

**Dominion Energy is committed to supplying electricity in a responsible and safe manner.** This commitment includes balancing issues related to the environment, aesthetics, land use, safety, project costs and customer preferences, as well as concerns about electric and magnetic fields (EMF).

No federal, state or international agency has conclusive evidence that exposure to low-frequency EMF—from household electrical sources including power lines—at the levels typically found in our communities is causally associated with any health hazards.

Dominion Energy includes data on the EMF levels produced by proposed facilities in all applications submitted to the Virginia State Corporation Commission or other applicable state agencies.

### What are Electric and Magnetic Fields?

There are two types of fields associated with power lines and any other device that carries or uses electricity: electric fields and magnetic fields.

**Electric fields:** These fields are produced by the voltage, or electrical pressure, on lines or in wiring. Electric-field strength increases as the voltage on power lines increases. However, power lines (even at high voltages) typically contribute little to a person's overall electric-field exposure because buildings, trees, shrubbery, fences and other conductive materials effectively block electric fields.

**Magnetic fields:** These fields are produced by the flow of current through electrical wires. Magnetic-field strength increases as the current flowing through power lines increases. The strength of magnetic fields is not directly affected by voltage. Like electric fields, magnetic fields are associated with transmission lines, distribution lines, household wiring, and the many electrical appliances found in our homes and businesses. Unlike electric fields, magnetic fields are not easily blocked by most materials, but the levels may be reduced by their interaction with fields emitted from adjacent power lines.

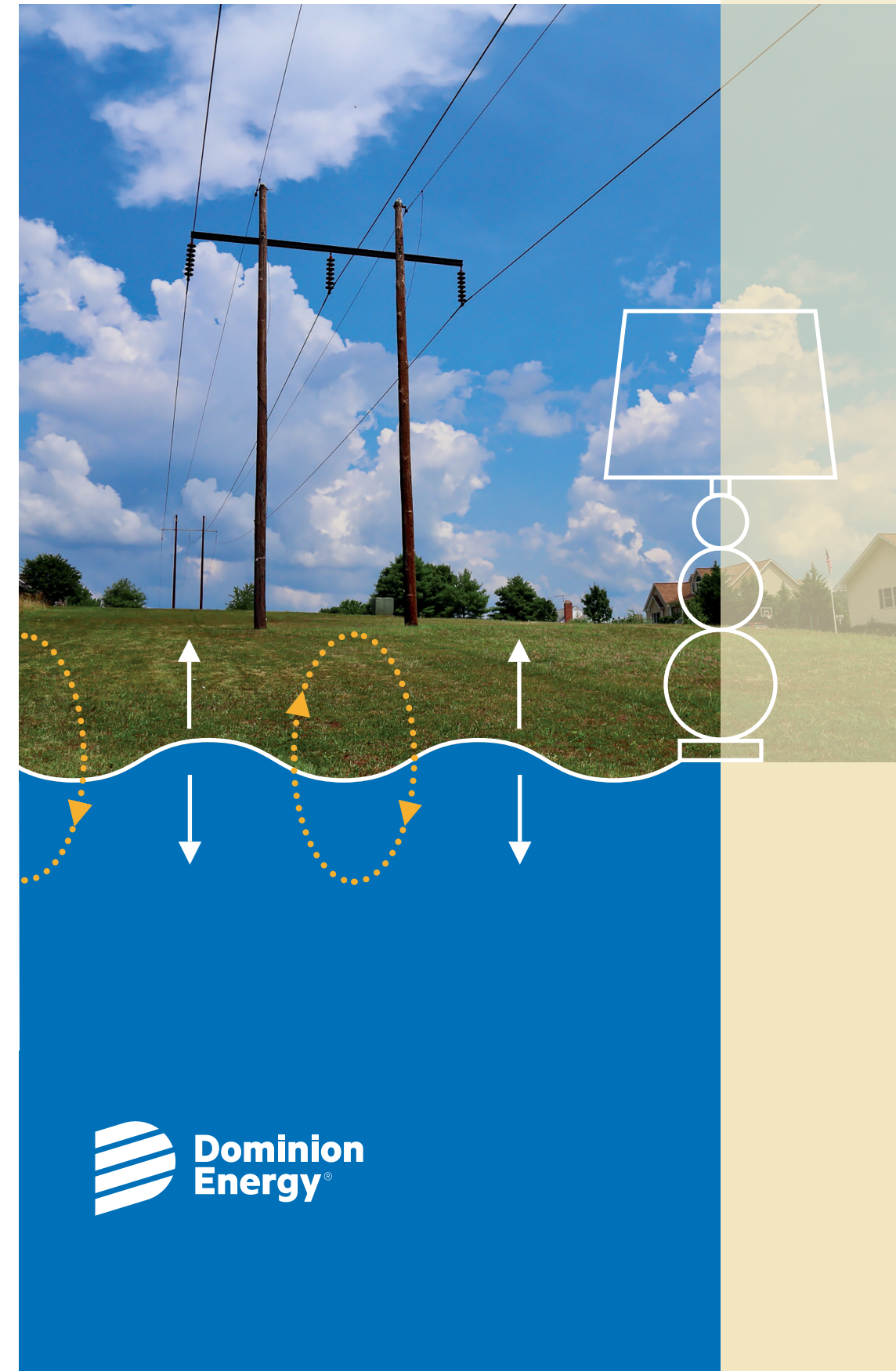
The underground installation of power lines reduces the electric field to virtually zero. Magnetic fields may be reduced, but not eliminated by underground installation.

