WIMMERA RENEWABLE ENERGY SOLUTIONS

Understanding EMF

Electric and magnetic fields

Electric and magnetic fields (EMF) are naturally occurring, formed from the movement of electric current.

Numerous studies have found EMF from transmission lines in Australia present no risk to people, livestock or crops.

What are EMF?

Electric and magnet fields (EMF) are two types of invisible energy zones that form with the movement of electric currents. EMF occur naturally and are all around us, created by things like lightning and the sun's ultraviolet rays, as well as many household items - in fact, anywhere that electricity is used.

Transmission lines transfer electricity across vast distances, connecting power sources to homes, industries, and businesses. Like all things carrying an electrical charge, these lines generate EMF.

EMF from transmission lines in Australia are considered low risk because they are low frequency.

Electric fields are strongest close to their source and reduce quickly with distance. They can be blocked by their surroundings - like trees and structures.

Magnetic fields are also close to their source and reduce quickly with distance. However, unlike electric fields, most materials do not act as a barrier to magnetic fields. This is why studies focus on magnetic fields. The strength of a magnetic field is measured in milliGauss (mG). The public exposure limit for magnetic fields is 2,000 mG.

The magnetic field range for transmission lines is low, similar to that of many household items (refer right).

Magnetic fields: household items vs transmission lines

- Fridge 2-5 mG
- Electric blanket 5-30 mG
- Toaster 2-10 mG
- At edge of easement for high voltage transmission line 2-50 mG
- Laptop 2-20 mG
- Under high voltage transmission line 10-200 mG
- Stove 2-30 mG
- Under distribution line 2-20 mG
- Hairdryer 10-70 mG
- Above underground cables 2-200 mG

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Transmission lines are low risk for EMF

EMF from power lines in Australia are considered low risk because transmission is low frequency and non-ionising. This means they do not have enough energy to cause chemical or biological changes.

In contrast, magnetic fields from x-rays are on the opposite end of the spectrum to transmission lines. The magnetic field from an x-ray is ionising, meaning that the forces applied by those magnetic fields alternate at a high rate and have potential to change the structure of the things they encounter, such as human cells.

International research has found no relationship between low EMF and health impacts:

- Studies by the World Health Organisation's International Agency for Research on Cancer and the UK National Radiological Protection Board found no evidence that exposure to low level electromagnetic fields is harmful to human health.
- Locally, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has found no reliable evidence that exposure to magnetic fields from power lines and their infrastructure causes health issues.

EMF safety guidelines

Magnetic fields from a transmission line fluctuate with the current flowing through the conductors, but they represent a fraction of the stated public exposure limits in all cases. This is even more so when close to the edge of the transmission easement.

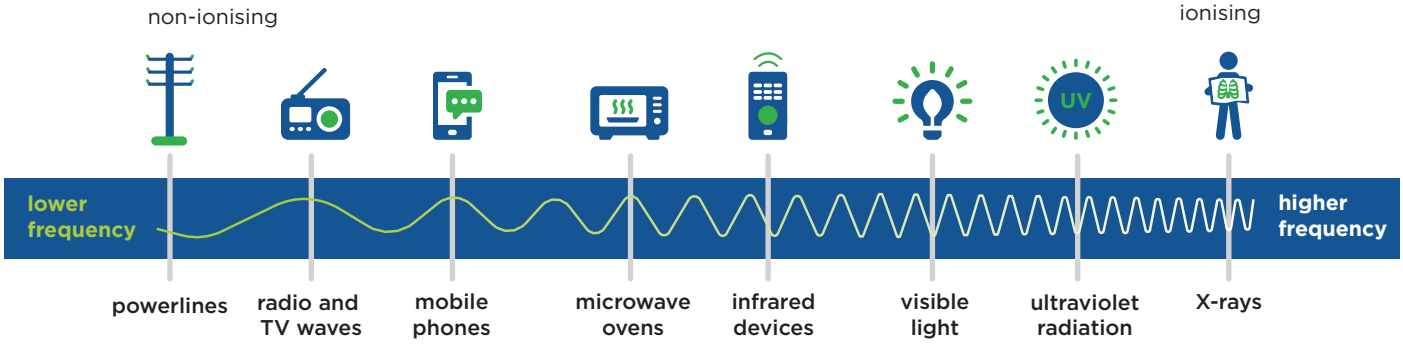
While there is no international consensus on standards, to ensure public safety Australia follows the International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2010 international standard to ensure that magnetic field levels are well below the public exposure limit of 2,000 milliGauss (mG).

Impact on flora and fauna

There have been numerous scientific publications studying the health effects of low frequency EMF on flora and fauna. These studies have found no link between EMF and risks to animal health or production of livestock.

The 1991 Gibbs Report found that magnetic fields did not affect the health of farm animals nor did electric fields have any adverse effect on crops and other vegetation.

Powerlines on the electromagnetic spectrum



Based on figure by ARPANSA: What is the electromagnetic spectrum? (www.arpansa.gov.au)

Related information:

- Australian Radiation Protection and Nuclear Safety Agency - arpansa.gov.au
- Victorian Department of Health Better Health Channel - betterhealth.vic.gov.au
- World Health Organisation's EMF project - who.int/health-topics/electromagnetic-fields
- The Gibbs Report (1991): Inquiry into community needs and high voltage transmission line development - aph.gov.au (search for 'Health and EMF')

For more information about the project

www.wiresco.com.au
1300 096 258
info@wiresco.com.au

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