EnergyCo

# Electric and magnetic fields

## Hunter Transmission Project

Summer 2023–2024

The Hunter Transmission Project is one of the State's most critical energy projects and will help provide clean and reliable electricity to consumers for generations to come.

## Overview

EnergyCo is committed to delivering safe, reliable and efficient transmission infrastructure with the Hunter Transmission Project (HTP). We understand there is concern in the community about potential health impacts from electric and magnetic fields (EMFs) when living and working near transmission lines.

EMFs are found everywhere, including in the natural environment, and are produced wherever electricity or electrical equipment is used. According to health authorities, including the World Health Organisation (WHO) and the Australian Radiation Protection and Nuclear Safety Agency (APRANSA), EMFs from electrical transmission lines are not considered a risk to human health.

EnergyCo is guided by health advice and is taking a precautionary approach to EMFs in the planning and design of the HTP.

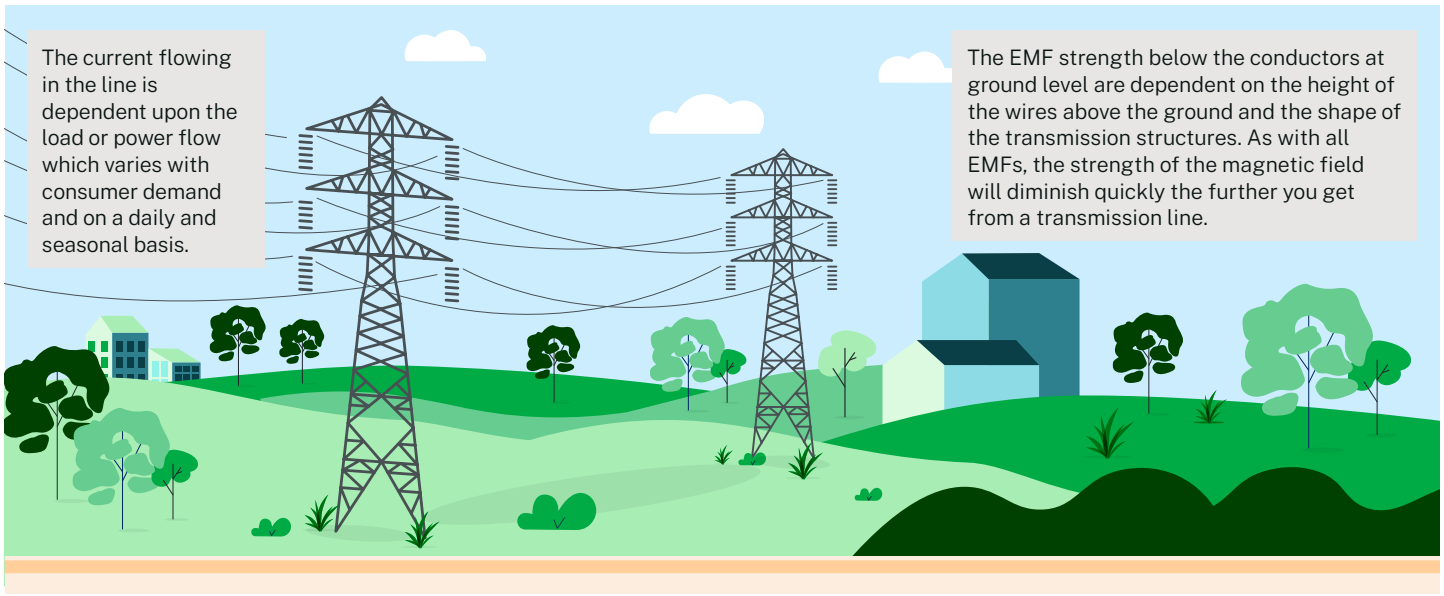
## Electric and magnetic fields

**Electric fields** are present in the atmosphere in electric currents, thunderstorms and lightning, while static **magnetic fields** occur in any area where magnetic materials experience a force including from the movement of Earth's core.

An electric field occurs around an area where electric charges experience a force. They are present in any appliance plugged into a power point which is switched on or on stand-by. Electric fields are proportional to the voltage of the appliance and the distance the user is from it. They reduce quickly with distance and most materials act as a barrier, including trees or buildings.

