PV in The Built Environment

October 1999

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

This newsletter is the third 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 Products Review

A workshop on PV integration concepts was held at EPFL in Lausanne, Switzerland on 11 and 12 February 1999. The workshop was organised by Task VII and attended by 75 delegates from 13 countries. Delegates had a variety of backgrounds including PV manufacturers, PV installers, architects, engineers, energy consultants and government representatives. A review of PV products was drafted for the workshop and formed the basis for discussion. A selection of three flat roof systems is briefly described below.

Ascension Technology RoofJack System

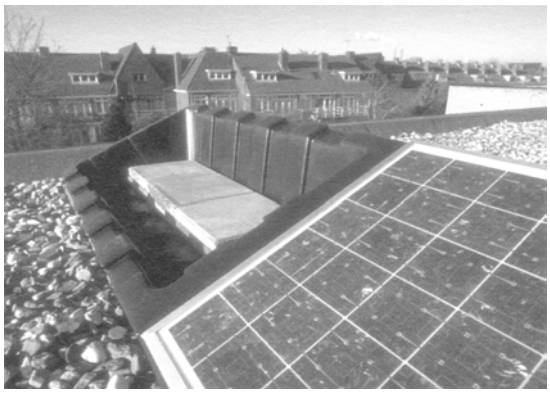
Ascension Technology's RoofJack system is a sheet metal tray with a vertical bracket to support large area PV modules. Units can be bolted together and come in fixed 10°, 15° and 25° versions. They can be mounted on flat roofs without the need for roof penetrations as the trays are filled with ballast (stone or concrete). Each RoofJack has a footprint of 2.01m x 1.12m with a 50mm lip on the tray and has a galvanised steel finish. For more information contact Ascension Technology, tel. +1 781-890-8844, fax. +1 781-890-2050, or e-mail ekern@ascensiontech.com

Sofrel 98 (Solar Flat Roof Element)

The SOFREL 98 system consists of two concrete elements designed to support 120Wp modules, 650mm wide. Either laminated or framed modules can be supported. The tilt angle is 30° and the concrete elements do not require roof penetrations for support. For more information contact Solstis S.a.r.l, tel. +41 (0) 22-786-3700 or fax. +41 (0) 22-786-6380.

Ecofys ConSole

The ConSole is a modular support structure for mounting PV's on flat roofs. The size of each unit is 1350 x 380 x 730mm and is designed to support one 120Wp module. The angle of tilt is 25°. The units are manufactured from recycled chlorine free polyethylene and are black. Fixing of the units is by addition of ballast into the ConSole, and no roof penetrations are required. The PV module is fixed with screws to 4 predrilled mounting slots in the ConSole frame. For more information contact Ecofys, tel. +31 (0) 30 2913400 or fax. +31 (0) 30 2913401.



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Task VII Design Competition

Photovoltaic Products for the Built Environment

Photovoltaics (PV) are the only electricity generating renewable energy technology suitable for deployment in the urban environment. If global warming is to be controlled renewable energy technologies will need to be deployed in many places and forms. PVs have the potential to supply significant part of our electricity requirements and are expected to become increasingly visible in the built environment in the future. However integrating PV in the built environment should enhance that environment, rather than detract from it. This design competition is being organised by Halcrow Gilbert as a Task VII activity with the aim of encouraging the design of well-integrated and well-designed PV products.

The competition is open to individuals and organisations throughout the world (although entries must be submitted in English). Architects, engineers, designers and students of these fields with an interest in renewable energy, good design and the built environment are invited to enter the competition.

Entries will be grouped into the following categories:

- Sloped roof products
- Flat roof products
- Façade products
- Other building products, e.g. shading devices building entrances
- Non-building products
- PV products recently released onto the market

These categories are not meant to be restrictive, designs may combine two or more categories if appropriate. Designs can range in scope from an entire structure to a smaller item such as a roof tile or mounting product.

