



# SECURING SOLAR FARMS FROM WILDFIRE THREATS AND FIRE HAZARDS



**Energy**



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An inclination towards renewable energy has made solar farms vital to global energy change. By Q3 2024, solar energy emerged as the dominant form of new electricity generation in the United States, with photovoltaic (PV) solar energy accounting for 64% of all newly installed capacity to the country's power grid.<sup>1</sup>

However, the expansion of solar farms is facing a major risk from wildfires. Studies show that during peak wildfire seasons in the US, solar generation dropped by nearly 7.7% as smoke and particulate matter blocked sunlight.<sup>2</sup> Last year, the California Independent System Operator (CAISO), the largest solar power producer in the country, produced less energy than it did in August 2023.<sup>3</sup>

Wildfires can reduce solar radiation at short downwind distances and far from the sources of emission. Moreover, they can impact the reserve requirements by raising the possibility of claims resulting from extensive damage to the infrastructure or assets of solar farms.

Given these difficulties, it is critical for solar farm operators to implement proactive risk management and wildfire mitigation techniques to protect their farms and guarantee continuous operations.





Solar farm operators can implement proactive risk mitigation to prevent **COSTLY DAMAGE**

## How wildfires and fire hazards threaten solar energy systems

- Wildfires can directly damage PV panels and electrical systems, as well as destroy support infrastructures like control rooms and transformers.
- High temperatures from wildfires lead to thermal stress, causing damage to components like wiring and inverters.
- Smoke and airborne debris from wildfires reduce energy production efficiency.
- Ash and soot accumulation on panels can lead to overheating, with prolonged exposure to heat potentially damaging the system.

Along with the external risks, some specific on-site conditions can trigger or fuel fires within the solar farm:

- Faulty wiring, overheating components and vegetation buildup.
- Grazing sheep, commonly used for vegetation control, often leave behind dry grass patches that are at higher risk of catching fire.
- Accumulated grass clippings on gravel roads can ignite if not adequately maintained, endangering solar modules.

By recognizing both external wildfire risks and internal fire hazards, solar farm operators can implement proactive risk mitigation strategies to prevent costly damage and avoid operational downtime.



## Mitigating wildfire risks: Key strategies for solar farm protection

### 1 Vegetation management is key

Dense and highly flammable vegetation can significantly increase the risk of fire hazards, making effective vegetation management crucial for wildfire prevention. This also requires strict maintenance of surrounding fuel loads to minimize potential ignition sources.

Some key steps to consider include:

- **Regular mowing and clearing:** Keeping the area around and between solar panels trimmed helps prevent fires from spreading.
- **Firebreak maintenance:** Gravel roads must be free of flammable debris, such as grass cuttings, to serve as effective barriers against fires.
- **Grazing with caution:** Grazing sheep may deposit flammable debris under the modules. This can be alleviated by mechanically clearing dry grass and animal waste from underneath the solar panels.

### 2 Incorporating fire-resistant design and materials

Solar farm operators can use fire-resistant materials to reduce probable risks caused by wildfires. Some key strategies can be:

- **Opting for non-combustible mounting structures and enclosures:** Choosing materials that do not catch fire when used to mount panels and enclose electrical components.
- **Ensuring secured and insulated cabling:** Cables must be carefully fastened and insulated to prevent any risk of sparks.
- **Applying fire-resistant coatings:** Applying protective coatings to critical infrastructure can enhance fire resistance and safeguard key components.

### 3 Ensuring routine maintenance and inspections

Regular inspections help prevent electrical fires and identify risks before they escalate. A robust maintenance program can include:

- **Checking for hot spots:** Autonomous devices such as thermal scanning robots use infrared cameras to constantly search for hotspots. This helps monitor and detect heat anomalies before they lead to fires.
- **Regular clearance of dust and debris:** All electrical connections must be safe and free from dust or debris at all times to avoid overheating.
- **Inspecting panels for microcracks:** Solar panels may often develop microcracks, and rising temperatures can cause these cracks to expand and hinder the flow of electricity.

### 4 Leveraging early fire detection and suppression systems

Early warning systems are crucial for stopping fires from spreading. Experts suggest the following fire detection solutions:

- **Thermal imaging systems:** Placing long-range thermal sensors at specific points around the area can help detect heat buildup before flames are visible. Thermal scanning robots can also help extinguish fires before they spread, resulting in less damage and reduced downtime.
- **Drone monitoring:** Equipped with thermal cameras, drones can quickly assess potential fire hazards across vast solar farms. Even after a fire outbreak, drones can be used for damage assessment and to help farm operators determine the appropriate response.
- **Fire suppression systems:** Innovative containment methods, such as using sandbags along fences, can also prevent the spread of fire.



### 5 Emergency response planning

Due to their high-voltage equipment and expansive layouts, responding to a solar fire outbreak requires specialized training and coordinated action.

A well-prepared emergency response plan can include:

- **Training local fire departments** on how to safely handle fires at solar farms with the specialized knowledge required.
- **Developing and regularly updating an emergency response plan** that includes evacuation routes, suppression strategies and designated firebreak areas.
- **Establishing agreements with local emergency services** to ensure rapid response times.





## Stay ahead of risks with Gallagher

Growing threats from wildfires, extreme weather and equipment-related risks make proactive risk management necessary for solar farms. However, damages can still occur despite standard preventive measures. For instance, inadequate coverage for hidden risks like microcracks, faulty wiring or undetected fractures can expose solar energy systems to costly damages. With this in mind, implementing a multi-layered risk management approach is key to safeguarding against the risks.

Gallagher offers a well-structured approach that combines targeted risk mitigation strategies with tailored coverage. With decades of expertise in risk management and renewable energy protection, Gallagher helps solar farm operators keep ahead of risks and safeguard their investments. By minimizing potential losses, streamlining claims processes and implementing innovative solutions, we help to ensure operations keep running smoothly even in an unpredictable climate.

<sup>1</sup>["Solar Market Insight Report Q4 2024," SEIA, 4 Dec 2024.](#)

<sup>2</sup>Cai, Mengmeng, et al. ["Final Technical Report: Impact of Wildfires on Solar Generation, Reserves, and Energy Prices," NREL, accessed 24 Feb 2025. PDF file.](#)

<sup>3</sup>Maguire, Gavin. ["California wildfires dim solar generation during power demand peak," Reuters, 31 Jul 2024.](#)

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