# Roof-Mounted Solar Panels and Fire Prevention for Churches

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**What Are Solar Panels?**

Solar photovoltaic (PV) systems convert sunlight into electricity and typically include roof-mounted PV modules (panels), wiring and conduit, inverters that convert power into usable electricity, and disconnect switches intended to support safe servicing and emergency operations. A key difference from conventional building electrical systems is that PV circuits can remain energized whenever panels are exposed to sunlight, even if the main electrical service to the building is turned off.

Many churches are installing rooftop solar PV systems to reduce energy costs and support environmental stewardship. When properly designed, installed, and maintained, these systems are generally safe and reliable. However, like any electrical system, they introduce property damage system exposures that should be understood and managed.

Following industry standards such as FM Data Sheets 1-15, National Fire Protection Association (NFPA), Underwriters Laboratories (UL) product safety listings, the International Fire Code (IFC), and the local Authority Having Jurisdiction (AHJ), allows churches to meaningfully reduce the likelihood and severity of fire and property losses while benefiting from solar power. Fire Marshals / Fire Inspectors, establish requirements and standards intended to ensure solar systems are installed and maintained properly.

**Potential Fire and Property Risks**

Electrical faults are a primary concern, as loose connections, damaged conductors, or inverter/component failures can lead to arcing, overheating, and potentially fire. Equipment selection is critical, as UL-listed components (such as UL 1703 or UL 61730 PV modules and UL 1741 inverters) are designed and tested to meet recognized standards when properly applied and installed. Property risks also include roof leaks and interior water damage caused by improper roof penetrations, flashing, or mounting practices. In high-wind or hurricane-prone areas, inadequately engineered or secured racking can allow panels to shift or detach, damaging roof coverings and increasing water intrusion probability. Large arrays can also hinder firefighter movement and ventilation activities if roof access pathways and setbacks are not incorporated into the system design.

Insufficient maintenance can allow debris accumulation, corrosion, insulation breakdown, or other deterioration to go unnoticed until it results in failure.

**Practical Risk Reduction Steps**

Risk can be reduced by engaging qualified contractors who understand applicable requirements and standards outlined by NFPA, coordinating early with the local AHJ, and ensuring a third-party consulting firm is conducting plan review services.

System layout should preserve clear roof access pathways and setbacks consistent with fire code concepts in NFPA and the IFC supporting safe firefighter operations. PV equipment locations, inverters, and disconnects should be clearly and durably labeled, to help verify/reduce electrical hazards during emergency response. Ongoing maintenance should include routine electrical inspections. Thermal imaging can help identify overheating connections or failing components early. Engaging the fire department in pre-incident planning is critical to reducing the potential for a major loss by ensuring responders understand the site layout and associated hazards.

**Lessons from Losses**

Loss experience involving solar PV installations most often relates to electrical or inverter failures, roof leaks resulting from deficient installation or compromised flashing, and storm damage where panels or racking were not adequately secured for site conditions. These outcomes are frequently preventable when churches require code-compliant design and installation, specify properly listed equipment, and maintain roof integrity through periodic checks.

**In Summary**

Solar PV systems can be a strong long-term investment for churches, supporting sustainability goals and reducing operating costs, but they also change the building's electrical and roof risk profile. By prioritizing qualified installation, code compliance, clear labeling and shutdown provisions, roof-access considerations for firefighters, and ongoing inspection and maintenance, churches can meaningfully reduce the likelihood and severity of fire and property losses while benefiting from solar power.