

Solar power can be a health hazard



Rooftop solar systems have become popular, but the “dirty electricity” they generate has been linked with serious health effects, including diabetes, cancer and ADHD. A few people report a range of symptoms, such as restlessness and sleep disturbances.

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Generating electricity from the sun is gaining popularity. In many parts of the world, governments encourage their citizens, businesses and schools to put solar panels on their roofs. The state of California has mandated solar systems on all new homes built from 2020.

Dirty electricity

Dirty electricity is high-frequency waves that travel on the electrical wiring of homes, schools and businesses. It is caused whenever the current is chopped up rapidly, such as by most low-energy light bulbs and home electronics.

A particularly potent emitter of dirty electricity is modern solar electric systems. They use inverters that take the electricity from the solar panels and turns it into alternating current (AC electricity) that feeds the house wiring or is sold back to the utility. An inverter does its work by chopping up the electricity tens of thousands of times each second (SEI, 2006).

Many solar systems use additional technologies that have names such as “optimizers”, “voltage converters”, “maximum power point tracking” and “pulse width modulation.” They also chop up the electricity, at additional frequencies (Fink, 2011).

All this “chopping” of the electricity generates powerful dirty electricity on the household wiring, which can be measured. A specialist is needed for a complete picture, but simple instruments can measure a subset that gives a good idea.

The picture below shows two such meters measuring the output from a Xantrex sinewave inverter. (It’s in an off-grid house with all breakers turned off, so there are no other possible sources of dirty electricity).



Instruments from Stetzer Electric and Alpha Labs showing high levels of dirty electricity from a sinewave inverter.



The same instruments showing clean power in a grid-connected home with no solar system.

The second picture shows the same two instruments measuring the level of dirty electricity in a grid-connected home. This house has no solar system. The two houses are half a mile apart.

This author has measured three other inverters of various types. In all those cases the level of dirty electricity was so high the Stetzer meter went off the scale (i.e. above 1999 units).

Wires as antennas

Electricity produces magnetic and electric fields around any wire it runs on. When radio-frequency waves travel on a wire, they turn the wire into a big antenna, whether it is the wires inside the walls of a house or the wires running along the street (Loftness, 2007).

This radiation can sometimes disturb radios and other equipment, depending on what frequencies are emitted, how powerfully and how far away it is.

Solar systems with inverters are a well-known problem for radio amateurs, whose antennas pick up the “noise.” (KA7OEI, 2016). Some radio amateurs have gone to great lengths to co-exist with such a solar system (Brock-Fisher, 2016). Other radio amateurs use inverter-free solar systems to avoid these problems (Gauger, 2012).

Health effects from inverter-based solar systems

Health effects from dirty electricity, regular electricity and wireless devices has been a controversial subject for decades. There is no scientific consensus and different parts of the World Health Organization don’t agree with each other.

There have been no studies on solar systems specifically, but the effects of dirty electricity from other sources have been studied. These studies suggest that dirty electricity can cause cancer, promote diabetes and ADHD (attention deficit hyperactivity disorder) in schoolchildren.

The largest study was done by scientists at McGill university in Canada, who measured the amount of dirty electricity utility workers were exposed to. They found that workers exposed to more dirty electricity were more likely to develop cancer (Armstrong, 1994).

An epidemiologist researching a cancer cluster among teachers at a middle school found parts of the school had very high levels of dirty electricity, and the teachers working in those classrooms had a much higher rate of cancer than teachers working in the other parts of the school (Milham, 2008).

There have been experiments where the level of dirty electricity was changed in school buildings, while the teachers reported on how attentive and disruptive the kids were. Higher levels of dirty electricity was associated with more disruptive and less attentive children (Havas, 2004).

There are some small studies showing that dirty electricity affects the blood sugar in diabetics, the neurotransmitters in healthy people and the symptoms of people with multiple sclerosis.

Anecdotally, there are also stories of people with electrical sensitivities who get symptoms whenever inside a solar powered home. This writer knows a woman who had a solar system installed on her house, but had it removed since it interfered with her sleep.

