

Solar Panel Fires and Electrical Hazards

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Although extremely rare, fires can originate from solar panels. In January 2007, California launched an effort to install 3,000 megawatts (MW) of new solar power, according to the California Public Utilities Commission. Inspectors may encounter these photovoltaic (PV) arrays with increasing frequency and may want to be aware of the ways in which an installed PV array may pose a fire hazard to a home.

Do solar panels cause fires?

Installed properly, PV solar panels do not cause fires. Most PV modules are tested by Underwriters Laboratories (UL), which subjects them to the rigors of everyday use before they are certified. In the rare cases where PV modules have been implicated in house fires, the cause has been electrical arcing due to improper installation, faulty wiring or insufficient insulation.



PV Systems and House Fires

PV systems may be a hazard in the case of a house fire, particularly if firefighters are not aware that a system is installed. Some of these hazards are as follows:

- The conduit leading from PV panels to an inverter may remain live with direct current even after the main service panel has been shut off. Firefighters who unknowingly sever live lines are vulnerable to electrical shock. Some firefighters carry a "hot stick" that aids them in finding live wires, but it does not detect direct current.
- Solar panels and batteries contain toxic chemicals that may be released in a fire and are dangerous if inhaled.
- PV modules may become slippery and pose a slip-and-fall risk to inspectors, technicians and firefighters.
- Solar panels may block key points and pathways that inspectors, technicians and firefighters would otherwise use to mount, navigate and dismount from a roof.
- PV modules may inhibit ventilation of a fire in prime roof locations.
- The added weight of a solar panel array may lead to roof collapse if the integrity of the structure is already compromised by fire.

InterNACHI inspectors may want to check for the following design elements that will prevent PV modules from exacerbating the dangers of a house fire:

- Photovoltaic systems should be installed and subsequently inspected regularly by a qualified professional.
- PV systems should be labeled in a clear and systematic manner to ensure that technicians and firefighters can quickly and easily identify key elements of the system. The main service disconnect panel should be clearly labeled on the outside cover, if it is operable from the outside without opening. Both interior and exterior portions of live conduit should be labeled every 10 feet. Batteries should also be clearly labeled.
- A rooftop shutoff valve should be present. This switch could be utilized to disable the direct current running from the solar panels through the conduit.
- The roof should have sufficient pathways and perimeter space around the PV modules so that inspectors and firefighters can traverse the roof safely.
- There should be a section of the roof left vacant so that it may be ventilated, if necessary.
- Check for damage from rodents and other pests, which could compromise wiring or insulation.
- There should be an integrated arc-fault detection device present in the solar panels, which shuts down individual panels in the case of a malfunction, such as arcing.
- During the permitting process when the PV system is installed, the local fire department should be given a set of the plans to refer to in case of emergency.

In summary, photovoltaic solar panels rarely cause house fires directly, but the potential hazards they pose in the event of a house fire can be mitigated with proper installation and preparation.