Reducing radio-frequency radiation from solar electric systems

Modern solar systems radiate radio-frequencies that can affect human health and interfere with radio reception. A radio amateur modified a solar system to greatly reduce the radiation, but it was a large and costly project.

Keywords: solar power, solar electricity, inverter, Maximum Power Point Tracking, dirty electricity, health, electrical sensitivity, radio, interference, EMF, EMC, shielding, filtering

The problem with solar systems

Modern solar systems use inverters to take the electricity from solar cells and make it into regular AC electricity that can power a home and be sold to a utility company. Inverters work by rapidly switching the flow of electricity. This generates radio-frequency radiation from the inverter itself and also from the wiring and solar panels connected to it, as transients travel on them (called "dirty electricity"). This is a problem with every type of inverter, including sinewave, squarewave and microinverters.

Most solar systems also use optimizers (also called Maximum Power Point Tracking), which work similarly and cause the same problems.

These technologies can cause symptoms in people who are electrically sensitive and can interfere with radio amateur (ham) operators and reception of short wave radio.

The radio amateur's solar project

Tony Brock-Fisher is a retired engineer who also has a degree in physics. He wanted to install a large 10 KW solar system on the roof of his house without interfering with his hobby as a radio amateur. He modified a standard solar system in various ways including:

- avoiding microinverters
- avoiding wire loops
- shielded wires
- line filtering

He was able to reduce the radiation about a hundredfold (20 dB). This added about 10% to the total cost of the solar system.

He wrote the article *Can Home Power and Ham Radio Coexist?* which was published in the April 2016 issue of QST magazine. QST magazine is published by ARRL, the organization of radio amateurs in the United States. The article contains details of the project and is very well written – highly recommend for people with some technical understanding of EMC issues.

The article can be purchased from ARRL by contacting tis@arrl.org. If this e-mail address is out of date, contact ARRL through their web site (www.arrl.org).

Commentary

Very few solar installers and electricians will understand the methods described in the article. If the problem is with a neighbor's solar system, it will likely be difficult to get them to modify the system, even if you pay them.

For people with electrical sensitivities, the measures in the article may not be sufficient. Much more than a hundredfold (20 dB) reduction may be needed. Don't place the solar panels on the roof of the house, or next to it. The inverter should also be placed well away from the house.

It is possible to avoid all these problems by using a DC-only solar system, such as a 12 volt system. These systems were common in the 1990s, but have various limitations.

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