A magnetic field is caused by the flow of an electric current (measured in amps) and are proportional to the amount of current flowing. Magnetic fields also reduce quickly the further away from the source of the current but are not easily blocked like an electric field.

The strength of the electric field for transmission lines varies with the operating voltage of the line (measured in volts), while the magnetic field strength is related to the current flowing in the line (amps).




# Health and safety

The use of electricity in daily life exposes us to low frequency EMFs which emit low level radiation and are not considered a risk to human health.

Transmission lines, household appliances and electrical equipment operate at 50 Hertz and therefore produce extremely low frequency EMFs that occupy the lower part of the electromagnetic spectrum in the frequency range of 0–3000 Hertz (ARPANSA, 2022).

ARPANSA is an organisation which maintains continual oversight of emerging research into the potential health effects of EMF exposure from powerlines and other electrical sources. ARPANSA publishes guidelines for EMF exposure to ensure community safety and the safety of electricity industry staff who work at much closer distances.

Leading global health bodies including the World Health Organisation continue to evaluate research into health effects associated with exposure to EMFs. The scientific evidence does not establish that exposure to EMFs found around the home, the office or near powerlines and other electrical sources is a hazard to human health.

The current international standard for human exposure limit to magnetic field levels is 2000 milligauss (mG) set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 2010. This standard is recommended by APRANSA. 330kV and 500kV transmission lines generally emit 10–50mG at the edge of a high voltage transmission line easement and 20–200mG directly under a high voltage transmission line, which is significantly below the international standard for human exposure limit.

## The electromagnetic spectrum

**Low frequency** → **High frequency**

**Extremely low frequency (ELF) EMFs**
Low to mid-level radiation generally found to be harmless to humans.

Examples of ELF EMFs:

- transmission lines
- electrical wiring
- household appliances
- electrical equipment.

**Electromagnetic radiation (EMR)**
High level radiation which can lead to cellular and DNA damage if exposed for long periods of time.

Examples of EMR:

- sunlight
- x-rays
- radioactive waste.

## Electrical appliances and infrastructure and their range of mG

Hairdryer
**10-70mG**

Under a distribution powerline
**2-20mG**

Stove
**2-30mG**

Under transmission powerline
**20-200mG**

Laptop
**2-20mG**

At the edge of transmission powerline line easement
**10-50mG**

## Assessment of the Hunter Transmission Project

A detailed assessment of EMFs from the HTP will be carried out as part of the project's Environmental Impact Statement (EIS). The EIS will be displayed for public exhibition in late 2024.

This assessment will ensure EMFs from transmission infrastructure are within the guidelines set by ICNIRP and ARPANSA. The assessment will model the impact of EMFs on surrounding property including considering distances from buildings as well as local geographical conditions. This will inform route selection and design of the transmission line to ensure prudent avoidance of buildings and compliance with standards.

Transmission tower.

# More information

### Australian Radiation Protection and Nuclear Safety Agency

ARPANSA maintains continual oversight of emerging research into the potential health effects of EMFs from powerlines and other electrical sources in order to provide accurate and up-to-date advice.

**W:** arpansa.gov.au

**P:** 1800 022 333

### Energy Networks Australia

The electricity industry in Australia has an active management program on the issue of Electric and Magnetic Fields at power and ELF frequencies (50 Hz) which has been in place for many years.

**W:** energynetworks.com.au

**E:** info@energynetworks.com.au

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### World Health Organisation

In response to public and governmental concern, WHO established the International Electromagnetic Fields (EMF) Project in 1996 to assess the scientific evidence of possible adverse health effects from electromagnetic fields.

**W:** who.int/health-topics/electromagnetic-fields

## About EnergyCo

The Energy Corporation of NSW (EnergyCo) is a statutory authority responsible for leading the delivery of the Hunter Transmission Project as part of the NSW Government's Electricity Infrastructure Roadmap.

For more information about EnergyCo, visit our website at energyco.nsw.gov.au/about-energyco.

## Contact us

For more information about the Hunter Transmission Project, you can visit our website or contact the community team:

htp@energyco.nsw.gov.au

1800 645 972 (9am to 5pm, Monday to Friday)

energyco.nsw.gov.au/htp

If you need help understanding this information, please contact the Translating and Interpreting Service on **131 450** and ask them to call us on **1800 645 972**.