

The Basics: Electromagnetic Fields



PowerOn Midwest is working with landowners and the community to power our region today and into the future. As power sources evolve and electricity demand grows, PowerOn Midwest is needed to ensure reliable low-cost power for customers.

Modern infrastructure can be integrated safely into everyday life.

There are more than 240,000 miles of high-voltage transmission lines and millions of miles of distribution lines operating safely and powering homes, schools and businesses in the country today. We recognize that people living and working near transmission lines may have questions about electric and magnetic fields (EMFs). We're providing general information to help you get started on understanding EMFs. For more in depth information, please refer to the resources list on the back.

Electric fields

Electric fields are created by voltage – the higher the voltage, the stronger the field. Anytime an electrical appliance is plugged in, even if it isn't on, an electric field is created in its vicinity. But these fields are easily blocked by walls, trees, and even your clothes and skin, and the farther away you move from the source of the electric field, the weaker it becomes. Moving even a few feet away from an appliance makes a big difference in the strength of the field that you're exposed to. Electric fields are measured in kilovolts per meter (kV/m).

Magnetic Fields

Magnetic fields, measured in milliGauss (mG), are produced by electric current and only exist when an electric appliance is turned on—the higher the current, the greater the magnetic field. As with electric fields, the strength of a magnetic field dissipates rapidly as you move away from its source. However, unlike electric fields that are easily blocked by ordinary materials, magnetic fields do not interact with and are not affected by walls and clothes and other barriers.

Anything that generates, distributes or uses electricity creates electric and magnetic fields. At higher frequencies, such as with radio or TV signals, the fields are interrelated and are more accurately described by the term "electromagnetic" or EMF.

The EMF from power lines is too low in frequency to carry any significant energy away, and the electric power stays on the power lines.

Electromagnetic fields at home, school, and work.

Electromagnetic fields are created whenever electricity flows or an electrical force is present. These fields can occur naturally, such as during lightning strikes, and are also produced by everyday household items like cell phones and appliances. The widespread use of electricity means we are exposed to EMFs in our everyday environment.

MAGNETIC-FIELD LEVELS (IN MILLIGAUSS) MEASURED NEAR HOUSEHOLD APPLIANCES



Hair dryer

6 in. away 300 mG
12 in. away 1 mG



Electric shaver

6 in. away 100 mG
12 in. away 20 mG



Blender

6 in. away 70 mG
12 in. away 10 mG



Vacuum cleaner

6 in. away 300 mG
12 in. away 60 mG



Coffee makers

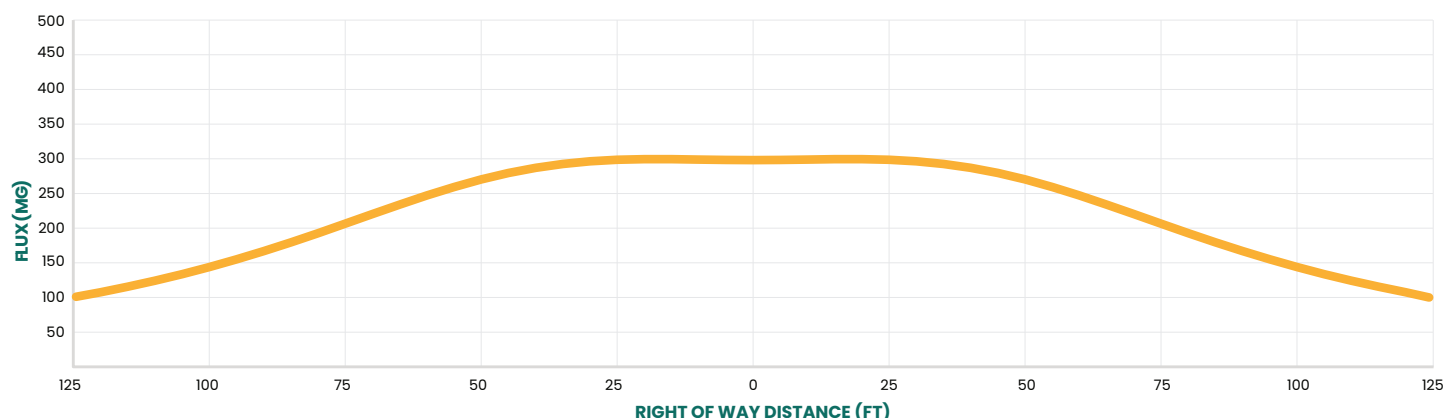
6 in. away 200 mG
12 in. away 40 mG



Under a distribution line

Directly underneath line
100 - 200 mG

ANTICIPATED MAGNETIC FIELD AT 1M ABOVE GROUND LEVEL



EMFs and Health

EMFs and their effects on health have been studied for more than 40 years by governments and scientific institutions all over the world. The World Health Organization (WHO), and other research organizations, have studied the potential for EMF to affect human health and have never found a correlation between exposure to EMF and negative health issues at typical exposure levels, including levels that would be associated with a 765 kV transmission line.

There may be concerns about EMF and interference with pacemakers or other medical devices. When there are high-level transmission lines some interference may occur, but newer pacemakers have been designed to be less susceptible to this type of interference. Additional guidance has been issued to line workers who work on transmission lines daily.

Transmission lines are essential for modern electrical infrastructure and support energy reliability, economic growth, meet the rising energy demand, and connect customers with low-cost, reliable electricity. Understanding that we live, work, and play around EMFs daily is crucial to public awareness.

EXPERT SOURCES AND USEFUL LINKS

The following are links to more information and studies on EMF:

- The National Institute of Environmental Health Services (NIEHS) offers information on a variety of EMF topics. In June of 2002 they prepared EMF: Electric and Magnetic Fields Associated with the Use of Electric Power, Questions and Answers. This booklet, along with other helpful links, can be found at www.niehs.nih.gov/health/topics/agents/emf
- American Cancer Society: Power Lines, Electrical Devices and Extremely Low Frequency Radiation <https://www.cancer.org/cancer/risk-prevention/radiation-exposure/extremely-low-frequency-radiation.html>
- Public Service Commission of Wisconsin: Electric & Magnetic Fields <https://psc.wi.gov/Documents/Brochures/EMF.pdf>
- Minnesota Public Utilities Commission: A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options <https://apps.commerce.state.mn.us/eera/web/project-file?legacyPath=/opt/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf>