

RISK CONTROL SERVICES

SOLAR ENERGY AND ROOFTOP RISKS



How to Manage the Risks Associated with Rooftop-Mounted Solar Equipment

Solar is one of the fastest-growing renewable energy sources in the world. Thanks in part to rising energy prices and government incentives, there are significant benefits to “going solar.” But installing a solar photovoltaic system on your building’s roof is not without risk. Here’s what you need to know.

SOLAR ENERGY EQUIPMENT RISKS

Fires. Electrical shocks. Falls. There are several risks associated with rooftop solar energy equipment. Fortunately, most can be mitigated. Here are some of the most common concerns, along with tips for managing them.

- **Roof Overloading.** The roof on your building is designed to handle a specific amount of weight. To reduce the potential for collapse, have it evaluated by a structural engineer prior to the start of the project to make sure it can accommodate the additional load.
- **Fire.** Solar rooftop fires are usually caused by design flaws, component defects, and faulty installation. They’re often the result of electrical arcs occurring near the combiner box, where numerous wires from the panels are connected. There is considerable voltage in this area, which can ignite the roof assembly and result in quick fire spread due to rapid heat building in the spaces under the panels, though manufacturers have made improvements in recent years to reduce the probability that this will happen. You should also be aware that installing solar panels may alter your roof’s fire-resistance rating.
- **Electric.** Solar energy equipment consists of various components that conduct electricity. In addition to the potential for electricity to ignite a fire, it may also injure those who come in contact with the panels, including maintenance personnel and your own property management

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or maintenance staff, who may be on the roof for reasons unrelated to the solar PV system, such as scheduled roof inspections.

- **Weather.** There are numerous ways weather can impact your solar PV system. Solar panels increase a building's exposure to wind damage, since the space below the panels can add extra pressure to the roof. When it's especially windy, a poorly installed or aged roof may lift, come in contact with the solar PV system, tear, and result in property damage, including water damage, or injuries. If you live in an area that gets snow or ice, note that snow adds extra weight to the roof, and that hail and ice can damage solar panels' protective coating, exposing electrical wiring, which may lead to panel failure and electrical hazards.
- **Liability.** Liability may arise whenever you have people servicing rooftop solar energy equipment. It's important to create programs and policies to mitigate fall hazards and to promote safety.

PLANNING CONSIDERATIONS FOR SOLAR ENERGY INITIATIVES

Building Prep

If you're planning a solar PV project, your building will need to undergo a comprehensive structural evaluation prior to installation. Plan to work with a structural engineer not only to determine whether the building can support the new load, but also whether the remaining useful life of the roof will maintain its integrity over the life of the solar PV equipment.

If you have other equipment installed on the rooftop, make sure to maintain appropriate access and clearance for maintenance and inspections. You also want to make sure the project won't impact drainage. Blocked drains can lead to ponding and may result in building and water damage.

You also need to work with an electrical contractor to ensure the current electrical system has the capacity to accommodate the new electrical load.

Finally, keep in mind that installing solar PV equipment may impact your roof's warranty. It's important to confirm that the installation will not void current warranties or adversely impact the guarantee.

Building Codes and Fire Department Considerations

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Contact your local building department for insight on applicable code and zoning requirements. For example, local building codes may require roofing to meet a specific fire rating to maintain fire resistance. Local jurisdictions will also enforce NFPA 70, National Electrical Code, so it's a good idea to connect with them before installing your solar PV project.

You should also work with your fire department during the planning phase of your project. Solar energy equipment stays energized as long as there is daylight, including during a fire. This may result in electrocution hazards for firefighters. As well, fire departments should be aware of any solar energy equipment installed on your rooftop as it may hinder their ability to fight the fire.

