Inverters and Solar Panels: Adverse Health Effects

Adverse health effects come from: Inverters, Panel wiring, Smart Meters and Communications. Each system is likely to be different and needs to be checked individually.

1. Inverters

- Inverters are used to change direct current (DC) from the solar panels and batteries to alternating current (AC) for electrical appliances and power supplies linked to the grid.
- Inverters operate in the day, with sunshine, and at night, with the battery supplying the grid.

(a) Inverters produce **dirty electricity** or **high-frequency voltage transients** (3 – 120 kHz).

- These frequencies are especially bioactive, particularly for people who already have Electromagnetic Hypersensitivity (EHS). They are associated with sleep disturbance, headaches, fatigue and poor concentration. Inverters are not recommended for EHS people.
- Dirty electricity or voltage transients can travel along the wiring to a neighbouring house.
- Filters (e.g. Stetzer, Greenwave) can reduce this dirty electricity or voltage transients. However, a traditional filter which uses a single capacitator to block lower frequencies can be less efficient if there are electrical spikes because of, e.g., car chargers, and these filters may overheat. Specialist equipment like Solar Filter 1 can help reduce spikes.
- The manufacturer's Total Harmonic Distortion (THD) gives the power quality of the output AC: <3% excellent; 3-5% good; 5-10% EHS people should avoid; >10% replace inverter.

(b) Inverters produce **magnetic and electric fields.** High fields can be harmful (see Notes).

- Locate inverters as far as possible from bedrooms and living space.

(c) Inverters can produce **acoustic noise**, often 25 to 55 decibels. String converters may be noisier because of larger transformers and more cooling. Fans can produce a whine. Transformer coils can produce a low-frequency hum. The rapid switching of DC to produce AC can produce a high-pitched whine, e.g. at 15 kHz within human hearing 20 Hz to 20 kHz.

2. Solar panels

- Solar panels may be wired as a 'daisy chain' in series. Therefore if each panel is 50 Volts, 12 panels can produce 600 Volts, the maximum allowed and a potentially dangerous level.

(a) If the solar panels are wired in a loop, they can **radiate the high frequency interference signals from the inverters**. These can interfere with radiofrequency signals.

- Ferrite chokes on the wiring reduce these voltage transients. Wires can be twisted together.
- The roof frames and rails can also be earthed or grounded.

3. Smart Meters and communications: Wi-Fi and 4G

(a) **Smart Meters** report electricity usage and exports to utility companies. Smart Meters are transitioning from 2G/3G to 4G. They can transmit at high power every 15 seconds.

- The health dangers of Smart Meters and other radiofrequency signals like Wi-Fi are well established and are a 2B carcinogen. People in the UK can refuse to have one. People sensitive to EMFs should refuse to have them close to their residence.

(b) Solar inverters often use a **communications system** or dongle via Wi-Fi, Ethernet, or mobile phone, to track generation. They may also take updates through Wi-Fi. The Wi-Fi transmitter can be covered in a Faraday bag if the Wi-Fi is needed only for updates.

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With thanks for advice from Guy Hudson of Beneficial Environments.

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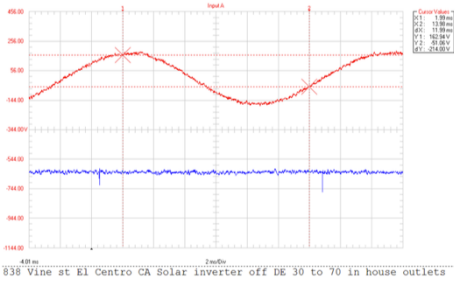
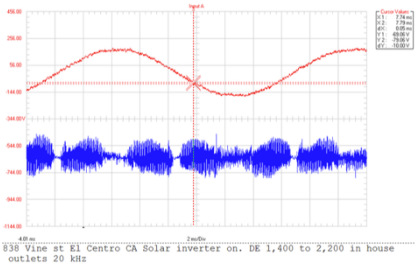
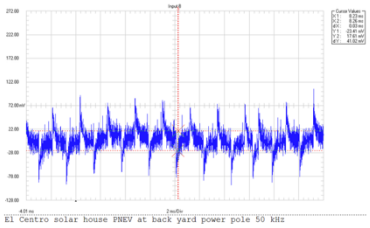
NOTES

