

Roof Mounted Photovoltaic Solar Panel Systems - Isolated, End of Life and Decommissioning

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Roof mounted solar arrays are present on many buildings and becoming more common. From planning to have them through to their end of life, these power generating devices present many additional hazards and exposures to a property.

This document is one of a series, to provide guidance to identify and mitigate the risks associated with these arrays.



Roof Mounted Photovoltaic Solar Panel Systems – Isolated, End of Life and Decommissioning



Introduction

If panels are isolated or have reached the end of their life, even if electrically disconnected, if they are still located on the roof directed to the sky, they create similar exposures to an operational array. The photovoltaic (PV) elements in the panels will still be generating direct current (DC) and cause exposures to life and property.

Aviva has had customers who have occupied buildings, with a solar array on the roof, that have:

- Been DC isolated.
 - There is residual DC in the system, in the area from the PV panels to the DC isolator switch.
- Had the DC cable disconnected and removed from the DC isolator.
 - The exposed cable presents an immediate life safety and property (fire) exposure.
- No supporting paperwork.
- No inverters in place.
- Cables missing.
- Cable, fitting, and panel damage etc.



The panels are still live generating DC, if they are still in place. This needs to be carefully managed.

In addition to the General Considerations, Planning for Installation, Installation and Construction, and the Installed and Ongoing Care Loss Prevention Standards, this standard outlines Risk Management advice for those property risks that have an existing roof mounted solar array that is isolated, decommissioned, or at its end of useful life.

Panel Removal

The most effective way to minimise the risk from the array is to physically remove the PV panels from the roof, in a careful and safe manner. While this may incur the most cost initially, panel removal removes the hazard and prevents the need for:

- Ongoing inspection and maintenance to ensure there are no issues with the PV panels, their fixing or securement.
- Having a means to block out the sun from the surface of the PV panel.

Panel Obscurement

If isolated, disconnected, or end of life panels are to remain the roof, then they need to be arranged with appropriate, secured weatherproof black out covers, to prevent the sun from interacting with their photovoltaic elements.

A temporary hoarding to block out the sun in theory could be constructed around and over the panels. However, there are significant issues with this in relation to:

- Additional static and dynamic roof loads.
- Combustibility of the covering.
- Wind uplift and securement.
 - And other weather exposures.
- Ongoing monitoring for damage, wear, and tear to the covering to ensure the sunlight is not reaching the PV panels.
- Ongoing monitoring for damage, wear, and tear to the PV panels and infrastructure within etc.

LOSS PREVENTION STANDARDS

PV Stop Paint

There is a product that can be used to cover and obscure the surface of the PV panel called PV Stop. This is a black paint specifically designed for solar arrays and is not just a 'normal black paint'. It is designed to black out the PV panel, so the photovoltaic elements are not exposed to the sun and no power is generated. This is not a permanent solution as it may only last a few months or be damaged by impact as examples. However, it:

- Is a very effective way of isolating the photovoltaic elements to enable safe removal of the panels from the roof.
- Can be re-applied repeatedly over the period of isolation to ensure the PV elements do not interact with the sun.

Panel Replacement/Retro Fit

If installed panels are underperforming or damaged, and need replacement, this needs to be carefully managed via a formal Management of Change process ([Managing Change LPS](#)), with appropriate Risk Assessments and Method Statements.

For solar arrays particular attention should be paid to the following enhanced risk factors:

- Removing panels from the array and damaging other panels or the associated infrastructure
 - Including cabling and connections.
- Dropping panels/equipment from the roof.
- Newer or different technologies for the replacement panels.
- Different power ratings to the replacement panels.
 - Need to match the electrical design if the DC load (voltage and current) are different for a new panel.
- Different OEMs, so different connections and fittings (as discussed previously this is a cause of concern).
 - Same OEM but different types of mating connector.
- Panel traceability.

Please see the General Considerations, Planning for Installation, and Installation and Construction Loss Prevention Standards in this series for further guidance.

Isolated or Disconnected Panels Ongoing Care

'Isolated' or 'disconnected' panels can be an ambiguous statement. Are the panels:

- Never to be used again.
 - May or may not be removed from the roof.
- Not to be used for an unknown period or indefinitely... but will be used again at some point in the future.
- Isolated for a short period of time and will be used in the near future.

If panels are isolated or disconnected for any reason, and remain in situ on a roof then, they will need ongoing:

- Regular inspections
- Testing
- Servicing
- Maintenance

to ensure they are not damaged and causing a risk to life and property, even if they are photovoltaically masked from the sun (as above).

Please see the Installed and Ongoing Care Loss Prevention Standard in this series for further guidance. It is critical there is no damage to the panels or the infrastructure and that they are appropriately cared for.

Reinstatement of Panels

If isolated or disconnected panels are to be reinstated, then formal inspections, testing and full servicing is required by a Microgeneration Certification Scheme (UK scheme) certified or equivalent (if there are less than 5 employees at the installing company) organisation (or similar local organisation in other territories) prior to handover to the building owner/occupant.

Please see the General Considerations, Planning for Installation, and Installation and Construction Loss Prevention Standards in this series for further guidance.

Bifacial Panels

Care is needed with isolated, end-of-life, and decommissioning of **'bifacial' panels**. As these panels generate DC from both sides, attention should be focussed to ensure they are not generating DC from either side of their surface.

Please see the General Considerations Loss Prevention Standard in this series for further guidance on bifacial panels.

Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners, including:

- Electrical inspections and thermographic imaging: [Bureau Veritas](#)
- Thermographic imaging and PAT testing: [PASS](#)
- Automatic fire detection and portable extinguishers: [SECOM](#)
- Security marking: [Selectamark](#)

For more information please visit:

[Aviva Risk Management Solutions – Specialist Partners](#)

Sources and Useful Links

- Guide to the Installation of Photovoltaic Systems: Published by the Microgeneration Certification Scheme (MCS) <https://mcs-certified.com/>

Additional Information

Relevant Loss Prevention Standards include:

- Roof Mounted Photovoltaic Solar Panel Systems - General Considerations
- Roof Mounted Photovoltaic Solar Panel Systems - Installation and Construction
- Roof Mounted Photovoltaic Solar Panel Systems - Installed and Ongoing Care
- Roof Mounted Photovoltaic Solar Panel Systems - Isolated End of Life and Decommissioning
- 15 Top Tips for Roof Mounted Photovoltaic Solar Panel Systems
- Contamination Following a Fire
- Control and Management of Combustible Waste Materials
- Electrical Installations – Inspection and Testing
- Emergency Response Teams
- Third Party Property Exposures
- External Wall Insulation Systems
- Fire Compartmentation
- Fire Safety Inspections
- Heat and Smoke Venting Systems
- Housekeeping
- Managing Change - Property
- Managing Contractors
- Smoke Contamination
- Smoking and the Workplace
- Thermographic Surveys

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