



emfcheck.com

# Background Information

## Overview

### Summary of EMF and IEQ Considerations

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with help from my many mentors and colleagues

## EMF

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EMF is a general term that refers to artificial Electromagnetic Fields created by modern electrical devices, and also those found in nature. Biological organisms are fundamentally electrical in nature and are therefore extremely sensitive to external electrical phenomena. Our body's intricate processes, such as basic cellular functions, are easily disrupted by the energy emitted from modern technology, whether strong or weak, high frequency or low frequency. The negative effects are cumulative and can take years to show up as health problems. Many thousands of independent peer reviewed scientific studies are available showing harm from non-ionizing electromagnetic fields, yet they are ignored by mainstream sources. However, the weight of the science is on the side of recommending avoidance, or at least, caution.

The Building Biology strategy, in order of importance, is:

1. Identify the sources
2. Eliminate things that can be eliminated
3. Increase distance to sources
4. Shield what can't be eliminated

The types of EMFs I measure in my inspections include AC Magnetic Fields (MF), AC Electric Fields (EF), Radio Frequency (RF), and Dirty Electricity (DE). Due to their prevalence, these four types are, in general, the most important. In most homes the strongest source of EMFs comes from the Wifi Router and Cell Phones. These emit RF regularly and the strength in close proximity is comparable to being right next to a cell tower. When devices try to connect to the data source, your overall exposure increases. Microwave ovens are also extremely strong, and all of them do leak. The radiation can be measured as far as 50 feet away.

RF reduction can best be achieved by avoidance. Removing WiFi in your home and using Ethernet cables to each point of use, such as the office, kitchen, bedroom, etc., would be the best option. You will need a wired-only router, in some cases you can disable the WiFi in your modem/router. You can purchase Ethernet adapters that enable your phones, tablets, and laptops to use the Internet without WiFi. A simple place to start is to turn off or unplug the router at night. A timer can be purchased from the hardware store to automatically turn it on and off. You can also add a landline to your internet service package. However, you should avoid cordless phones since they are just as problematic as cell phones.

You can reduce your exposure to RF from your cell phone by turning airplane mode ON when you don't need to receive calls, texts, or emails. Be sure to also turn WiFi and Bluetooth OFF when not needed. Additionally, you can read and compose emails and texts in airplane mode and then send them once airplane mode is off again. The signal is strongest while the phone is connecting to the cell tower or WiFi so you could set it down and walk away during those times. Shielding is another option, and many products are on the market for this purpose, but selection and installation must be wisely designed, guided by accurate measurements of RF and EF. Otherwise it could make you feel worse.

During sleep, your body makes melatonin to recover from the toxins encountered during the day. This is critical for overall health. EMFs can disrupt this process. When you sleep, it's best to power off your phone, or use airplane mode, or put it in another room. Using it as an alarm will still work in airplane mode. Also, the further away you are from your phone, the weaker the field is. Some say 4-8 feet is safe, but for the sensitive, that's still not enough. Whenever you have weak cellular reception the phone ramps up its power to connect to the tower. Your exposure is less when you have a better signal.

DE is created by anything that has a circuit board and uses a switch-mode power supply to transform AC power to DC. Examples are: computers, dimmer switches, power adapters, chargers, electronic devices, and most appliances. Some create more DE than others. The "dirty" part is the high frequency voltage spikes that get created and then travel along the wires - they also radiate into your home within the electric and magnetic

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the basics

fields. Digital utility meters, mini-split heat pumps, and solar inverters are some of the worst offenders. Energy efficient appliances that use variable speed and variable frequency drives are also big sources. LED bulbs cause DE and so do compact fluorescents. It is best for your health to use incandescent bulbs.

Wiring errors that create high magnetic fields are commonly found in homes. These need to be identified and resolved, both for health reasons, and because they are electric code violations. Wiring errors can also put current on the grounding system which creates the additional hazard of low level contact current on metallic fixtures and pipes. Most houses are also wired with plastic jacketed cables which emit a high electric field. Metal clad cables are best because they contain the electric field fairly well.

A healthier electrical system can be created by moving the utility meter and main disconnect off of the house plus ensuring there is only one grounding point. All Neutral-Neutral and Neutral-Ground connections within the system must be separated except for the one required at the main disconnect.

My Motto is  
"The Less, The Merrier"  
when it comes to artificial EMFs

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## IEQ

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IEQ stands for Indoor Environmental Quality. Building Biology is the study of how the built environment — our home — affects our overall wellbeing, including our health and state of mind. There are many factors that contribute to our homes' ability to nurture us properly. We need to consider all of the ingredients that go into the building of our homes, as well as what we bring into our homes. Maintenance is another critical component because without it our homes will degrade and become unhealthy.

The static electric charge of the air in our homes should be more negative than positive, but synthetic materials tend to increase the positive ions. This is easily resolved by switching to natural fabrics and finishes. Letting in fresh air also helps. The Earth's static magnetic field normally rises upwards steadily but metal objects in the home such as metal bed frames and rebar can deflect it, causing it to distort. Caverns, underground water flows and metal ore deposits can have the same effect, making careful building site selection even more important.

Radioactive particles are naturally present everywhere and can be concentrated in certain building materials such as granite and drywall. It would be ideal to prescreen such materials but this takes a high amount of expertise. Similarly, the radon rising from deep underground can build up inside the house. In addition to a radon mitigation system, ensuring a good fresh air supply to the home can help.

Indoor temperatures can affect our well being and state of mind, making thermal comfort an important consideration. At certain times of the year extreme temperature differences and high humidity can cause condensation in places where mold can grow. Damp areas can also be a breeding ground for pests and bacteria. Adequate insulation and humidity regulation are ways to reduce this risk.

Carbon monoxide is a byproduct of all combustion. Propane exhaust also contains Nitrogen oxide, Carbon dioxide, Methane, Nitrous oxide, VOCs, Sulfur dioxide, and particulate matter. Therefore adequate venting which is properly maintained is critical. A kitchen range hood cannot sufficiently catch everything, but careful planning and use can help.

HVAC air filters need to be high quality and changed regularly or the system will not perform well. Having multi stage filters is a good way to make a high MERV filter last longer - such as low, medium, high. However, the system has to be designed for this. The ducts should also be cleaned regularly, every few years, or sooner in some cases.

What chemicals are under your sink or in your basement? How natural is the paint on your walls? All of these add to the toxic load in your environment. Use unscented cleaning products and store chemicals in a part of the house that won't freeze and is vented to the outside. Air always migrates upward in a house, making the basement the worst place to store toxic substances.

Cleaning up dust often will help keep down the particulates in the air. It's best to use a damp cloth or a high quality HEPA filter vacuum cleaner. Carpeting should not be in a healthy home. It is almost impossible to clean carpets effectively and they become breeding grounds for bacteria, mold, dust mites, and bed bugs.

An effective whole house water filter is the best option for providing good drinking and bathing water, free of chlorine and disinfection by-products.

The Building Biology premise is  
when it comes to health choices  
"Nature is the Gold Standard"