How to protect yourself against smart meters

Smart meters and their simpler AMR cousins are being installed in many countries. There have been numerous stories of sensitive people having problems with them, in some cases even if they were allowed to opt out and keep a mechanical meter on their house.

Keywords: smart meter, smartmeter, mitigation, protection, dirty electricity

This article provides a number of remedies to consider if a PLC/PLT or wireless smart meter or AMR meter is installed on your house or in your neighborhood. The remedies to consider depend on the type of meter installed, so the first step is to find information about the local system.

There are several factors that can work together to cause the problems; every situation is unique. There is no certainty that a remedy will work for your particular situation.

This article is not a textbook in smart meter mitigation. This is still a pioneering field with no sure solutions. What this article can provide is a starting point for trying possible solutions or helping a homeowner when discussing the options with an electrician or EMF specialist.

The information in this document is provided without any warranty. It is the sole responsibility of the reader to apply this information wisely and seek competent help where needed.

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1. Gathering information

First of all, it is necessary to find out what type of meter is (or will be) installed, and which communication technology it uses.

The front of the meter states the manufacturer and model of the meter. From there, it may be possible to find information about the meter on the internet. For most accurate information, look at the manufacturer and utility company web sites.

Mechanical (analog) meters *usually* do not transmit, but some do. To see if yours does, look up at it from below and note any labels with key words, such as “FCC”, “AMR” or “ERT”. There might be some informative company logos, such as that of a turtle.

The manufacturer may also have put out a press release about the agreement with your utility. These can be very informative.

Many meters can be configured differently, so the best source of information is probably to call the utility. The office staff probably does not know very much and may simply want to minimize your concerns. Make sure your questions are answered competently.

1.1 Questions to ask the utility

- Which communication technology does it use?
    - telephone modem?
    - radio?
    - cellular?
    - wireless network?
    - mesh network?
    - power line carrier?
- Which frequencies does it use?
    - very low frequency
    - kilohertz (low RF, often referred to as CENELEC A or C)
    - megahertz (RF/microwave)
- Does the system use “ routers”/”relays” or “collectors”/“gatekeepers” that are mounted on people’s homes?
- How will the utility collect the information?
    - drive-by vehicle
    - receiver close to your house
    - receiver in neighborhood
    - receiver at substation
    - cell tower (new? where?)
    - via power lines
    - via telephone line
- How often will the meter transmit?
    - billing information
    - network status
    - does it transmit even if not received by a drive-by vehicle?
    - any other transmission, including internal network traffic
- What capabilities does the meter have, that are not presently used?

  - communications methods possible?
  - how frequent?
  - any plans to use them in the future?

- Does the meter communicate with anything inside the house?

  - what devices?
  - how? (wireless/power line)
  - how often
  - does it transmit even if not used for anything?

- Is there an opt-out option?

  - what does it cost?
  - is there a discount for people of low income?
  - does it provide a fully mechanical meter?
  - how is this meter read?

Note that most people at the utility will probably only know how often the billing information is received. They may tell you that their meters are only read once a month when their radio truck drives through the neighborhood and not know that the meter actually transmits 24/7, even when their truck is not in the area. Or they may tell you that the meter only transmits its billing data a couple of times a day, while it is only their technical staff who knows that each meter also transmits "hello, I'm alive" messages several times a minute, or even multiple times a second.

Many meters can later be programmed to do sophisticated "smart grid" features. These features will require much more frequent transmissions to and from the meter. Even though your utility does not currently plan to use those features, they may in the future and would probably not notify you in advance.

Once you have the basic information, the picture should be more clear and you may be able to see how concerned you need to be and what action you need to take, if any.

Armed with what information you can get, you'll have to decide whether this is likely to be a real problem. It may not be. Some do just fine with them. In Sweden, the support organization for the electrosensitive there did a survey and about half of the respondents said that the new meters did not bother them. Sweden tends to

use the simpler meters that only communicate infrequently, so we don't know the impact of the more intrusive models.

If you live comfortably in a big city with its thick soup of wireless transmissions of all sorts, you'll probably be okay with the smart meters as well.

2. Keeping the old meter

Controlling the source of the problem is generally the best, cheapest and most effective method. This usually means having a mechanical (analog) meter on your home. This may not be sufficient, but it should help in most cases.