Weather-Related Considerations

It's important to evaluate regional climate patterns and probable weather-related risks before you start your solar PV project. Take a look at historic hail events, since hail can cause significant damage to the equipment. And remember that snow can add additional weight to the roof. For panels installed on pitched roofs, snow will slide off as it melts, which may impact sidewalks below. Some solar panel manufacturers have addressed weather-related risks in their designs, so be sure to do your research to make sure the product you choose is appropriate for your region of the country.

SELECTING A VENDOR

Just like you should research solar PV equipment, you should research solar PV vendors. Call their references and ask about equipment quality and customer service. It's also important to note that licensing requirements for solar companies vary by state; local building departments are the best resource for obtaining information relating to these requirements. Consider selecting solar contractors that are certified by the North American Board of Certified Energy Practitioners (NABCEP). National certifications are not required, but the certification can help you identify vendors who have the technical skills and safety knowledge specific to solar energy initiatives.

Contracts

Make sure you solidify your partnership with your solar energy vendor with a written contract that outlines the terms and conditions and transfers risk from your agency to the vendor. Contract language should favor your organization and hold the vendor financially and legally responsible for any claims

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arising from their work. Always consult with legal counsel prior to entering into an agreement. Your contract should cover, at a minimum:

- **Liability.** Require the vendor to have a general liability policy that will provide coverage should liability arise from their operations or negligence. The policy should have adequate limits in place for the duration of the agreement.
- **Additional Insured Status.** Ask the vendor to add your organization to their policy as an additional insured. This allows for an entity, other than the policyholder, to be covered by the insurance policy, which means your organization would be covered should liability arise. Be sure to request a copy of the certificate of insurance from the vendor as proof of coverage. The document should list the coverage(s), limits, and expiration dates, and include endorsements that have been added to the policy, such as the additional insured status. Note that the certificate of insurance will not legally transfer any risk; the insurance policy will always prevail. For an additional layer of protection, your organization can request a copy of the additional insured endorsement to confirm coverage.
- **Indemnification Clause and Hold Harmless Agreements.** These are additional protections you should include in your contracts, because they shift risk from one party to another. Make sure the solar energy vendor is holding your organization harmless, and not the other way around.

Consider including conditions on roof replacements in your contract. Rooftops should be evaluated during the project planning phase; it may be necessary (or at least encouraged) to replace the roof prior to the installation of the equipment. If a roof replacement is not necessary, consider including provisions for the temporary removal of the solar equipment for roof replacement at a later date. You can negotiate the agreement to specify whether the equipment will be removed at the cost of the building owner or the vendor.

MAINTAINING ROOFTOP-MOUNTED SOLAR ENERGY EQUIPMENT

Rinse your solar energy equipment regularly to remove dust, pollen, and other debris. Because the equipment is exposed to the elements, you should also hire someone to conduct routine preventative

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maintenance and inspections to address deficiencies and ensure proper functioning. The Solar America Board for Codes and Standards recommends annual inspections focusing on the following:

- Water damage/roof penetrations
- Adequate roof drainage
- Vegetation growth
- Proper system signage
- Appropriate expansion joints, where needed
- Electrical enclosure (making sure the equipment is accessible to authorized personnel only, secured with padlocks or combination locks, and have restricted-access signage)
- Corrosion on the outside of enclosures and the racking system
- Loose or exposed wiring
- Signs of animal infestation
- Overall site cleanliness.

FOR MORE INFORMATION

Contact your local city or town government for additional information on licensing and code compliance. Contact your insurance representative with coverage-related questions.

SOURCES

Solar America Board for Codes and Standards, [*PV System Operations and Maintenance Fundamentals*](#)

U.S. Department of Energy, Better Buildings Initiative, [*Commercial Rooftop Solar*](#)

U.S. Department of Energy, [*A Consumer's Guide to Fire Safety with Solar Systems*](#)

Travelers, [*Rooftop Photovoltaic Systems*](#)

Society of Fire Protection Engineers (SFPE), [*Fire Concerns with Roof-Mounted Solar Panels*](#)

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