Frequently Asked Questions (FAQ)

COMMERCIAL ROOFTOP SOLAR

When a commercial building owner first considers installing solar PV, the first questions they typically ask involve how the system will be mounted to their roof and its impact on the roof warranty. The Better Buildings Alliance's Renewables Integration Team put this together to help answer common questions.

How are rooftop PV systems mounted?

There are two primary mounting methods for PV systems on commercial building roofs:

Ballasted Racking – Uses heavy weights, typically concrete blocks, to anchor PV systems on a flat roof. Some hybrid-ballasted systems use a combination of ballast and roof penetrating anchors to fasten the system to the roof. The number of roof penetrations for these systems usually depends on how much weight the roof can handle in terms of ballast, and how much additional support the PV system will need to meet wind load requirements.

Ballasted PV Racking System
Photo credit: SolarPro

- **Advantages:** Simple to install; require few or no roof penetrations; hybrid-ballasted systems require less weight that fully-ballasted systems
- **Disadvantages:** Only applicable for flat roofs that are capable of supporting the ballast weight; some jurisdictions limit the use of fully-ballasted systems; may require more advanced wind-loading evaluations; hybrid-ballasted systems have an increased risk of roof leaks from faulty roof

Attached Racking – Uses roof penetrating hardware to mount PV systems on any type of roof. There are many types of attached racking systems for different applications, as shown in the images below. The number of required roof penetrations will depend on the roof structure, PV system design, and local building codes.

Attached PV Racking System
Photo credit: SunLink

- **Advantages:** Can be used on sloped or flat roofs and in more jurisdictions than ballasted systems
- **Disadvantages:** Can be more difficult to install than ballasted systems; faulty roof penetrations can reduce the weather-tight integrity of the roof

How will installing a solar PV system impact my roof?

A rooftop PV should have no negative impacts on a building if installed correctly. Building owners' key concerns about PV systems typically include the potential impact PV may have on roof integrity (.i.e. risk of water intrusion or other damage), roof warranties, building permitting, and business operations, however, all of these risks can be mitigated or eliminated, as outlined below. All rooftop PV systems should be installed by reputable solar installers. Although national certifications are not required for PV installers, many installers are certified by the North American Board of Certified Energy Practitioners (NABCEP).

Commercial Rooftop PV System, Alcatraz Island
Photo credit: National Renewable Energy Laboratory

Will a rooftop PV system impact roof drainage, or maintenance of other rooftop systems?

No. A quality PV installer will assess roof drainage routes and existing rooftop equipment, and will design the system to ensure drainage is not impacted, and access is provided to all rooftop systems to allow for proper maintenance.

Will a rooftop PV system increase the risk of roof damage from large snow/wind loads?

No. The solar installer should conduct a roof assessment to evaluate the roof's structural integrity, and design a PV system to meet snow and/or wind loads specified by local building codes. These designs must be approved by a licensed engineer prior to installation, and must also receive approval from the local building inspection authority.

Will PV increase the risk of fire or impede fire fighters' ability to extinguish a fire?

No. Reputable PV installers should design PV systems in accordance with recognized fire codes that identify best practices for rooftop PV systems. The California Department of Forestry and Fire Protection has published leading guidelines on PV system installations. Many PV installers will also share PV system designs with the local fire department, to ensure the fire department is aware of the PV system and approves the design.[3, 1]

Who is responsible for the warranty, and code compliance of my roof?

Under a TPO or host ownership agreement, the solar installer will be responsible for designing and installing the PV system in accordance with applicable building codes. Generally, a reputable solar installer will also work with the original roof manufacturer for a given building to ensure that they install the PV system in a manner that does not void the roof's original warranty. After the PV system is installed, the roof manufacturer will inspect the system to confirm that the system meets the approved design and that the roof warranty remains intact. Any damage done to the roof during installation will generally be covered by the solar installer's workmanship warranty. Building owners should ensure that a solar installer provides a suitable workmanship warranty prior to installing a rooftop solar system[2, 3]

What happens if I need to replace my roof?

Before installing a PV system, the solar installer will conduct a roof assessment and determine if the roof will need to be replaced during the life of the PV system. Typically if the roof will need to be replaced, building owners are encouraged to replace it prior to installing the PV system. However, TPO contracts can be designed to include the temporary removal of the PV system for roof replacement at a later date. These agreements are negotiated to specify whether the PV system will be removed at the cost of the building owner or system owner, and designate which party will bear the responsibility for lost revenues during system downtime.[2, 3]

Additional Solar Resources:

- U.S. Department of Energy (DOE) SunShot Initiative, *Solar Finance for Residential and Commercial Customers*: http://www1.eere.energy.gov/solar/sunshot/pdfs/stat_webinar_050113_presentation.pdf
- National Renewable Energy Laboratory (NREL), *Power Purchase Agreement Contract Templates*: https://financere.nrel.gov/finance/solar_securitization_public_capital_finance
- NREL, *PV System Cost Database:* https://openpv.nrel.gov/index
- DOE Better Buildings Alliance (BBA), *On-Site Commercial Solar PV Decision Guide*: https://www4.eere.energy.gov/alliance/sites/default/files/uploaded-files/solar-decision-guide.pdf

[1] California Department of Forestry and Fire Protection, *Solar Photovoltaic Installation Guideline*, http://osfm.fire.ca.gov/training/pdf/photovoltaics/solarphotovoltaicguideline.pdf
[2] Center for Environmental Innovation in Roofing, *Successful Rooftop Photovoltaics: How to Achieve a High-Quality, Well-Maintained, Compatible Rooftop PV System*, http://www.roofingcenter.org/syncshow/uploaded_media/SUCCESSFUL%20ROOFTOP%20PHOTOVOLTAICS.pdf
[3] Based on interviews with solar industry professionals.