3.10. What are solar panels mounting types?

Solar panel mounting systems refer to the structural support that holds the photovoltaic (PV) modules in place. They are designed to securely attach the PV modules to the roof or ground, and are an essential component of any solar PV system.

The most common types of solar panel mounting systems include:

1. **Flush mount:** This type of mounting system attaches the solar panels directly to the roof surface using a system of brackets and clamps. It is suitable for most types of roofs and is the most common type of mounting system used for residential solar panel installations.
2. **Ballasted mount:** This type of mounting system uses weights, such as concrete blocks or lead ballasts, to hold the solar panels in place. This system is suitable for flat roofs and does not require any penetrations to be made in the roof surface.
3. **Ground mount:** This type of mounting system secures the solar panels to a frame that is anchored to the ground. This system is suitable for large-scale solar panel installations and is often used for commercial and utility-scale projects.
4. **Pole mount:** This type of mounting system attaches the solar panels to a single pole or a set of poles. This system is suitable for areas where space is limited, such as in urban environments, and can be adjusted to follow the sun's movement for optimal solar exposure.
5. **Roof mount:** This type of mounting system attaches the solar panels to the roof surface using a system of brackets and clamps. This system is suitable for most types of roofs and is the most common type of mounting system used for residential solar panel installations.
6. **Tracking mount:** This type of mounting system uses a motorized mechanism to adjust the angle of the solar panels throughout the day to follow the sun's movement. This system can increase the efficiency of the solar panels but also requires more maintenance and is more expensive to install (Fig. 3.10.1).

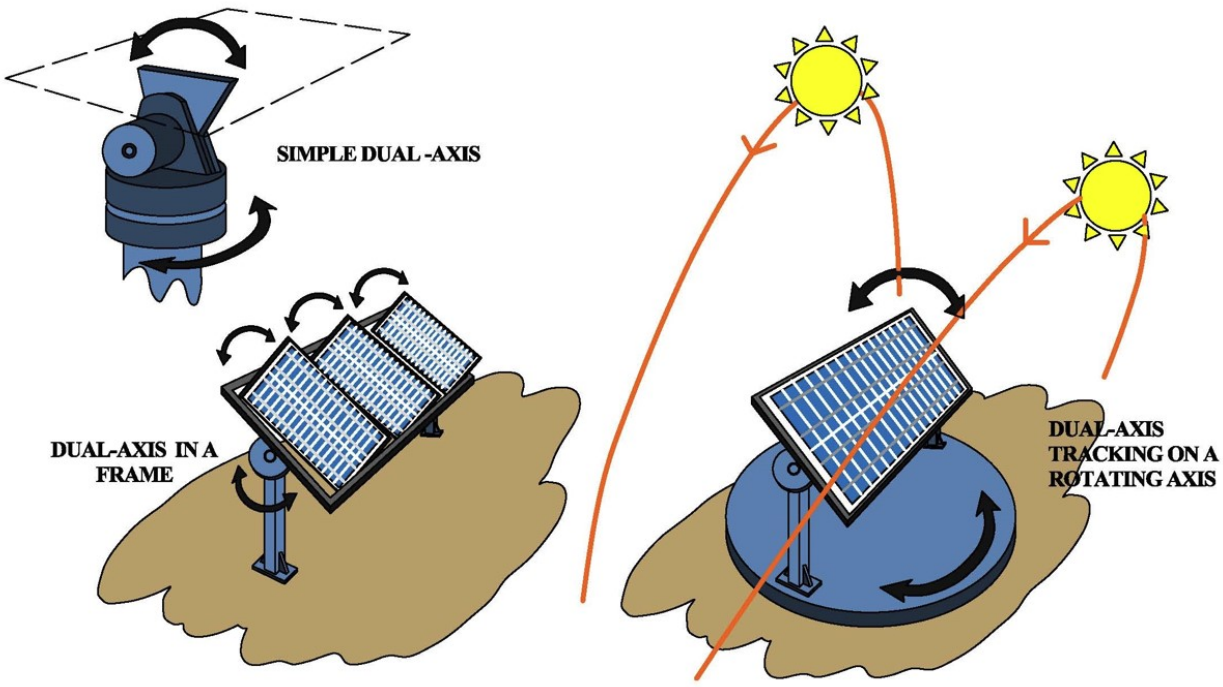

Fig.3.10.1. Dual-axis solar panel. (Source: own elaboration).

Roof mounts tend to be the least expensive way to mount your solar system because they take advantage of your existing roof structure to provide a foundation for your panels. This saves money in racking material and labor costs to complete the installation (WEB-1: *Solar Racking: Best Solar Panel Mounts in 2021*) (Fig. 3.10.2).

