

## MOUNTING SOLAR SYSTEMS ON METAL ROOFS

When assessing the benefits of renewable energy technology systems on a roof the long term economic benefit is just one of the issues which needs to be considered by the building owner. Perhaps one of the more serious considerations is the impact that an installation will have on the functional performance of the roof and the roof covering.

It is widely recognised that the large areas involved with metal roofing make them inviting places to install renewable energy technology systems, such as photovoltaic panels (PVs) to gain the feed-in tariff while helping the environment. With any type of roof there is more to placing PVs on the roof than meets the eye. Positioning the panels to gain best power generation is one thing; keeping a fully functional roof is another matter.



*Arnold Lodge School, Leicester. Image courtesy of Kalzip*

This article lists many of the factors that should be considered by the building owner or person responsible for the PV installation. This list is not exhaustive, but a good start and will help in trying to maintain a serviceable roof and be environmentally responsible at the same time.

The MCRMA strongly recommends that for retrofit applications on an ageing roof a specialist consultant is employed to survey the roof and address the list of questions. One of the first considerations is the structural capability of the existing roof covering and primary structure. Renewable energy technology systems can in themselves add a considerable additional dead load onto the roof and, in many cases, local geographical conditions can adversely influence both positive and negative wind loads.



*Typical example of a large scale solar PV installation: Image courtesy of CA Building Products*

These loads are in many instances transferred to the external skin of the roof via special brackets and fixings. As the market has grown so have the bespoke PV fittings for attaching to a roof. Some are provided by the roof manufacturer and others by specialist suppliers. In all cases the questions should be asked to determine how they impact on the functional performance of the roof for example, are the fittings compatible, are they strong enough, have they been tested and can the roof construction take these loads?

During installation, access loads may be different from in service loads therefore there is a need to consider the issues within the design parameters. In addition the roof must be assessed for fragility, walkability and an overall assessment must be made to establish that the roof is sound.

Rooflights are also a major item for consideration particularly if they are weathered and not obvious. Installation and any subsequent removal or replacement of a panel in the event of failure will also increase the level of foot traffic on the roof and this can cause localised damage.



*Energus, Cumbria. Image courtesy of Kalzip*

Manufacturers' guarantees are an important consideration; is the roof material guaranteed and, if so, will the presence of renewable energy systems negate a guarantee or inhibit the inspections that may be required? On the subject of guarantees, PV installations set closely above a metal roof surface can create a micro climate which can influence the performance of the cells or the roof covering. This may be further influenced by debris build up or poulitice corrosion. These points are not barriers to using renewables but they do need to be considered at the pre installation stage and designed out of the equation.

Large arrays of PV cells by their nature require electrical connection between cells and permanent links to distribution boards positioned within the building. This highlights the need for suitable penetrations through the roof covering which are adequately weather sealed on the outside and vapour sealed on the inside; these need to be cut and sealed both internally and externally which is a specialist operation. Failure to achieve this can result in a leak or other mishap which calls into question who should rectify the problem, the renewables installer, the roofer, or, most likely, the building owner due to split responsibilities.

During and following the installation there may be a requirement for non-roofing people to go on the roof for commissioning and maintenance. This highlights the need for safe access to the roof; fall arrest or restraint systems, formal training of personnel and the documented safe method of work and work permits.

Metal roofing systems in conjunction with renewable energy technology systems provide a sustainable and environmentally sensible solution which with due consideration can provide an economic and trouble free installation. MCRMA members offer a range of solutions but any proposed scheme should be fully evaluated at the early stages by any of the recognised MCRMA consultants whose details can be found on the MCRMA web site at [www.mcrma.co.uk](http://www.mcrma.co.uk).

*This article was written on behalf of MCRMA by David Lowe, technical director, SpeedDeck Building Systems. This article first appeared in RCI magazine, October 2012*

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