The jury will consist of technical experts from Task 7 and well-known designers and architects. This will include the architects of some of the pre-eminent PV buildings constructed to date including David Lloyd Jones of Studio E Architects in the UK, Tjerk Reijenga of BEAR Architecten in the Netherlands and Steven Strong of Solar Design Associates in the US. Duncan Jackson, Head of Industrial Design at Nicholas Grimshaw and Partners, Dr Anthony Dunne of the Royal College of Art, Jerome O'Hea, Chairman of Colt International and Peter Krouwel, Director of NPK Industrial Design in the Netherlands will provide product design expertise. Sponsors include Shell International Renewables and Shell Solar. Short listed entries will be exhibited at the 16th European PV Solar Energy Conference and Exhibition to be held in Glasgow 1 - 5 May 2000.

Final judging will take place during the conference and the winners will be announced at the end of the conference.

Awards will be made for the best entry in each category, the best student entry and the best overall entry.

Deadline for registration: 30 November 1999
Deadline for entries: 29 February 2000

Further information is available on the web at www.task7.org. The detailed competitors briefing pack will be available at this web address in early September 1999. For those people without web access, paper copies of the information can be obtained by contacting your national Task VII expert, Donna Munro at the address below.

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.

New Government Initiatives

Three new initiatives for the development of photovoltaics were announced by Energy Minister, John Battle, at the DTI/EPSRC PV conference in Manchester in 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 Call for Proposals for the support of PV components and systems development was issued at the end of May 1999, with information packs being sent out to 70 companies. The objective of the Call for Proposals was to enhance the competitiveness of UK companies through the development of competitive PV systems and components. The scope was stated as follows:

- A budget of approximately £1 million over 3 years
- Projects to expect to receive between 25% and 50% of total costs
- Preference to be given to collaborative projects involving small and medium-sized enterprises
- Topic areas including: building integrated PV products and services, balance of systems equipment, manufacturing processes and applications in developing countries.

28 proposals were received, covering all the topic areas mentioned, and these were all reviewed by the Solar Energy Advisory Committee. 14 proposals were selected to be taken forward to the project stage. It is expected that the £1 million will be committed as planned.

100 domestic PV systems field trial

Around 100 PV systems will be installed on housing in the UK in a field trial aiming to use the design, construction and monitoring of the installations as a learning opportunity for utilities, building developers and other key players in the process. It is anticipated that the field trial will identify barriers and possible solutions to the development of PV in the domestic sector. Emphasis will be given to quality control, the employment of best practice standards, the meeting of utility guidelines and the active involvement of utilities and building developers. The project definition is currently being finalised with consultation from parties, such as the PV industry, utilities and building developers. Installations are expected to commence next year.

Large scale BiPV demonstration scheme

The DTI is considering the setting up of a scheme to support large building-integrated PV projects in the UK. The scheme will probably not become operational until summer 2000 but in the meantime the first steps have been taken to prepare for it. In the coming months the Scheme will be carefully defined by ECD Ltd. in consultation with the DTI and the building and PV industry. The aim will be to provide support to a wide range of building types with a good geographical spread. The present scheme concept envisages that projects will need to be over 20 kWp to be eligible and the funding support will cover design, capital investment and monitoring of the PV. There is already considerable interest in the Scheme. There seems little doubt that there will be plenty of projects that could be supported. Look out for further information on the scheme in the coming year.

Other DTI Projects

Design study workshop

Integrating PV into the built environment is regarded as potentially one of the most cost-effective uses of the technology in industrialised countries. Cost-effectiveness is dependent upon the design process and there are many lessons to be learned at this pre-construction stage. As mentioned in the previous newsletter five PV design study projects are being supported by the DTI. The projects are undertaking the design work necessary for the integration of PV into real new build projects. The design studies include:

- Morn Hill: an office building in an environmentally sensitive rural area
- Yorkshire art space: a brownfield development in Sheffield, providing studio workspace for local craftspeople
- Haileybury College: a girls' boarding house in a sensitive planning area.
- Kensall Green: a mixed use development, including offices, housing and workshops, on a brownfield site in London
- Anglia Polytechnic: the new Riverside building, including the possible use of PV on tracking louvers.

