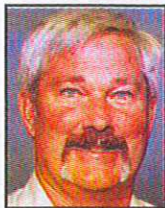


# Solar design can be of wirey importance

There are so many different aspects to designing a solar system. Wire sizing is ever so important. If the wire is too small a percentage of the energy will not make it to the grid or battery.

The industry has settled on 2 percent voltage drop as an acceptable loss. In a lot of commercial applications engineers may require less than a 1 percent voltage drop. In a lot of off grid systems wire sizing is a bigger issue. When dealing with lower voltage the wire has to be bigger. Long runs can get rather expensive because of wire size.

Off grid systems can be 12, 24 or 48 volt. Most systems for homes and cabins are 24 or 48 volt. The industry has got a way from 12 volt because of the size of wire and inefficiency of the inverters. It is more efficient to convert 24 or 48 volt DC power to 120 AC power.



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In an off-grid 48 volt system the wire running solar panel array to the charge controller should be kept as short as possible. For our analysis we are installing a 2040 watt array. At 50 feet the wire would need to be a No. 2 wire. At a hundred feet the wire would need to be a 2/0 wire. Keeping the wire runs as short as possible is a goal of any good designer. Keeping cost down and efficiency high is the

theme.

If we were dealing with an off-grid 24 volt system, a fifty foot run the wire would need to be a 2/0 wire. Sizing the system with a higher voltage and will make a lot of difference. On larger systems it is best to go with the higher voltage.

In net metering or grid tied systems voltages can run from 200 to 600 volts. In most grid tied systems the run from the array to the inverter is around 50 feet. A string of six panels will have the same amperage as a 13 panel string. The voltage

however would go up.

Panels are rated in watts. Multiplying voltage by the amperage equals watts. If the amperage is doubled and the voltage is reduced by half the

watts would stay the same. In a grid tied system with 50 foot run the size of the wire would need to be No. 12.

When figuring wire size, always check with the National Electrical Code. There are a lot of important items to consider when designing a system. No one wants his or her house to burn down. DC current is more dangerous than AC current. An AC (Alternating Current) arc can be broke much easy because the current is always changing direction. DC (Direct Current) current is like a welder. When given the chance will continue to arc until a fire is started.

Never use wire nuts on a DC circuit. On the roof there is such a wide range of temperatures that a wire nut will loosen and arcing will result. Make as few connections as possible. A junction box also known as a J-box is the only connecting point

other than the inverter and panels.

The new 2008 NEC will require a steel conduit from the J-box to the inverter. This hopefully will keep some fireman form chain sawing the wires of the array. The array is a power source and should be respected as such. Voltages can be as high as 600 volts.

Never take short cuts or try to save a buck when installing a solar system. Always use qualified contractors and you will have no worries. Always use properly rated equipment. Most local electrical suppliers do not carry the equipment needed for a proper installation. Let's solarize our world.

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