Roof Mounted Solar Photovoltaic Systems - Decommissioning

Roof mounted solar photovoltaic (solar PV) systems are installed on many buildings and present a number of potential hazards and exposures requiring careful management to avoid fire and other material damage losses.

This Loss Prevention Standard is one of a series of related documents and provides guidance on managing risk during the decommissioning and removal of solar PV systems.

Version: 1.0
Date: 29th July 2026

Roof Mounted Solar Photovoltaic Systems -Decommissioning

Introduction

Roof mounted solar PV systems will eventually reach their end-of-life state and require decommissioning and removal. Retaining the equipment in place, even when seemingly isolated, presents a number of asset exposures including:

- Residual energy generation in the modules with overheating potential.
- Live electrical cables.
- Wind-related damage.
- Deterioration and collapse.

This document provides practical guidance on managing the risks associated with end-of-life solar PV system care.

Note: This Loss Prevention Standard relates to roof mounted solar PV systems and is focussed on asset loss prevention and related risk management guidance. It is not intended to address building integrated solar PV systems or liability/general liability exposures. The presumption is that all local regulatory territory requirements, and compliance with national/local building regulations, codes, or standards take precedence and have, or will be, met. In territories where local authorities have jurisdiction, compliance with applicable laws and regulations is assumed as a minimum requirement. The recommendations in this document are intended to supplement, not replace, local requirements.

Reasons For Removal

PV systems may be decommissioned for a number of reasons, including, but not limited to:

- The entire system or individual components having reached their end of useful life.
- The system being repowered with a new installation.
- Issues identified by the landlord, occupier, maintenance contractor or others.

Management Systems

Managing Change

The decommissioning and removal of solar PV systems should be managed through a formal Management of Change process. This helps ensure all stages of the change are progressed with minimal exposure to the existing arrangements.

Refer to the Aviva Loss Prevention Standards **Managing Change – Property** for further guidance.

Hot Works

Hot works are tasks or equipment that use or create heat, flame, or sparks. Examples include but are not limited to the use of welding equipment, blowtorches, grinders, drilling, and brazing. Hot works are associated with many fires and must be closely controlled.

- Roof-based hot works in relation to decommissioning works should be prohibited and any necessary hot works should be undertaken in a remote and safe location.
- Where this is not possible, any hot works must be conducted in strict accordance with the Aviva Loss Prevention standard **Hot Work Operations.**
  - ✓ Fire watches should be undertaken for up to 240 minutes after the hot works and only reduced where supported by a specific risk assessment.
  - ✓ Thermographic cameras should be used throughout the works and during the fire watch periods.

Refer to the Aviva Loss Prevention Standards **Hot Work Operations** and **Managing Contractors – Property** for further guidance.

Emergency Response

Emergency response plans should be reviewed and updated to reflect the key responsibilities and actions that are to be followed in an emergency event during the solar PV system decommissioning and removal.

Any revisions to the emergency response rules should be formally documented, and appropriate training provided to key workers and contractors prior to works commencing.

Refer to the Aviva Loss Prevention Standard **Emergency Response Teams** for further guidance.

Business Continuity Plans

Ensure Business Continuity Plans are reviewed to reflect any changing exposures created by the solar PV system removal.

Refer to the Aviva Loss Prevention Standard **Business Continuity - Seven Steps to Continuity** for further guidance.

Training

Any persons engaged within the organisation to support the decommissioning and removal of the solar PV installation, or whose work activities may bring them into proximity to the system components, including any emergency response procedures, should be appropriately trained and skilled to complete such tasks and be aware of the risks associated with solar PV systems and the safety management systems that support them, e.g., hot work management systems, lock out tag out, etc.

Managing the Risks

Installer Competence

Ensure competent and experienced solar PV system contractors are utilised to decommission the solar PV system.

Guidance on selecting appropriate contractors is provided in the Aviva Loss Prevention Standard **Roof Mounted Solar Photovoltaic Systems – Ongoing Care**.

Module Removal

The most effective way to minimise the risk of damage is to physically remove the solar PV system from the premises in a careful and safe manner. Panel removal prevents the need for:

- Ongoing inspection and maintenance to ensure there are no developing faults with the PV modules, their fixings or securement.
- Installing and maintaining covers or other sun-blocking devices over the modules to prevent further generation-related hazards.

Panel Obscurement

Modules can pose an inherent risk when exposed to daylight. When there is likely to be a significant time period between isolation and removal of the solar PV system or refurbishment works, modules that are not fitted with functioning Module Level Power Electronics (MLPEs) should be covered with secured weatherproof black-out covers to prevent energy generation.

Such coverings will require regular self-inspections to ensure:

- The coverings remain correctly installed.
- The coverings are in good order with no signs of damage.
- No areas of wear are appearing.
- Water is not pooling and coming into contact with cables.
- Wind is not becoming trapped and straining solar PV module fixings.
- No energy is being generated, suggesting gaps in the covers.
- Birds are not nesting.

These inspections should be performed on a weekly basis, as a minimum, and can be performed via drone if there is no safe access to the array. The coverings should be installed, maintained and eventually removed in accordance with the Original Equipment Manufacturers (OEM) or installer guidance.

Note: Paint-on covers provide temporary light obscuration to allow for array maintenance. They are not however a permanent blocking solution. The material degrades, peels and will lose effectiveness over time, requiring continual inspection and upkeep. Paint-on covers should only be used for temporary and/or emergency works, not as a permanent light block.