You may convince the utility to let you keep your old mechanical meter or install one, if you are moving to a place that already has a smart meter. Many folks have already done that. The utility may not like it very well and try to tell you that the old mechanical meters are not compatible with the new, etc. The reality is that the old mechanical meters will ALWAYS work, it is not possible for them not to. It just won't work with their new control system.

Some people simply read off the meter themselves once a month and send the reading to the utility on a pre-printed postcard. The utility can then on a rare occasion send someone to check that you are not cheating. This method has been used in some rural areas for many decades.

The utility may not be willing to do this. The responses vary greatly. You may need to be persistent and not let them just dismiss you.

Some utilities readily accept the request to keep the old meter, others refuse on principle, even with a letter from a doctor. Most probably lie in between. Do not expect an easy sell, but be prepared to have to make many phone calls. If you can get a doctor's letter, that can only help. It will be harder for them to ignore that, as it has legal value in a lawsuit.

Doctors are always busy and sometimes poor letter writers. It often works well to give them a draft of the letter you need, which they can then edit and sign.

You should also submit your own comments in writing. Make sure to keep copies.

Having an analog (mechanical) meter on your home can help in most cases, but sometimes the neighbor's meter causes problems as well. Examples are when there are:

- close neighbors

- power line communication
- dirty electricity
- ground currents

These issues are covered in a few pages.

3. Get a more benign meter

If the utility refuses to let you have a non-radiating meter, perhaps try to negotiate for a less bothersome type. The meters that are only read once a month or once a day should be better than those that constantly transmit.

In one case, the utility sent someone out who reduced the transmission power of the meter to the bare minimum. Not all meter designs have this option, however.

You may be able to tolerate a pre-paid meter better than a frequently transmitting smart meter. The pre-paid meters typically transmit all the time to the in-house display panel, but the signal strength is much lower.

One woman in Arizona was unable to live in her home when a wireless mesh-network meter was installed. She did better when an M-Power pre-paid meter was installed, even though it transmits to the in-house display using the household wiring (PLC).

4. If you live in an apartment, townhouse, row house or duplex

This setup could mean that the meters are well away from your apartment. Or you could have a whole row of meters right on your wall. There may also be many wires passing your apartment going to other apartments. Keeping the old mechanical meter would probably make little difference with all the neighbors' meters being the new type.

It is unlikely that you could convince all the neighbors to request their meters not to be smart meters.

If there is a meter on the wall, and it is wireless, you may be able to shield it by putting a metal plate or aluminum foil on the wall, between you and the meter. See later.

If the problem is a PLC meter, you will likely receive dirty electricity radiation through the walls and ceilings from the adjacent apartments. The solution could be to ask your immediate neighbors to install filters, if you offer to pay the cost. If the electrical wires to other apartments (or town houses) pass through your unit, you

may need filtering for those neighbors, too. Filtering only works for some PLC systems (see section 7).

There are other possible remedies, though with an apartment you will be more limited in what you can do. There is little you can do, other than move away, if it turns out to be unlivable. It may not be, since it is likely that there is already a lot of electropollution from the other apartment dwellers' use of wireless gadgets and electronics.

5. If you live in a detached house

If the new meters communicate wirelessly, and the neighbors are not very close, it may be sufficient to get the old mechanical meter back.

Communication over the power line (PLC) is different. Especially if your house shares a transformer with other houses. In Europe, it is common that one transformer serves from ten to a hundred homes. In North America, there is typically only one or two houses per transformer. A transformer dampens some types of the power line communication signals, so the biggest concern is households on your side of the transformer.

If the utility refuses to let you have a mechanical meter, or the neighbors' meters are too much of a problem, there are several options left.

6. Wireless meters

The radiation from a wireless meter passes right through walls and ceilings as if they are not there. The strength of the signal goes down by distance. What is a safe distance depends on the person, but 10 ft/3 m is probably the closest anyone should be to a meter.

If a lot of metal is located in the room next to the meter, such as steel cabinets, steel desks, refrigerator or steel countertop, these can reflect the radiation and increase it. This is similar to sitting in the sun and holding a mirror in the lap.

Depending on your situation, there are several options that can be considered:

- move meter to a pedestal or garage
- shield the wall
- move your bed
- shield your bed

If these options are not enough, there may be a more radical option:

- disconnect the whole house

These options are described in separate sections of this document.

