



## ELECTRIC AND MAGNETIC FIELDS (EMF)

Electric and Magnetic Fields (EMF) associated with electric power lines are similar to the low level electric and magnetic fields that we are exposed to in our daily lives. EMF is generated from common items like hair dryers, computer monitors, toasters – and power lines. The fields generated by these common items are classified as ‘extremely low frequency’ (ELF) because they generate frequencies below 300 hertz (Hz). Electric power lines typically operate using ELF alternating current (AC) fields that generate frequencies of 60 Hz. This is similar to household appliances and the wiring in our walls.

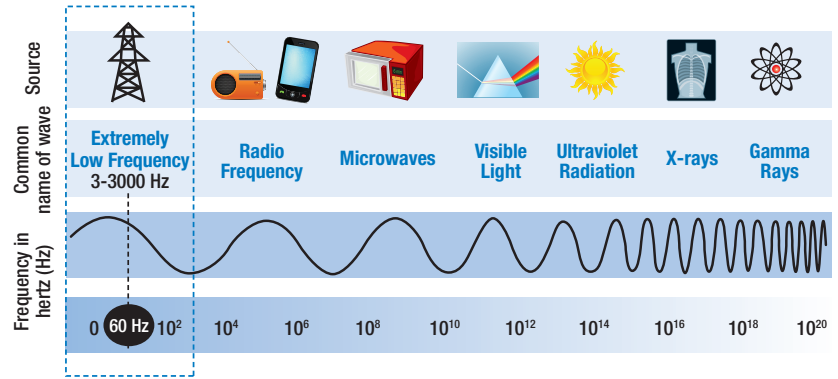
Because the use of electricity is so common in our lives, researchers have been studying exposure to EMF since the 1970s.

# EMFS – THE BASICS

**Electric fields** are related to voltage in a wire. For example, an electric field is created by a washing machine that is plugged into an outlet, even if it is not turned on. Electric fields are easily shielded by objects like trees or buildings. **Magnetic fields** are created when the current is flowing through a wire. So, when you turn on the washing machine, the current begins to flow and a magnetic field is generated. Magnetic fields pass through most objects and cannot be blocked as easily as electric fields.

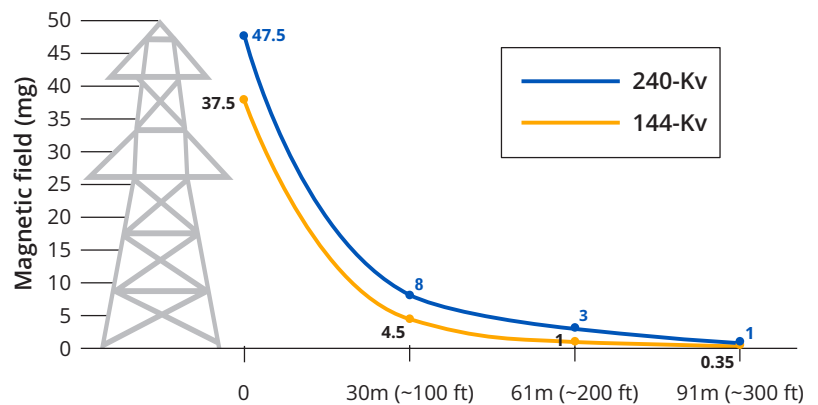
Both electric and magnetic fields (EMF) decrease rapidly as you move away from the source. At 30 metres (m) (approximately 100 feet (ft)) from a 144-kV or 240-kV AC transmission power line, magnetic fields are about one-quarter as strong as they are directly under these transmission power lines. At 91 m (approximately 300 ft) from a 144-kV or 240-kV AC transmission power line, electric and magnetic fields are too low to distinguish them from other common sources of EMF.

## FREQUENCIES OF THE ELECTROMAGNETIC SPECTRUM AND COMMON SOURCES



This diagram illustrates the different levels of energy that make up the electromagnetic spectrum. The energy of the waveforms increases exponentially as you move from left to right in this diagram.

## ELF MAGNETIC FIELDS FROM AC TRANSMISSIONS LINE



Typical magnetic field strengths of ATCO alternating current (AC) transmission lines

# ELECTRIC FIELDS AND MAGNETIC FIELDS COMPARISON

ELECTRIC FIELDS	MAGNETIC FIELDS
Produced by voltage. Present any time an appliance is plugged in.	Produced by current. Only present when an appliance is turned on.
Easily shielded	Not easily shielded
Strength decreases rapidly with distance from source	Strength decreases rapidly with distance from source





## EMF & YOU

Over the past 30 years, numerous studies have examined the health effects of exposure to extremely low frequency (ELF) EMF. Reputable health organizations, such as Health Canada and the World Health Organization, have undertaken thorough reviews of these studies and have determined that the weight of scientific evidence does not support a cause and effect relationship between negative health effects and exposure to extremely low frequency EMF.

The International Agency for Research on Cancer has classified extremely low frequency EMF as a “possible carcinogenic”. It is important to understand that the “possible carcinogenic” classification is also applied to coffee, gasoline engine exhaust and pickled vegetables. This classification is often used for items that should continue to be monitored and studied.

Health Canada states that:

“There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors.”

(Health Canada, Electric and magnetic fields from power lines and electrical appliances, July 2016)

## RESEARCHING EMF

- ✓ If you plan to undertake your own research on EMF, it is important to check for some important qualifications in the information:
- ✓ Ensure the research is on ELF fields from AC sources (60 Hz), and not higher frequency EMF;
- ✓ Check that the information has been reviewed by a reputable scientific organization.

## ADDITIONAL INFORMATION

Additional information on EMF is available at:

- ▶ **World Health Organization**  
[www.who.int/en](http://www.who.int/en)
- ▶ **Health Canada**  
[www.healthcanada.gc.ca](http://www.healthcanada.gc.ca)
- ▶ **Canadian Electricity Association**  
[www.electricity.ca](http://www.electricity.ca)
- ▶ **International Agency for Research on Cancer**  
[www.iarc.fr](http://www.iarc.fr)
- ▶ **U.S. National Institute of Environmental Health Sciences**  
[www.niehs.nih.gov](http://www.niehs.nih.gov)





## CONTACT INFORMATION

If you have any questions or require more information, please contact us.

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## QUESTIONS & ANSWERS

### **Q: I'm still concerned about the potential negative health effects of EMF. Is there anything else I can do?**

**A:** Health Canada states that there does not appear to be any need to take special precautions with regards to extremely low frequency (ELF) EMF. However, if you are still concerned, you can:

- Reduce your usage of electronic appliances;
- Increase your distance from computer and TV screens.

### **Q: Where can I get more information on EMF?**

**A:** A list of sources of information on EMF is provided in this brochure or you can contact ATCO and request additional EMF information.

### **Q: Does ELF EMF have negative health effects on animals?**

**A:** Research to date has included both epidemiological and experimental studies in animals. These studies have not provided a basis to conclude that extremely low frequency EMF are the cause of any negative health effects in animals.

### **Q: Can I avoid exposure to EMF if I avoid power lines?**

**A:** No. EMF is found wherever there is electricity, whether it is power lines, electric appliances or household wiring.

### **Q: Can you eliminate EMF by burying the power lines underground?**

**A:** No. The ground will shield the electric field but not the magnetic field.

### **Q: What precautions is ATCO taking?**

**A:** ATCO is committed to monitoring new EMF research, to including any new information in decisions that might impact the public, and to sharing that new information with interested parties.

In developing new power lines, ATCO Electric considers and tries to avoid close proximity to residences. Although this consideration is not related to EMF, the result is that, where possible, new ATCO Electric power lines are located away from residences.