Aviva recommends roof mounted solar PV equipment is removed or reinstated as soon as possible after decommissioning. If roof mounted modules remain in situ, even for a short period, they will require strict ongoing care, including, but not limited to:

- Regular self-inspection.
- Maintenance.
- Monitoring.

Important: Discuss any plans to leave decommissioned solar PV systems in situ with your insurer, broker or authority having jurisdiction.

Refer to the Aviva Loss Prevention Standard **Roof Mounted Solar Photovoltaic Systems – Ongoing Care** for further guidance.

Solar PV System Repowering

If the decommissioned solar PV system is to be repowered, a full system health assessment should be undertaken:

- All damaged, worn or end-of-life components repaired or replaced.
  - ✓ This should include full string testing in accordance with **IEC 62446-2: Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 2: Grid connected systems - Maintenance of PV systems**,
- Full inverter inspections in accordance with the manufacturer's instructions, and
- A full array thermographic survey if the modules are to be retained.

Consider changes in industry guidance since the solar PV system was originally installed to ensure compliance with current national regulations, standards or codes, e.g., inverter placement, upgraded roof access infrastructure for ongoing maintenance, covering of exposed string cabling, etc.

Any combustible roofing elements should be replaced at this time to benefit from the roof access infrastructure in place.

MLPEs should also be considered for repowered systems where the original inverters are replaced.

Note: MLPEs comprise two types of devices:

- DC optimisers and
- Micro-inverters.

They provide improved monitoring data, power and current regulation and improved isolation capabilities than would be possible with string inverters. During events such as maintenance, a cable fault, or an ignition event, MLPEs can instantly reduce the system voltage in affected areas to help reduce the risk of fire and also minimise the risks of injury to maintenance workers and emergency response teams. Aviva highly recommends the use of MLPEs in solar PV systems.

Refer to the Aviva Loss Prevention Standards **Roof Mounted Solar Photovoltaic Systems - Ongoing Care, Roof Mounted Solar Photovoltaic Systems - Installation and Roof Mounted Solar Photovoltaic Systems - Planning and Design** for further guidance.

Contact Information

United Kingdom

Please visit Aviva Risk Management Solutions or email us at riskadvice@aviva.com. To speak to one of our advisors, call 0345 366 6666.*

*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

Canada

Please visit Aviva Risk Management Solutions | Aviva Canada or email us at arms.canada@aviva.com

Ireland

Please visit Insurance Risk Management | Business Risk Management Insurance - Aviva Ireland or Email us at armsireland@aviva.com

Specialist Partner Services

Aviva have created a network of Specialist Partners to complement our in-house capabilities and to enable our policyholders to benefit from a wide range of risk management solutions at preferential rates and terms. Together, we provide solutions to help with the significant challenges of modern-day risk management.
Note: These partner relationships are wholly for the benefit of our policyholders with no income to Aviva.

The following Specialist Partners provide products or services in relation to risk guidance provided, discussed or referenced in this Loss Prevention Standard.

United Kingdom

- Solar PV servicing and maintenance - **Solarsense**
- Direct low pressure suppression systems – **Secom**
- Solar PV cleaning - **Rentokil**

For more information please visit: Aviva Risk Management Solutions – Specialist Partners

Ireland

For more information please visit: Insurance Risk Management | Business Risk Management Insurance - Aviva Ireland

Canada

For more information please visit: Our Specialist Partner Network | Aviva Canada

Standards, Sources and Useful Links

Canada

- CSA standards for photovoltaic systems and electrical installations. CSA Catalogue - Standards and Learning Store - CSA Group
- Canadian Electrical Code (CEC), Part I.
- PV maintenance guidance from CanREA (Canadian Renewable Energy Association) and provincial utilities Canadian Renewable Energy Association

Ireland

- Safe Electric National Rules for Electrical Installations (I.S. 10101).
- ESB Networks and EirGrid connection requirements.
- SEAI-Solar Photovoltaic (PV) Manual of Consenting Procedures

United Kingdom

- Industry best practice manual : Guidelines for the operation and maintenance of rooftop solar photovoltaic systems
- RC62 - Recommendations for Fire Safety with PV Panel Installations

Other

- RETC Module Reports
- IEC 62446-2: Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 2: Grid connected systems - Maintenance of PV systems

Additional Information

Loss Prevention Standards

These documents set out best practice recommendations to help reduce the likelihood and impact of losses.

Relevant Aviva Loss Prevention Standards include:

- **Roof Mounted Solar Photovoltaic Systems - Planning and Design**
- **Roof Mounted Solar Photovoltaic Systems - Installation**
- **Roof Mounted Solar Photovoltaic Systems - Ongoing Care**
- **12 Top Tips for Roof Mounted Solar Photovoltaic Systems**
- **Roof Mounted Solar Photovoltaic Systems - Self-Inspection Checklist**
- **Managing Change - Property**
- **Hot Work Operations**
- **Emergency Response Teams**
- **Business Continuity - Seven Steps to Continuity**
- **Managing Contractors**

Please visit Loss Prevention Standards to view the full library.

Aviva Risks Training Solutions (United Kingdom Only)

Aviva Risk Training Solutions, delivered through our Specialist Partner, SafetyCulture, provide free, bite-sized learning modules exclusively for Aviva policyholders.

Please visit Aviva Risk Training Solutions for further guidance.

29th July 2026

Version 1.0

ARMSGI4372026

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