polycarbonate at the four corners of the cover, so that the object may blend into the environment in which it is used, tourist villages for example, or to display company logos.



Rendering of the umbrella (Officine di Architettura, Cinzia Abbate)

Task VII Design Competition

International Competition to harness the power of the sun in buildings!



To date only a limited number of building integrated PV systems have been developed and a substantial opportunity exists for new product designs that are innovative, aesthetically pleasing and cost competitive

In order to encourage these new designs to be created a competition has been organised by the



International Energy Agency group responsible for PV in the Built Environment, the competition announcement has been distributed to over 20 countries and is open to anyone with an interest in renewable energy technologies.

The organisers, Halcrow Gilbert, have secured sponsorship from eminent companies actively involved with Photovoltaics including: Shell Renewables and Eastern Generation (Main sponsors); Plus Wall Limited and Colt International Limited (Category sponsors).

Cash prizes will be awarded to the best entry in each category (1500 Euros), the best student entry in each category (750 Euros), the best overall entry (1500 Euros) and the best overall student entry (750 Euros).

The short-listed entries will be on show at the 16th European PV Conference in Glasgow, 1 to 5 May 2000, and the winners will be announced at the closing session of the conference.

Further information is available at the Task VII website: www.task7.org. Those without access to the web can contact Dr Angela M^cKenna at Halcrow Gilbert, Burderop Park, Swindon, Wiltshire, SN4 0QD.

So far, many registrations have been received from all over the world, including Australia, Austria, France, Germany, Japan, the Netherlands, Switzerland, the UK and the United States.

The deadline for submission of entries is 29 February 2000.

DTI PV Programme Activities

This section briefly reviews some of the on-going projects managed by ETSU under the Department of Trade and Industry's Photovoltaic Programme. The emphasis of the programme is on gaining an understanding of the opportunities for, and barriers to photovoltaics so as to inform industry and government. Building integrated applications are one of the priority areas identified within the programme.

Progress on DTI Initiatives

The following gives an update of the progress of the three initiatives for the development of photovoltaics launched by the DTI last February; a call for proposals for the development of PV components and systems, a field trial of around 100 domestic PV systems and the design of a potential scheme for demonstrations of PV in large-scale building applications. The total value of the three initiatives is estimated at £15m over three years including industry contributions, with Government support of around £5m.

PV components and systems call for proposals

The PV Components and Systems Call for Proposals was undertaken in the summer last year. Out of 70 invitations to tender, 28 outline proposals were received. Ten projects have been taken forward and at least four are already in contract with the DTI. The DTI is expecting to commit around £1M of funding as a result of the call for proposals. BIPV projects will account for around £270k of funding

Domestic PV systems field trial

A Call for Proposals for projects to contribute to the DTI funded domestic photovoltaic field trial is planned for March/April this year. The field trial will install at least 100 domestic PV systems with the aim of using the design, construction and monitoring of the installations as a learning opportunity for the utilities, building developers and other key players in the process. Systems will be installed in clusters of around five to twenty five installations on new build developments or major refurbishment projects.

The Call for Proposals in March/April will be for the recruitment of the project teams to install and monitor groups of domestic PV systems. Proposals will be judged against the contribution to the scope of the field trial, and a selection of projects will be recruited to fulfil the target installation of 100 systems.

If you are involved in a new build housing development or major domestic refurbishment project in the UK with plans to include PV which may be applicable to the field trial you can contact

Madeline Wood to obtain further details and register for the Call for Proposals.

Madeline Wood, B153, ETSU, Harwell, Didcot, Oxfordshire, OX11 0RA
Tel.: 01235 433137, Fax.: 01235 433434, e-mail: madeline.wood@aeat.co.uk

Large scale BiPV demonstration scheme

The demonstration scheme for the support of large building-integrated PV projects in UK has now been defined, through a contract led by ECD Ltd. The UKPV industry has been consulted as part of the definition process. The development of the scheme is running to schedule and is on line to start in early Autumn this year.

Other DTI Projects

Design study publication

The funding of BIPV design studies by the DTI has been reported in previous newsletter issues. The aim of the work is to raise the capability and confidence of building designers to integrate PV into their buildings in the most cost-effective way. A BIPV design workshop was held in November last year to share the experiences of the design teams involved in the studies. This event proved to be successful and now the results of the design studies and workshop are being brought together in a Review of BIPV Design. The publication is being produced by Studio E Architects and is due to be published in April this year.