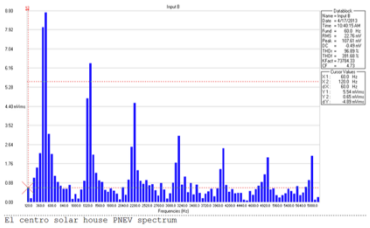
A. Inverters' Dirty Electricity or high-frequency Voltage Transients

Left: Solar inverter off, 30-70 GS Units in house outlets.[1,4]
Middle: Solar inverter on, 1,430-2,200 GS Units, 20 kHz, house outlets.
Right: Primary neutral to earth voltage: *Top:* Each 10 milliseconds
Bottom: Harmonics 120-5,880 Hz









B. International Safety Limits; Typical Measurements near Residential Inverters

IGNIR Safety Limits[2]			***Typical Measurements near Residential Inverters***			
Dirty Electricity, Voltage Transients, Graham-Stetzer units (GS),[1] and **Harmonic Distortion**						
Average, sensitive[3]	(Maximum advised)		Inverter off[4]	Inverter on, 20 kHz[4]	Total Harmonic Distortion (THD) of output AC [5]	
30 GS	50 GS		30 – 70 GS	1,430 – 2,200 GS	<3% good	>5% avoid
Magnetic Fields, nanotesla (nT) (1,000 nT = 1 μT)						
Average, sensitive[3]	Maximum, sensitive[3]		1 m. inverter off[6]	1 m. inv. on, earthed, shielded[6]	1 m., inv. on, not earthed/shielded [7]	At inverter on, not earthed/shielded [8]
30 nT	100 nT		6 nT	36 nT	500-1,000 nT	12,000-118,000 nT
Electric Fields, Volts/metre (V/m)						
Average, sensitive[3]	Maximum, sensitive[3]		1 m. inverter off [6]	1 m. inv. on, earthed, shielded[6]	At inverter on, not earthed/shielded[8]	At inverter on, not earthed/shielded[9]
1 V/m	10 V/m		0.0 V/m	0.4 V/m	2 V/m	9.5 V/m

[1] 3-100 kHz: Graham-Stetzer Units (Stetzerizer Microsurge meter), the rate of change of voltage with time: dV/dT.
[2] IGNIR: International Guidelines on Non-Ionising Radiation: ignir.org
[3] Sensitive: children, elderly, foetus, ill, people with EHS, pregnant women.
[4] Sam Milham (2013) Link. Guy Hudson, *Dirty Electricity: The Invisible Pollutant Disrupting Your Health* (2025) Link.
[5] Jayce Love, *EMF from Solar Panels and Inverters: What Australian Homeowners Need to Know* (12 July 2026) Link; Keyur Rakholiya, THD in Solar Inverters, Why It Matters. *Qbitsenergy* (14 October 2026) Link. Lighter loads: higher THD.
[6] Institute of Building Biology + Sustainability (2014) Link
[7] Industry claims omitting established health harm from Dirty Electricity or Voltage Transients (2 May 2026) Link
[8] Safigianni, AS et al, Electric and magnetic fields … roof mounted photovoltaic systems, *JBAP.* (2014) Link
[9] Karawia H et al, ELF electric and magnetic fields … rooftop photovoltaic system. *23 Int Conf El Distr.* (2015) Link

C. Cancer Classifications

IARC: ELF (≥ 300 nT: increased cancers), and RF EMFs: 2B possible carcinogens (2002 Link, 2011 Link).

D. Smart Meters' Adverse Health Effects

See: *Smart Meters and their Adverse Health Effects* (ES-UK, 2026) Link.

E. Further information

International Institute for Building Biology & Ecology: *Photovoltaic Electrical Systems: Fact Sheet* (2019)

- "Solar or Photovoltaic power generation systems are not recommended … especially for … EHS." Link

Health Impacts of Solar Panels: A Building Biologist's Guide (24 May 2026) Link:

- use shielded cabling; use string inverters (not microinverters) in one box placed in a distant location.

Variable frequency drives for **heat pump motors** can cause similar health problems to inverters. Link.
Electric vehicles, traction inverters and electric chargers can have high voltage ripple and transients. Link.