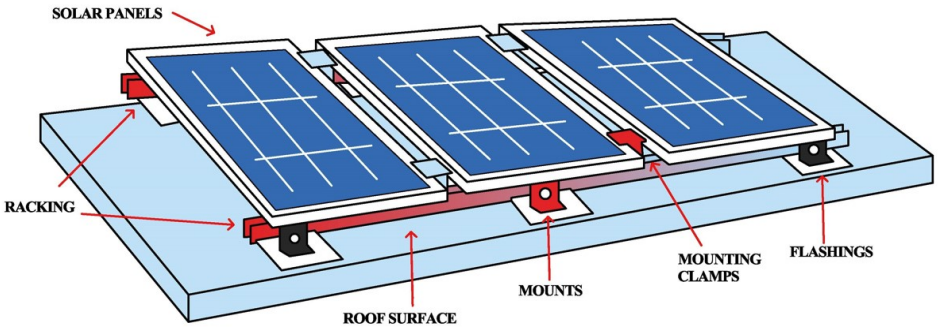

Fig.3.10.2. Rooftop solar instalation components. (Source: own elaboration).

The selection of the appropriate solar panel mounting system depends on several factors, including the location and orientation of the solar PV system, structural characteristics of the building or structure, and local building codes and regulations.

The position at which solar panels are installed, known as the solar panel angle or tilt (Fig. 3.10.3), can greatly impact the amount of electricity they generate. This angle is determined by two factors: the location's latitude and the season. The further away a location is from the equator, the higher the tilt angle should be.

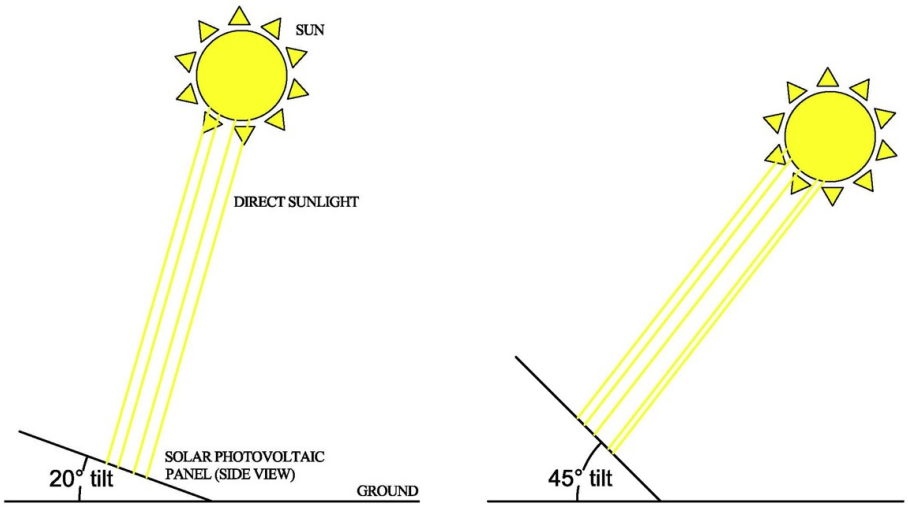

Fig.3.10.3. Solar panel tilt angle. (Source: own elaboration).

A simple calculation can be used to determine the optimal tilt angle for fixed-mount solar panels. During the summer, you subtract 15 degrees from the location's latitude, and during the winter, you add 15 degrees to the latitude. For example, if the location's latitude is 30 degrees, the optimum tilt angle for the solar panels during winter would be 45 degrees (30+15) and during summer would be 15 degrees (30-15) (Fig. 3.10.4). Factors such as local weather patterns, shading, and building codes should also be taken into account when determining the optimal tilt angle.

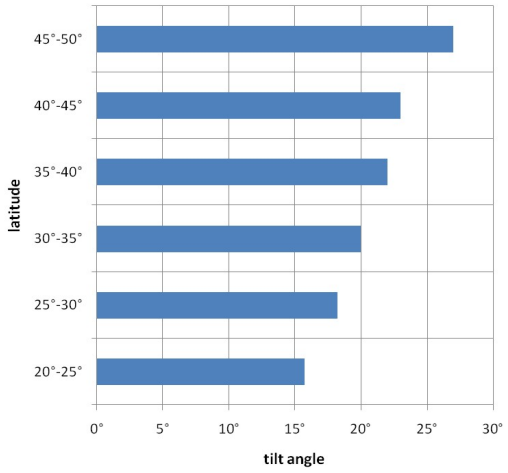

Fig.3.10.4. Solar panel tilt angle based on latitude. (Source: own elaboration baced on Sandhu, J., 2022)

References

1. Sandhu, J. (2022). *Best solar panel angle: How do you find it – and does it matter?* [Online] Available from: https://www.solarreviews.com/blog/best-solar-panel-angle [Accessed 19.01.2023].

2. WEB-1: *Solar Racking: Best Solar Panel Mounts in 2021*. [Online] Available from: https://unboundsolar.com/blog/best-solar-panel-mounts [Accessed 19.01.2023].