These studies are successfully increasing the knowledge and experience of building experts in the best practice integration of PV into buildings. PV may not be included in the buildings as built as these are simply design studies however it is hoped that building clients will give consideration to the idea.

There will be a workshop organised by Studio E Architects at the end of the year to share the experiences of the design teams involved in the studies and to publish the conclusions. The aim is to raise the capability and confidence of building designers to integrate PV into their buildings in the most cost-effective way.

Support for BiPV installation projects

Three further BiPV demonstration projects have been or are in the process of being supported since the last newsletter. These are:

CREED

The Centre for Renewable Energy and Education (CREED) is to be built at Delabole in Cornwall on the site of the UK's first windfarm. This multifunctional visitor centre incorporates PV into its new low energy building. A DTI supported project will analyse the integrated PV design and provide monitoring of the PV performance.

Nottingham University

The design and monitoring of two new BiPV systems at the School of the Built Environment at Nottingham University is to be supported by the DTI. One of the buildings is a teaching building called the Centre for Renewable Energy. The other is a family house called the Eco House that will incorporate the latest low energy techniques and technology including PV.

Bowater House

Bowater House is a tower block, which has been refurbished by Sandwell Borough Council, to include a PV façade. The electricity is used to run the landlord's amenities such as lifts and lighting of landings. The DTI programme is supporting design work and monitoring.

UK Activities

Solar Century's PV roof tile system

The roof on Solar Century's demonstration house at 12 Raleigh Road, Richmond, London was in need of replacement. In February 1999 it was replaced with a solar electric (PV) roof capable of generating electricity sufficient for the needs of the household. The roof comprises a total of 96 Uni-Solar SHR 17 shingles imported from the US. The shingles are made up of photovoltaic plates embedded in a weatherproof material.

These new products allow for an aesthetically appealing integration. The roof appears very similar to a conventional slate tile roof as can be seen in the photographs. The total 'active' area of PV shingles on the roof is 26.5m^2, comprising 17.5m^2 on the front south facing section and 9m^2 on the north facing section.

The remaining 'non-active' part of the roof is made up of the slates recycled from the original roof. On the south facing section of the roof the spaces at the edge of the active area have been made up of dummy shingles to achieve a uniform appearance.

The south facing section of the roof has a rated power of 1.088 kWp and the north facing section has a rated power of 0.544 kWp. Thus, the total installed power is 1.63 kWp, which will generate in the region of 1000 kWh (units of electricity) per annum. Any surplus requirements will have to be imported from the National grid. Also, any electricity generated in excess of household requirements will be fed back into the grid.

Future Events

	Date and venue	Description of Programme
PVSEC-11	20-24 September 1999 Sapporo, Hokkaido, Japan	Eleventh International Photovoltaic Science and Engineering Conference "Photovoltaic Energy for the Coming Century"
	For further details contact Prof. T. Sameshima, fax. +81 (0) 423 88 9055	
Energy for the New Millennium	8-10 March 2000 Sydney, Australia	Combined conferences of the Electricity Supply Association of Australia, ANZSES, the IEA SolarPACES Programme and IEA Task V and VII.
	For further details contact The Meetings Manager, fax. +61 (0) 2 9241 5354	
16th European PV Conference and Exhibition	1 - 5 May 2000 Glasgow, Scotland	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.
	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	
World Renewable Energy Congress VI	1-7 July 2000 Brighton	The first call for abstracts for this conference has been announced.
	For further details contact Prof. Ali Sayigh, 147 Hilmanton, Lower Earley, Reading RG6 4HN	
Solar Millennium Congress	25-28 October 2000 Toulouse, France	
	For further details contact the European Solar Council, fax. +33 (0) 1 44 180036	
Upcoming Task VII Meetings	13-15 September 1999, Toronto, Canada	Sixth Task VII Expert Meeting
	6-7 March 2000, Sydney, Australia	This is to be held in conjunction with the Energy for the New Millennium Conferences