7. Power line carrier communications (PLC/PLT)

Some meters communicate by sending signals that travel on the electrical wires from a house to the electrical grid. This is called “power line communication” or “power line carrier” (PLC) in America. In Europe it is called Power Line Telecommunication (PLT). This is not wireless communication, but it creates powerful “dirty electricity” on the household wiring. Dirty electricity turns the wiring throughout a house into unintentional antennas, radiating the dirty electricity. It can also radiate from the soil under the house, if there are ground currents (very common).

These systems will also radiate off the power line along the street, as well as any overhead wires going to a house or building.

Moving the meter may not help much. It may not even help to keep the old mechanical meter, as the signals from the neighbors’ meters may still enter into your household wiring.

Some types of PLC signals can be dampened or blocked by filters. Whether this is possible depends on the type of PLC system used (see below).

Low frequency PLC (TWACS or Turtle (TS1/TS2))

The signals from these systems are designed to pass through any sort of filter or transformer. This is probably the most difficult type of system to cope with. These systems are common in North America.

The following is a list of suggestions to try:

- move your bed
- fix ground currents
- fix stray voltages
- disconnect circuits

If they do not solve the problem, then consider:

- bury service line
- shield wiring

- disconnect the whole house
- move to another area

Medium frequency power line communication (G3-PLC, etc.)

These types of systems put radio frequency signals on the power line. They are usually in the 50 to 100 kilohertz range, and are often referred to as adhering to CENELEC A or CENELEC C.

These systems are more common in Europe than in North America. They are easier to install in Europe, where it is common for one transformer to serve up to a hundred houses.

These signals can be dampened in various ways. Some of these signals do not pass through a transformer well, so if your home does not share a transformer with other homes (common in the United States) it may be sufficient to keep an analog electrical meter.

These remedies can be tried:

- disconnect circuits
- install filter
- fix ground currents
- fix stray voltages

If that does not help, consider:

- bury service line
- shield wiring

As a last resort, consider:

- disconnect the whole house
- move to another area

The above remedies are described in detail later in this document.

Broadband power line communication (BPL)

These systems use higher radio frequency signals (about 1 to 30 megahertz) on the power lines. They are presently only used for communication with smart appliances inside the house (HAN networks).

8. Hybrid meters (wireless and power line)

There are various hybrid meters available, which communicate in multiple ways.

There are meters which use wireless WiFi to communicate with the household gas and water meters and then pass the information on to the utility computers using the power lines (PLC).

Some meters communicate with the utility through a wireless network, while it uses the household wiring to communicate with appliances inside the house, such as a display screen.

Various other combinations exist as well.

For remedies to consider, see the sections about wireless, power line carrier and dirty electricity.

9. Dirty electricity from the meter

Any type of digital electrical meter can unintentionally create substantial transients on the electrical line. This is called dirty electricity.

Whether a particular meter creates a lot of dirty electricity depends on the quality of the design. Some well-designed meters create very little.

Different components inside the meter can create this disturbance, however the main source is likely to be the power supply for the electronics.

The dirty electricity modifies the electrical and magnetic field around the wires in the house and electrical lines outside. It can also affect the magnetic field from ground currents.

Dirty electricity can travel from next-door neighbors via the electrical feed and through ground currents. These frequencies are dampened by transformers.

The best remedy is to use an analog meter.

Also consider:

- install filter
- fix stray voltages
- fix ground currents

Then try:

- disconnect circuits
- shield wiring

10. Consultants

Some of the remedies will require specialist knowledge to evaluate correctly for your specific situation. This is best done with a personal visit.

As many of the possible remedies are costly, it is best to get an expert opinion before proceeding.

There are several EMF consultants available, though it is a pioneering field and the quality of their services can vary dramatically. There is no real certification that guarantees competence in this field.

Word-of-mouth is probably the best way to find someone good. Otherwise, call local electricians and bau biologists for referrals. Some bau biologists have skills in this area.

An open-minded electrician can probably do most changes without prior experience, once they have been decided on. Some electricians will not understand the need and can be an obstacle.

The remedies

The rest of this document describes the different remedies. Each remedy will be more or less effective depending on the specific situation. The previous sections listed which remedies should be considered for various situations.

This is mostly pioneer territory. Expect to have to experiment.

Move your bed

The most important part of our home is where we sleep, at least from a health perspective. It is during sleep that the human body regenerates, which is more difficult if stressed by electrical exposures.

The bed should be placed where there are the least exposures, which is generally away from:

- electrical meter
- breaker box
- electronics
- appliances
- main wire runs inside walls

A sensitive gaussmeter is a good tool to find a good location for the bed. The meter must be capable of displaying values of 0.1 milligauss (10 nanotesla). It is best to be below 0.1 milligauss, or at least not to exceed 1 milligauss.

