



## **Squaring and leveling a solar array begins with a good layout on the roof.**

Determine the basic location on the roof with a marking item such as chalk (non-permanent), starting with the outline of where to place the solar panels. This may need to be adjusted according to rafters, pipes, trees, etc. In addition to the solar panel array outline, mark where the rails will be located. To avoid confusing lines, use two colors. With the system lined out, then install the RAQ's, be certain to confirm it meets building codes.

### **Leveling the Rails**

First, determine that the array lies in a single plane. This process is easiest when you work with at least one other person—and with the RAQ system that has quick and easy leveling features.

The rails are rigid and square, from rail to rail there is connectivity. To line up the installed rails, use a string line. Adjust the bolts on the upper and lower rails at the anchor points, then use the straight-edge to level the rails in between. If the middle of the roof sags, the rails in between will be adjusted higher. If the middle of the roof is raised, then the top and bottom rows will need to be raised.

Check that the top and bottom rails are in the same plane before working on the rails in between.

### **Install & Square the Solar Panels**

Roofs are rarely square, so as you install the racking and solar panels, make them square to the lines of the structure that will be most visible from the ground. If the modules are not aligned to the prominent edges of the structure, it will be very visible.

Generally, PV modules have very square edges, which make line-of-sight an excellent way to confirm alignment as the installation progresses. However, don't assume that all PV modules are perfectly square—the module frame itself can get slightly out of square during shipping and handling.

Once the first row of solar panels is in place, the other rows usually install quickly as they are spaced uniformly adjacent to the first row. Occasionally, one side of the array may be more visible from the ground or even from a second-story window. Continue using tape measure, string line, and a discerning pair of eyes to make certain the array looks good from every angle.

Finally, verify that all of the module clip bolts are tightened to their recommended specifications.