Both electric fields and magnetic fields rapidly decrease in intensity as distance from an electrical source increases.



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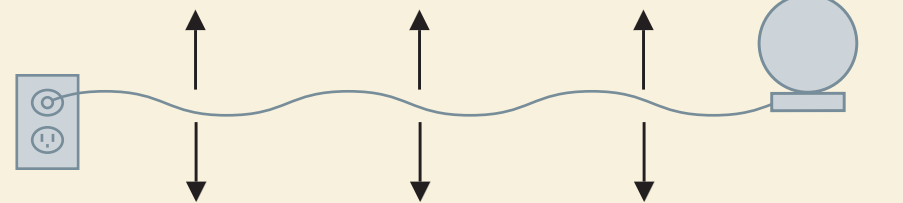
## Electric and Magnetic Fields and Health



## A Comparison of Electric and Magnetic Fields\*

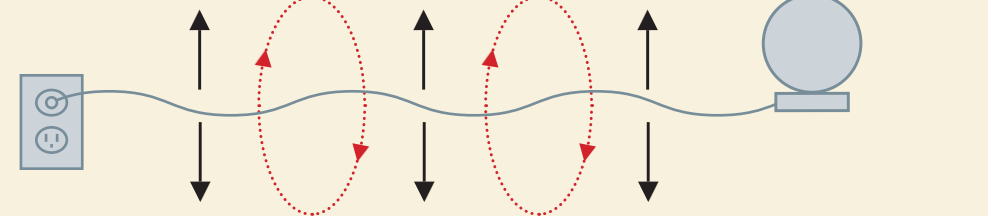
### ELECTRIC FIELDS — Produced by *voltage*

- Measured in *volts per meter (V/m)* or in *kilovolts per meter (kV/m)*
- **Easily shielded** (weakened) by conducting objects such as trees and buildings
- Strength decreases rapidly with increasing distance from the source



### MAGNETIC FIELDS — Produced by *current*

- Measured in *gauss (G)* or *tesla (T)*
- **Not easily shielded** (weakened) by most material
- Strength decreases rapidly with increasing distance from the source