If your home has power line communication signals, it may help to move the bed away from walls that have electrical wires in them (that are hooked up). also keep the bed away from wiring under the floor.

Shield your bed

It is possible to somewhat shield a bed from high-frequency radio waves, which is what the wireless meters transmit.

Shielding canopies are commercially available (see resources). They look like mosquito netting that goes over the bed and is also tucked in underneath the sleeper. There are various models with different coatings. Some can be washed. Some have a smell to them that can be bothersome. If that is a concern, ask for samples of the material.

Canopies are not great shielding — they are very thin and are only effective against weaker wireless signals, not a powerful (close) source.

Some people do not do well sleeping inside such a metallic cocoon.

The canopies cannot shield the lower frequencies from dirty electricity and most power line communication systems.

Fix ground currents

Ground current is electricity that runs in the soil around and below the house. This is very common, especially in more densely populated areas.

As the electricity moves across the plane of the soil, it will radiate upwards into the house. It takes a much weaker current to produce an effect than it does with an electrical cord. This is because the soil acts as a radiant plane (radiation diminishes only proportionally to distance). The waves radiating upwards also tend to be distorted, which can be more bothersome.

The ground currents go between ground rods. If multiple ground rods can be converted to a single-point grounding system, there will be no ground currents. Unfortunately, ground rods in an area often have different owners, such as neighboring homeowners and the electrical utility.

Each building will usually have its own ground rod. A well-casing is also often used as a ground rod and is a common culprit. Transformers and residential power lines usually have ground rods also.

In some cases, the ground currents can be eliminated by simple measures. Sometimes more extensive work is required, such as using an isolation transformer, a Faraday transformer or a separate ground system (only legal in some areas).

Correcting ground currents will usually require specialist help.

Fix stray currents

Stray currents (stray voltage) is electricity running in unintended ways in a house, such as along metal pipes and in unbalanced electrical circuits. The ground currents are also a type of stray current.

The stray currents result in cables that radiate much more than they otherwise would, because they are unbalanced.

A consultant is needed for this work. There is an excellent book about this issue by Karl Riley (see resource section).

Move meter to a pedestal or garage

If you have to have a meter that transmits wirelessly, you may be able to move it away from the house. If a wireless meter is moved to a pedestal at least 30 ft/10 meters from the house, that should help. The further away the better.

If you have a garage, it may be simpler and cheaper to mount the meter on the garage wall, as far away from the living space as possible.

Wireless meters tend to radiate most powerfully out the front and a lot less through the sides and back. If possible, make sure the meter does not "point" towards the house.

Moving the electrical meter is usually a substantial job. You will probably need both an electrician and the utility company to do work pulling new wires, mounting the meter, etc. An electrician or the utility company should be able to give you an idea of the cost.

Shield the wall

If the meter is mounted on an outside wall, it may be possible to put up a radiation shield. A plate of steel or aluminum could be placed on the wall, so the radio waves are reflected out from the house. The plate is mounted on the same wall as the meter, but on the opposite side (the inside). The plate must fully cover the meter, plus a generous overlap, otherwise the radio waves will simply circle around the edges of the shielding plate. Copper mesh may work as well.

Installing such a shield may disrupt the meter's communication with the central office, if it happens to be between the meter and the utility's receiver.

A shield works by reflecting radio waves, like a mirror. It does not absorb much of the radio waves. Both sides of a radiation shield work the same. This means that if you place a cordless phone, computer, etc. up against the shield, more of their radiation will be reflected into the room.

No shield works 100%, some radiation always gets through. Don't assume it works perfectly, i.e. don't sit or sleep right up against the wall with the meter on it, even if shielded.

Do NOT connect the shield to the household ground, such as from the ground plug in an electrical outlet. Most ground wires have "dirty electricity" in them, which could turn the shield into an antenna.

Do NOT cover the whole wall with an airtight shield (i.e. foil or plate). This may trap moisture inside the wall, producing mold and fungus after some years. For large areas, use copper mesh or other shielding with many tiny ventilation holes.

If there is metal siding behind the meter, that should work as a shield already.

If the utility installs a transmitter near your home to communicate with the meters, or a neighbor's meter is a problem, there is little you can do about that. Shielding a whole house is very difficult to do correctly. It requires specialist knowledge, and is often not successful.

Wireless meters can also produce a lot of dirty electricity on the electrical wires.

Filters

A filter dampens the dirty electricity riding on the cable. There are a variety of filter models, some of which are more effective than others. The general types are:

- Stetzer filters
- line filters
- ferrite beads
- isolation transformer

The filter must be designed for the frequencies it is to dampen. It is very difficult to dampen frequencies below a few kilohertz (1000 hertz). It is virtually impossible to dampen frequencies near the power frequency (60 hertz/50 hertz) as such a filter would also restrict the flow of electricity.

Some filters do radiate by themselves, so they should not be placed near where a sensitive person sleeps or spends much time.

Stetzer filters

The cheapest, simplest and easiest filter to use is a Stetzer filter.

To use a Stetzer filter to dampen dirty electricity coming from the electrical meter (and from the outside), you'll need at least one filter for each phase. Homes in North America usually have two phases, while homes in Europe often have three.

Place each filter in the electrical outlet that is the closest to the breaker box, in terms of the length of the wire run in the wall. Do this for each phase.

It may be best to have an electrician install a new electrical outlet on each phase, located right next to the breaker box.

Try to install one or two Stetzer filters for each phase.

A Stetzer filter can sometimes make things worse, depending on the situation, such as the particular layout of the house wiring. The Canadian government (Health Canada) did a study on the Stetzer meters and found that they could create low-frequency dirty electricity.

There are many stories of people who have been helped by these filters, and many who have felt worse. It is a low-cost device, so it is possible to buy a couple to experiment with and no big loss if they are not helpful.

The Stetzer filters do radiate a little themselves, so they should not be placed next to people.

The technical term for the Stetzer filter is *capacitive low-pass filter* or *single-stage RC filter*. It is a very simple filter that only has one active component. It dampens frequencies from about 1 kilohertz to 150 kilohertz, depending on the particular layout of the household wiring.

Line filters

More sophisticated filters are available. They require more extensive electrical work to install, as all the electricity to the house will be directed through the line filter. Such filters are costly.

There are many types of filters available. It is important to choose the correct type, both in terms of which frequencies it will block, how well it blocks them, and how much power it can safely handle.

The Swedish utilities have developed filters to remove the signals from medium-frequency communication but they are costly and unlikely to be available in other countries where electrosensitivity is not accepted.

Large line filters are used by military and research institutions. It may be possible to purchase a suitable filter from vendors catering to those needs. See the resource section.

These types of filters can only block frequencies higher than about 15 kilohertz.

Ferrite beads

Ferrites are small round filters that mount around the wires and are generally easy to install. They dampen the dirty electricity by interacting with the magnetic field around the wire.

Ferrites are most effective for frequencies above 100 kilohertz. They have no effect below the kilohertz range.

The best ferrites are those which fit tightly around the wire. Those made out in one are better than the clamp-on types, but may be more difficult to install. Ferrites should be mounted on the cables where they go into the house, after the electrical meter.

You'll likely need several ferrites, perhaps dozens. They are low cost, so it is feasible to experiment with them.

There are many types of ferrites available. Choose one or more that are rated for the frequency band you need to dampen.

Isolation transformer

Transformers can be effective at dampening frequencies in the kilohertz area, which is where a lot of dirty electricity is, including some PLC smart meters. Unfortunately, the standard household transformers used in North America have a direct connection through the transformer for the neutral wire. These transformers are thus ineffective as filters.

Replacing the regular transformer with an isolation transformer can solve that problem. This should also eliminate ground currents.

To dampen higher frequencies (such as used by BPL systems), a Faraday transformer may be the solution. It is an isolation transformer with an added radio-frequency shield.

These transformers are expensive to buy, waste electricity, and are usually installed by the utility company.

Shielding the house wiring

The wiring in the house can act as an unintentional antenna, radiating the frequencies of the dirty electricity. This includes all the wires in the walls, in the

attic, etc. Also, it includes any cords plugged into a wall outlet, both extension cords and each cord that came with any lamp, TV, computer, refrigerator, etc.

Shielding the cords is most effective for higher frequencies. It is the least effective for frequencies below the power frequency (60 Hz/50 Hz).

This can be very costly and very involved to do well as a retrofit. If done while building a new house, it can be done at a low to moderate cost.

There are four basic methods:

- twisted wires
- shielded cables
- metal conduits
- special plastic conduits

Twisted wires are routinely used in telephone and computer cables to dampen the magnetic radiation from the wires. It is the simplest method.

