



SIMPLEENERGYWORKS

Solar's Dirty Little Secrets...



By Randy Velker

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Dirty Little Secret #3

DLS3- Solar can be Dangerous

The third dirty little secret is that a [photovoltaic system](#) can be dangerous!

This is not really a secret at all. This is like saying that fire or oil or gasoline is dangerous. Of course they are dangerous, that is why they have value! In order for something to be of value it must be capable of doing work- which is dangerous.

Anything dealing with electricity will be required to follow some very specific and rigid guidelines in order to insure the safety of everyone. That is why Underwriters Laboratories tests all electrical equipment for safety. That is also why the National Electric Code is revised every 3 years and updated- in order to insure that safe practices are being followed and that dangers are satisfactorily addressed.

There are a few dangers that are specific to [Solar energy](#). The most dangerous is that Photovoltaic modules do not have an OFF switch. When you put a photovoltaic module in the sun it automatically starts to produce electricity. The ONLY way to make that module stop producing electricity is to cover it with a blanket (or remove it from the sun). Until that happens the

module will produce electricity. It is like a runaway generator that cannot be turned off.

This is not so serious if you only have one module. It becomes a very serious problem when you connect many modules together in series. When they have been connected together they can generate voltage up to 600 volts DC. Now you have a 600 volt runaway generator that will be live unless you can put a blanket over ALL of the modules.

Don't underestimate this issue. 600 volts of live DC electricity is plenty of electricity to kill someone or to start a fire. Firefighters across the country are concerned. Many fire chiefs would rather allow a house to burn to the ground rather than endanger their firefighters.

The National Electric Code (2008) requires that there are now two disconnects for every PV system. One disconnect (manual shut off switch) is required if the electricity enters your roof and another disconnect is required at the inverter. These requirements are good (as far as they go) and they definitely make the Photovoltaic system safer. There is still the issue of a runaway generator. If you shut off the complete system at the inverter (or at the initial switch) you still have 600 volts of electricity upstream from the switch being piped to that switch. The whole system is still live (and producing) it is just not pushing that electricity to the inverter. It is like revving up an engine but having the clutch pushed in (so the “load” is disconnected). The engine is still running.

In an emergency the [PV system](#) is still dangerous. When/if firefighters have to work around (or on top of) a photovoltaic system they must be very careful as there can still be 600 volts DC even after the switches have been turned OFF!

One technological advancement that offsets this risk is the new “micro-inverter.” With a [microinverter](#) there is a small inverter for each and every module. When the shut off switch is turned off all of the modules automatically shut themselves down. You never even get to 120 volts. The most electricity that is possible (after the switch is shut off) is the maximum that ONE module can produce (a very small amount of electricity). These micro-inverter systems have succeeded in bypassing the dangers that are inherent in a traditional “central inverter” PV installation.

If you are [installing a PV system on your house or business](#) you should seriously consider the possibility of using the micro-inverter system because of the increased safety that firefighters have when working around your PV system in an emergency. You want to save money and to protect the environment, but not at the expense of potentially injuring a firefighter.

About the Author



Randy Velker is a solar designer/installer in Middle Tennessee. He is the owner of Simple Energy Works LLC which plans, designs and installs commercial and residential photovoltaic systems. They are also pioneering PV leasing in Tennessee. He lives in Crossville with his wife and seven children, and they use electricity produced

by their Grid-Tied Photovoltaic solar system. They also track all of their energy usage using the Current Cost Envi real time energy monitor.

He is interested in renewable energy and “Green” technologies only when they make sense (financially, environmentally, etc.) - and not a moment before!

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