

## Fire Safety – Solar Panels

Photovoltaic panels come with a number of benefits:

- Lower energy bills
- Reducing CO<sub>2</sub> emissions and carbon footprint
- Protection from future energy price rises
- Don't increase existing footprint of the building if installed on rooftops

But PV panels also bring with them their own risks, especially if ongoing maintenance and inspection is neglected. The below guidance is intended to help you get the most out of your PV panels and avoid introducing unnecessary risk into the school. For further information and additional resources, check out [The Renewable Energy Hub](#).

### Reduced Efficiency and Power Output

Accumulated Dirt and Dust: Dirt, dust, bird droppings, pollen, and leaves can block sunlight from reaching the PV cells, reducing energy output. Even a small amount of dirt can significantly decrease efficiency, leading to a potential 10-20% reduction in energy production or even more in dusty or polluted areas.

Hot Spots: Partial shading from dirt or debris causes certain parts of the panel to heat up unevenly, creating "hot spots." These hot spots not only lower the system's efficiency but also increase wear on the panel, shortening its lifespan.

### Increased Maintenance Costs and Shorter Lifespan

Damage to the Panels: Dirt and debris can scratch or degrade the protective glass on PV panels over time, especially if they are left uncleared for long periods. This wear can lead to irreversible damage, reducing the lifespan of the panels and increasing maintenance and replacement costs.

Inverter Strain: When PV panels produce less energy, inverters work harder to convert the available energy, potentially leading to increased wear on the inverter and higher replacement or repair costs.

### Fire Hazards

Electrical Issues: Dirty panels are more likely to develop hot spots, where one part of the panel is producing proportionally more electricity than surrounding cells, which can cause components within the PV panel to degrade faster. In extreme cases, these hot spots could lead to electrical faults, posing a fire risk, particularly if the PV system is near dry vegetation or other flammable materials.

**Accumulation of Flammable Debris:** Debris like dry leaves, twigs, or paper can gather on or around PV panels, especially if they are mounted near trees. This can increase the risk of fires if the panel overheats.

### **Impact on Warranties and Insurance**

**Voiding of Warranties:** Some manufacturers require regular cleaning and maintenance of PV panels for warranties to remain valid. Neglecting to clean the panels could lead to voided warranties, leaving the owner responsible for the costs of repairs or replacements.

**Insurance Risks:** In cases where fires or other damages arise from neglected maintenance, insurance may not cover the damage if lack of cleaning and care is identified as a contributing factor.

### **Environmental and Economic Impact**

**Inefficient Energy Production:** Reduced energy output due to dirty panels leads to a lower return on investment (ROI) for solar energy systems. This inefficiency can have broader economic impacts for businesses or homeowners relying on solar energy for cost savings.

**Carbon Offset Reduction:** Lower PV performance means less clean energy, reducing the environmental benefits. When PV panels aren't functioning optimally, more energy may have to be drawn from traditional fossil fuel sources, reducing the carbon offset intended by the solar installation.

### **Potential for Algae or Mold Growth**

In damp environments, algae, moss, or mould can grow on uncleared panels, especially on edges or frames. This can reduce performance and, if not addressed, may damage the panel's surface or frame, leading to long-term degradation.

### **Animal or Pest Damage**

Animals or birds may be attracted to dirtier panels or unmaintained systems, leading to nesting or chewing on wires, which can cause electrical faults, damage, or additional cleaning and repair costs.

Regular cleaning, depending on the location and environmental conditions, is essential to maintain PV panel efficiency, safety, and lifespan. Most manufacturers or installers recommend cleaning schedules or offer maintenance services that can keep PV panels operating at their peak.

## **Solar Maintenance**

Those panels installed by Herefordshire Council (HC) will remain the responsibility of HC to carry out physical inspections and will be inspected at a frequency determined by the size and capacity of the installation.

Schools will however have access to the ORSIS system, which remotely monitors the output of the system. Schools should monitor the system output using the monitoring alerts.

If schools have installed panels themselves, or via a DfE funding grant, the responsibility for maintenance will fall to the school, and you should contact your insurer for guidance. Many PV panel manufacturers and installers provide a maintenance package or contract if you are concerned about keeping your solar panels serviced.

Regular solar maintenance includes the following services:

- Visually inspecting the panels to look for any potential weather, animal, or other external damage.
- Examining the meter, the inverter, and other components. ensuring that the solar panels on your roof are functional.
- Verify the current and voltage.
- Examining the roof's condition. ensuring that the roof is still secure and safe for the location where the solar panels must be.
- Research on energy production. This would be to ensure that you are still receiving efficient electricity from the solar panels.

## **Startup and Shutdown procedure**

All isolators within the system can be used at any time for isolation of the relevant part of the installation. However, you must never disconnect or connect the dc isolator while under load. The AC must be isolated before the DC.

The emergency services may need to isolate the panels in the event of a fire, and the location of both AC and DC switches should be included on your plan of the school located next to your fire panel, and in any grab-bags used by the school.