Cables can sometimes be purchased with wires that happen to be twisted already, inside the sleeve. Some brands of American 12/3 ROMEX wires are that way (the extra wire is just not used).

Cables can easily be twisted by the electrician, before being installed. This is done by mounting the end of the cable in a variable-speed power drill. One twist per 4 inches/10 cm is good.

There are cables available with built-in shielding. These are specialty items which are not available in stores. The author has not tested them, but they should offer shielding of both magnetic and electric fields. As the shield is thin, it is probably best for the electric field.

Metal conduits are used to protect cables that are exposed. There are both flexible and rigid conduits available and they work equally well. This is more costly than twisted wires but it shields both the electrical and the magnetic fields, and allows for new wires to be placed in exposed areas.

There are special EMF-reducing plastic conduits available, but the author has no experience with those. They probably work only for the electric field, not the magnetic.

Bury service line

The service line brings the power into the house from the outside. This line can radiate the frequencies it carries.

The worst offender is the type of line where the wires run separately from the power-pole to the house. This setup is common in Europe.

A better version is where there is an actual cable going to the house, suspended in the air. With the wires running close together, inside the cable, there will be less powerful fields. This setup is common in North America.

Best is where a cable is buried underground instead of hanging from poles. The earth will dampen the electrical and magnetic fields.

Burying the line is costly. It will probably not make sense to do that if the distribution line along the street is close to the house, as it will also radiate into the house.

Disconnect circuits

It may help to fully disconnect the circuits to a part of the house, so there is not dirty electricity in any of the walls. It is not enough to just turn off the breaker, all the wires must be disconnected.

To try it out, get an electrician to disconnect all wires to the circuits at the breaker box. It is best to also disconnect the ground wire for the circuit.

Make sure the ends of the loose wires are capped off with wire nuts or other appropriate means.

An electrician can install a kill switch for each circuit. A kill switch disconnects both the wires (a regular switch only disconnects one wire). It is best to also let the switch disconnect the ground wire, but that may not be legal to do. Very few people also disconnect the ground wire.

Automatic kill switches are available. They are sometimes called an *automatic demand switch*. They sense whether electricity is needed on the circuit and turn the electricity on. When there is no need for electricity, the power to the circuit is removed.

This can be useful for a bedroom with a lamp that is not on all night. Just make sure there are no other items on the circuit, such as a clock radio or night light, that keeps the circuit energized.

Some people use battery lamps in the bedroom instead.

Disconnect the whole house

The most radical option is to take the house off the grid and simply not have power connected to it. Some people have done this, but it takes some up-front planning.

This option is not really available to apartment dwellers.

A simple version is to install a four-pole disconnect to the house. It disconnects the two phases, the neutral and the ground wire (i.e. four poles). The inspector may not like the disconnect of the ground, but signals can travel on that wire as well.

Some people have utility power going only to a detached garage or outbuilding, and keep their refrigerator and electric stove there. The main house is powered by 12 volt DC electricity from solar panels, or they just use battery lamps.

One person has a long heavy-duty extension cord from a neighbor that he once a day plugs in to run a well pump and for other brief needs.

Another person tried it out by asking the utility to disconnect all the wires to his house for a test period. He told the utility he needed to do some construction work involving a backhoe. With the power disconnected, he used a generator a few times a day to power the water heater, stove, etc.

Heating the house is often the biggest problem. In some cases, they use a wood stove, in another, the propane furnace (for in-floor heat) gets power through a long extension cord to the outbuilding (make sure the cords are appropriately sized to avoid a fire hazard).

See the resource section for more information about off-grid living.

Resources — Information

www.eiwellspring.org	Articles about low-EMF wiring, off-grid living, smart meters, etc.

Tracing EMFs in Building Wiring and Grounding by Karl Riley	Book for electricians on how to find and eliminate stray currents, etc.
Principles of electro-magnetic Compatibility by Bernhard Keiser	General textbook about filters, shielding, etc.

Resources — Vendors

Digi-Key www.digikey.com 1-800-344-4539	Ferrites small line filters
Genisco www.genisco.com 1-858-565-7405	Industrial/military grade line filters
Less-EMF 1-518-432-1550 www.lessemf.com	Stetzer filters automatic demand switch books, shielded cords shielding canopies
RTK (Sweden) www.rtk.se	Shielding Faraday canopies

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