The available science is just briefly summarized here, with a small subset of references. For a more detailed description, please see our posting “Health effects from dirty electricity,” which is available via the link at the end of this article.

What to do?

It is not easy being green and sensitive. Many “green” technologies are not safe for people who are chemically or electrically hypersensitive. Some examples beyond this article are electric cars and most low-energy light bulbs. So what is a green-minded sensitive person to do?

If you already have a solar power system, you can try to disconnect the breaker for the solar system at night and see if you feel better. It may not be possible to fully turn the system off in the daytime if it has any electronics mounted on the panels, such as optimizers or microinverters.

Mounting the solar panel in the yard (instead of on the roof), placing the inverter in a separate shed and installing a heavy-duty filter on the line from the shed to the house should help, but whether it is enough is uncertain. Such a project will require specialist help, especially with the filter (the simple “capacitors” will likely ruin the inverter).

All types of inverters generate copious dirty electricity, whether they are sine wave, square wave, modified sine wave or micro inverter. It appears that the micro inverters are the worst, since there are more of them and they often have simpler designs with less filtering (KA7OEI, 2016). Square wave inverters will probably emit the highest frequencies, due to high harmonics.

Doing what one amateur radio operator did (Brock-Fisher, 2016), may not be sufficient, since he was only concerned about the higher harmonics in the frequency band he used. They would be less intense than the fundamental inverter frequency somewhere in the lower kilohertz area.

We have an article with more information on how to reduce the dirty electricity from a solar system. See the end of this article.

Avoiding having your own solar system is usually best. That also saves a big extra expense of dismantling and then reinstalling the system when it is time to replace the roof.

Using a wind generator instead of solar panels can create new problems with noise and zoning, and many wind generators use inverters too.

It may be possible to buy into a larger local solar system that is shared among households, either in the same subdivision or around the community. These are sometimes called “community solar.” Such systems may be cheaper than mounting solar panels on individual houses due to lower labor costs. The system should not be next door, since the dirty electricity may still reach your household wiring, as it can travel shorter distances. Also be aware that ground-mounted solar plants often use herbicides to keep down weeds (Green American, 2018).



Consider buying into a shared or utility-scale solar system.

Some utilities offer a “100 percent renewable” energy plan. This may be the safest and simplest option.

A radical option is to go off the grid with a DC-only solar system and no inverter. This is what solar systems looked like until the early 1990s. There are people doing it today for health reasons (including this author), but it is not for everyone. See the links below for articles.

More information

For more information about dirty electricity, its health effects and more about low-EMF solar systems, go to www.eiwellspring.org/demenu.html

For articles about ultra low radiation DC-only solar systems, see www.eiwellspring.org/offgrid.html.

2008 (updated 2023)

References

Armstrong, Benedict et al. Association between exposure to pulsed electromagnetic fields and cancer in electric utility workers in Quebec, Canada, and France, *American Journal of Epidemiology*, 140, Nov 1994.

Brock-Fisher, Tony. Can home solar power and ham radio coexist? *QST*, April 2016.

Fink, Dan. Charge controller buyer's guide, *Home Power*, December 2011.

Gauger, Dave. Going totally green: moving your station off the grid may be easier than you thought, *QST*, Feb 2012.

Green American. Farms harvest the sun – twice. *Green American*, Winter 2018.

Havas, Magda et al. Teacher and student response to the removal of dirty electricity by the Graham/Stetzer filter at Willow Wood school in Toronto, Canada, Biological effects of EMFs, 3rd international workshop, October 2004.

KA7OEL. The solar saga – part 1: Avoiding interference (why I did not choose microinverters!), ka7oei.blogspot.com, March 2, 2016.

Loftness, Marv. AC power interference handbook (3rd edition), American Radio Relay League, 2007.

Milham, Samuel and L. Lloyd Morgan. A new electromagnetic exposure metric: high frequency voltage transients associated with increased cancer incidence in teachers in a California school, *American Journal of Industrial Medicine* 59, 2008.

Solar Energy International (SEI). Photovoltaics design and installation manual, New Society, 2006 (chapter 8).