### Average Magnetic Fields in the Home\*

Median EMF levels in milligauss (mG) from the source of magnetic fields

	6 inches	1 foot	2 feet	4 feet
Personal Computer	14	5	2	-
Hair Dryer	300	1	-	-
Electric Shaver	100	20	-	-
Ceiling Fan	**	3	-	-
Window Air Conditioner	**	3	1	-
TV	**	7	2	-
Blender	70	10	2	-
Coffee Maker	7	-	-	-
Dishwasher	20	10	4	-
Garbage Disposal	80	10	2	-
Electric Can Opener	600	150	20	2
Electric Range	30	8	2	-
Electric Oven	9	4	-	-
Refrigerator	2	2	1	-
Toaster	10	3	-	-
Electric Clothes Dryer	3	2	-	-
Washing Machine	20	7	1	-
Iron	8	1	-	-
Vacuum Cleaner	300	60	10	1
Power Saw	200	40	5	-

**NOTE:** Dash (-) means that the magnetic field at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.

\***SOURCE:** *Electric and Magnetic Fields Associated with the Use of Electric Power*, National Institute of Environmental Health Sciences (NIEHS) and National Institutes of Health, June 2002. This report is available at [DominionEnergy.com/emf](http://DominionEnergy.com/emf).

\*\* NIEHS did not measure the magnetic field at this distance from the operating appliance.

### Does Dominion Energy Calculate EMF For Power Lines?

Yes. Public exposure to magnetic fields is best estimated by field levels from power lines calculated at annual average loading. For any day of the year, the EMF levels associated with average conditions provide the best estimate of potential exposure. Maximum (peak) values are less relevant as they may occur for only a few minutes or hours each year.

Since EMF is a function of the amount of current flowing through the lines, deriving specific conclusions from “spot” readings is problematic because the levels vary based on weather, temperature, load, etc.

### What Does Research Tell Us About EMF?

Public interest in EMF began in the 1970s, when the results of some early epidemiological studies had suggested a statistical association between estimated EMF exposure and certain cancers.

Epidemiology is the study of the relationship between exposures or biological factors and diseases in human populations; epidemiologists use statistical methods to study these associations. The results of individual studies are often difficult to interpret because weak associations between exposures and health conditions in a study can be skewed by chance, subtle differences between populations assembled for comparison, and other confounding factors.

To address this limitation of epidemiology studies, experimental research is also conducted because this type of research has greater control over the variables affecting the results of a study. The results of three major types of research—epidemiology studies, laboratory studies of human volunteers or animals, and laboratory studies of isolated cells and tissues—provide complementary information to address questions about health.

International, national and state health agencies and scientific agencies have reviewed research on EMF from all three research areas in tandem to arrive at well-formulated conclusions. None of these agencies, including the Virginia Department of Health, World Health Organization and European Commission’s European Health Risk Assessment Network on Electromagnetic Fields Exposure, have conclusive evidence that EMF affects our health.

Links to the reports published by these agencies, as well as other EMF information, can be found at [DominionEnergy.com/emf](http://DominionEnergy.com/emf).

For more information, contact Dominion Energy’s Electric Transmission team by calling **888-291-0190** or sending an email to [powerline@dominionenergy.com](mailto:powerline@dominionenergy.com).

### Typical EMF Levels for Electric Transmission Lines\*

	Under Structure	50 feet**	100 feet	200 feet	300 feet
115 kV	29.7 mG	6.5 mG	1.7 mG	0.4 mG	0.2 mG
230 kV	57.5 mG	19.5 mG	7.1 mG	1.8 mG	0.8 mG
500 kV	86.7 mG	29.4 mG	12.6 mG	3.2 mG	1.4 mG

### Typical EMF Levels for Distribution Lines\*

Under Main Feeder Lines	Under Smaller Lines	100 feet
10 mG to 20 mG	Below 10 mG to under 1 mG	Similar to levels found in most homes

\***SOURCE:** *Electric and Magnetic Fields Associated with the Use of Electric Power*, National Institute of Environmental Health Sciences (NIEHS) and National Institutes of Health, June 2002. This report is available at [DominionEnergy.com/emf](http://DominionEnergy.com/emf).

\*\* Approximate edge of right of way