Action plan for Photovoltaic Standards

The report of the action plan for photovoltaic standards has recently been published. This DTI and UK PV industry funded project, led by IT Power, assessed the current status of the development of standards for PV and through the use of working groups and consultation developed an action plan to take standards work forward. In the area of the building integration of PV the following high priority activities were identified as the next steps:

- Development of cooperation between the building industry and the PV industry on all levels
- Safety aspects
- Development of methods for the integration of PV modules in curtain wall systems, including electrical connections
- Guidelines for the use of different types of glass used
- Electrical installation aspects
- Requirements for PV modules

The areas of safety and electrical installation are already being taken forward.

The report is available from the ETSU N&RE Enquiries Bureau (ETSU S/P2/00294/REP).

BIPV design with Land Securities Victoria Development

This project involves the redevelopment of a large site on Victoria Street London for a mixture of office and commercial uses. The design study will investigate the influence on the design process of including PV as an integral part of the building.

BRE Office Building

Support is being given for the monitoring of the amorphous silicon PV installation at the BRE low energy offices at Watford.

UK Activities

The Kensal Green Solar Urban Village

By integrating photovoltaic cells into buildings, the building produces electricity as well as using it, resulting in a saving of running costs as well as a contribution to reducing greenhouse gas emissions. Architects increasingly explore new ways of using this technology, causing the need for engineers to gain experience and technical capability in PV systems design.

To gain experience was one of the objectives of a design study recently completed by the engineers Whitby & Bird on behalf of The Energy Technology Support Unit for the Department of Trade and Industry under the UK Solar Programme. It has been focussed on a mixed use development for the Peabody Trust on a brownfield site in Kensal Green, West London.



To demonstrate the use of renewable energy in an urban setting, both residential and commercial buildings will incorporate PV panels where possible, replacing 1500m² of conventional cladding material on roofs and façades. On the sunniest days, the system will generate 200kW, meeting all electricity requirements of the site. A site-wide energy management system will move power between

buildings to meet local demand. Annually, 15% of the development's local electricity needs will be PV-generated, which will have the added benefit of reducing carbon dioxide emissions by 200 tonnes.

PV Building Integration Concepts

The Proceedings of the Task VII workshop held last February in Lausanne, Switzerland are shortly to be published and will be accessible from the Task VII web page.

With the rapid growth of the market for building integrated PV a wide range of products have been developed and a review of commercially available mounting systems is included in the Proceedings. Some product examples were given in the last newsletter. Building integrated PV projects are increasingly focussing on the need to satisfy architectural and construction requirements as well as giving a good energy yield. Innovation is being driven by programmes such as PV Bonus, in the

USA, and large-scale demonstration projects such as the Nieuwland development in the city of Amersfoort, the Netherlands. A total of 51 products are reviewed by Task VII experts who have direct experience of using these products. These include PV roof tiles, PV profiles for sloped roofs, PV on flat roofs and PV in facades.

The Proceedings have been produced by Halcrow Gilbert.



Photo: The 1 MW_p PV project in Amersfoort, the Netherlands, taken by Jan van Ijken of Fotografie, Amersfoort

Future Events

	Date and venue	Description of Programme
World Sustainable Energy Day 2000	9-10 March 2000 Wels, Austria For further details contact O.Ö., fax. +43 (0) 732 6584 4383	Forum for presenting sustainable energy solutions, planning political initiatives, launching new projects and starting partnerships
Energy for the New Millennium	8-10 March 2000 Sydney, Australia For further details contact The Meetings Manager, fax. +61 (0) 2 9241 5354	Combined conferences of the Electricity Supply Association of Australia, ANZSES, the IEA SolarPACES Programme and IEA Tasks V and VII.
16th European PV Conference and Exhibition	1 - 5 May 2000 Glasgow, Scotland For further details contact WIP-Munich, Sylvensteinstr. 2, D-81369 München, Germany Tel. +49 89 7201235, Fax. +49 89 7201291, World Wide Web: http://www.wip.tnet.de	This is the main European conference specific to Photovoltaics, covering all aspects from basic cell research through building integrated PV systems to policies and markets.
EuroSun 2000	19-22 June 2000 Copenhagen, Denmark For further details contact "EuroSun" c/o DIS Congress Service Copenhagen A/S, fax. +45 (0) 4492 5050	The third ISES-Europe Solar Congress
World Renewable Energy Congress VI	1-7 July 2000 Brighton For further details contact Prof. Ali Sayigh, 147 Hilmanton, Lower Earley, Reading RG6 4HN	A conference including all renewable energies with the emphasis this year on environmental issues and policies
Solar Millennium Congress	25-28 October 2000 Toulouse, France For further details contact the European Solar Council, fax. +33 (0) 1 44 180036	Conference, technical exhibition and festival
Upcoming Task VII Meeting	6-7 March 2000, Sydney, Australia	This is to be held in conjunction with the Energy for the New Millennium Conferences