

DEMOSITE IN IEA-PVPS PROGRAM: EXTENSION AND NEW FLAT ROOF AREA

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ABSTRACT: The newly started Task VII of the Photovoltaic Power Systems (PVPS) Program gives a second life and an extension opportunity to the Demosite, the International Demonstration Centre for photovoltaic building elements, established 5 years ago.

Operated by the photovoltaic team of the LESO-PB/EPFL in Lausanne, this centre was an important part of the demonstration effort of 'PV in Buildings' of Task XVI in the IEA Solar Heating and Cooling Program (SHCP), and is still unique of its kind.

Presently hosting PV products for tilted roofs and for façades coming from countries participating in SHCP task XVI (Japan, USA, Germany, England, Switzerland, ...), the Demosite will be extended and will offer new opportunities both for industrials who want to present their new systems and for potential customers (architects, interested professionals, authority representatives, ...).

New promoting tools are already and will be implemented (Website with pictures and technical details available, virtual visit set-up, CD-ROM for multimedia visit, ...).

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1. INTRODUCTION

The development of the photovoltaic market is not only slowed down by high costs and dissatisfying technical performance but also because of a lack of information. In the case of building-integrated photovoltaic systems mainly architects are concerned since they can drastically influence projects. The demonstration site DEMOSITE has been set up by architects for architects in order to remedy this lack of information.

2. EXTENSION

Launched right before the 11th European Photovoltaic Solar Energy Conference held in Montreux in October 1992, this project allowed to show to thousand of visitors the unlimited possibilities of the integration of photovoltaics in architecture. A second row of stands has recently been added to the site to present up to twelve more innovative products and typical examples.

Although hard coordination work was required to build the "It Power and partners" stand (Fig. 1), it was rapidly set up. This stand presents an element of one of the largest photovoltaic façades installed in northern Europe, at the University of Northumbria in Newcastle-upon-Tyne (UK). The refurbishment of this building dating back to the sixties comprised:

- Replacement of the old single-glass windows by double-glazing
- Addition of a new skin: a rainscreen overcladding system, with frameless PV modules tilted at 65°, on the south-facing facade. These BP Solar modules are equipped with the now well-known SATURN cells, giving a nominal efficiency of 13.5%.

The DEMOSITE stand presents the facade over the height of one floor and 5 m. in length, with seven crystalline laminates under the windows.



Fig.1. A replica of the facade of the famous Northumberland Building in Newcastle (UK) is now presented at the Demosite. The modules at this stand are connected thanks to the MC Contact AG connection system (connection boxes, connectors, ...).

As an interesting technical difference between the stand and the Northumbria original, the connections on the stand were done using the MC CONTACT system of junction boxes and connectors.

Another stand of the extended site has been equipped with a new photovoltaic tile developed by Star Unity (Fig. 2). This is a real roofing tile by its form and color, but made of acrylic glass like the transparent tiles used for day-lighting. The tile is 44 cm long, 26 cm wide, 3.5 cm thick and weighs about one kilo. The distance between the supporting slats is 35,5 cm. There are two variants: one equipped with amorphous cells (2 W) and the other with monocrystalline cells (6,5 W). The crystalline module has 27 cells in series delivering 12,5 V. It is therefore possible to load a standard battery even with a single tile.

Thanks to a well thought out connection system (pre-wired cables with connectors, for both series and parallel cabling), the mounting time is very close to that of

conventional tiles. The tiles include a by-pass diode and an electroluminescent diode (LED) for a quick visual control of good operation.



Fig. 2. : The new roofing tile Star Unity: three fields of PV tiles surrounded by ceramic standard tiles. Thanks to a well thought out connection system, the mounting time is very close to that of conventional tiles.

The extension of the DEMOSITE also concerns the new flat roof systems exhibition. This new area is situated on the flat roof of an existing building located closely near the parking lot of the original DEMOSITE. It is a necessary complement to the first exhibition site where mostly roofs and façades can be demonstrated advantageously. Depending on the success of this first flat roof exhibition site, another area could be found for further extension.

3. NEW FLAT ROOF SYSTEMS

In order to give a good idea of the effective appearance of the exhibited systems, each stand covers about 20 m². As soon as the last project phase was initiated, three new stands were implemented on this new site.

The first presents the SOFREL system (Fig. 4),

Fig. 3. : The new Demosite phase features among others a new flat roof systems exhibition site right near the parking lot site. As soon as it was started, three new flat roof systems were installed.

Fig. 4. : The SOFREL system with Photowatt-50 W modules. The basic socle weighs ____kg. Two socles per module are needed for a secure fixation on the roof. The patented X-Clip metallic brackets fasten the modules to the socle .

Developed by a team combining engineering offices (Enecolo AG, Alpha Real AG, Switzerland), the Swiss Federal Institute of Technology of Lausanne (LESO-EPFL, Switzerland) and a bank (UBS, Switzerland). SOFREL is a flat roof PV integration system with concrete socles and several possible mounting techniques: the more interesting is a special patented fastening system called "X-Clip" which allows rapid fixation of the PV modules on the base without any glue or screw. Several other mounting techniques have been developed both for frameless (laminates) and framed modules.

The second stand shows a system combining standard roadside socles and a metallic aluminium construction (Fig. 5). Similar to conventional roof-mounted systems (concrete socles with metallic profile structure), this system has a slightly more attractive design. It was developed by the Swiss Company Amax. Two variants are presented on the Demosite: one for framed modules and one for frameless modules.



Fig. 5. : The Amax System uses standard roadside socles and an aluminium profile structure. The system is presented with SIEMENS M55 modules (framed and frameless).

Fig. 6. : The SOLBAC system, with fibre-cement socles and metallic brackets allows mounting of both framed and frameless modules. The system is equipped on the Demosite with Siemens Modules M75 (framed and unframed) but can be combined with all available modules of the market.

The third stand shows the new SOLBAC system (Fig. 6). In this case, the basic concept is that the base is light. It is made of fibre-cement (about 15 kg for the element of

1,2 m) and can be weighted on the roof with the gravel. Given gravel is already present on the roof, the additional load is very low. Therefore, this system is very well suited for flat roofs which cannot carry too much weight. The cabling is hidden by the socle. And as little time is required for mounting, the system costs are relatively low. It has been developed at the LESO-EPFL and recently entered the market (already ____ kW installed).

4. A COMPLETE PROMOTION TOOL WITH NEW FEATURES

During its first phase, the DEMOSITE was provided with several promotion tools, as its main goal was to make the exhibited systems better known. These tools were:

- Organising of visits, for individuals or groups
- Participating at conferences to present the exhibited systems
- Writing articles, in the scientific press, in the architecture specialised press and in the general press
- Writing a magazine to inform about the Demosite: Demonews
- Offering a WWW site complete with pictures and technical details.

The next phase will of course keep these features unchanged or improved but will also upgrade this palette by introducing new, modern promotion tools. These are:

- Virtual set-up, ready for tele-conference-like visits
- Publishing of pictures on slides or CD-ROM's
- Developing a CR-ROM for remote multimedia visiting and exhibiting.

These new features have just been announced and we invite interested people to contact us about it. Since the task is important, some time will be necessary for having every feature operational.

5. CONCLUSION

Given the success of the first round, the Demosite is now gone for a second start.

The site of the parking lot has been extended with a second row allowing a total of up to 24 exhibition stands. Simultaneously, at a time where flat roofs are more and more equipped with photovoltaic systems, a new site has been started to better show flat roof systems. It was inaugurated with 3 new stands.

These measures will be accompanied by new promotion features like diffusion of slides or numerical pictures (CD-ROMs) and a new service for remote visiting.

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