Electric and Magnetic Fields (EMF)

This factsheet provides information about electric and magnetic fields (EMF), findings from independent, credible scientific studies and adoption of the 'Prudent Avoidance Approach' by TasNetworks.

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What is EMF and where is it found?

TasNetworks recognises that there is community interest regarding the potential health effects from exposure to Electric and Magnetic Fields (EMF).

EMFs are present wherever there is electricity, including in the home, office, work sites and around transmission lines, and people are exposed to them every day.

Electric fields are present in any electrical appliance that is plugged into a power point and switched on. They are strongest close to their source and diminish rapidly as you move further away. Electric fields are easily shielded by most objects including trees, buildings and even human skin.

Magnetic fields are present in any electrical appliance that is operating. Like electric fields, they diminish rapidly as you move further away from the source, however, they are very difficult and expensive to shield.

To give you an idea of the relative strengths of EMF, the following guide shows the typical magnetic fields close to common household appliances and under powerlines. These levels are well below the public exposure limit stated in the International Commission on Non-Ionizing Radiation Protection EMF guidelines.

For magnetic fields, the recommended general public exposure guideline limit is 200 micro-Tesla (μT) or 2000 milligauss (mG) and for electric fields, the recommended general public exposure guideline limit is 5 kilovolts per metre (kV/m).

Typical magnetic field measurement ranges

Magnetic Field Source	Range of Measurements in μT*
Electric stove	**0.2 – 3**
Refrigerator	**0.2 – 0.5**
Electric kettle	**0.2 – 1**
Toaster	**0.2 – 1**
Television	**0.02 – 0.2**
Personal computer	**0.2 – 2**
Electric blanket	**0.5 – 3**
Hair dryer	**1 – 7**
Pedestal fan	**0.02 – 0.2**
Substation **» substation fence**	**0.1 – 0.8**
Distribution line » under line » 10m away	 **0.2 – 3** **0.05 – 1**
Transmission Line » under line » edge of easement	 **1 – 20** **0.2 – 5**

* Note: Due to variations in the design of electrical appliances / powerlines and the power consumed or transmitted, the levels of magnetic field will vary. Appliance measurements at normal user distance.

Source: Australian Radiation Protection and Nuclear Safety Agency, Measuring magnetic fields, https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/measuring-magnetic-fields

Independent, expert scientific advice on EMF

TasNetworks relies on independent, expert scientific advice on EMF from government and health authorities in Australia and around the world when designing, locating and operating Tasmania's transmission network.

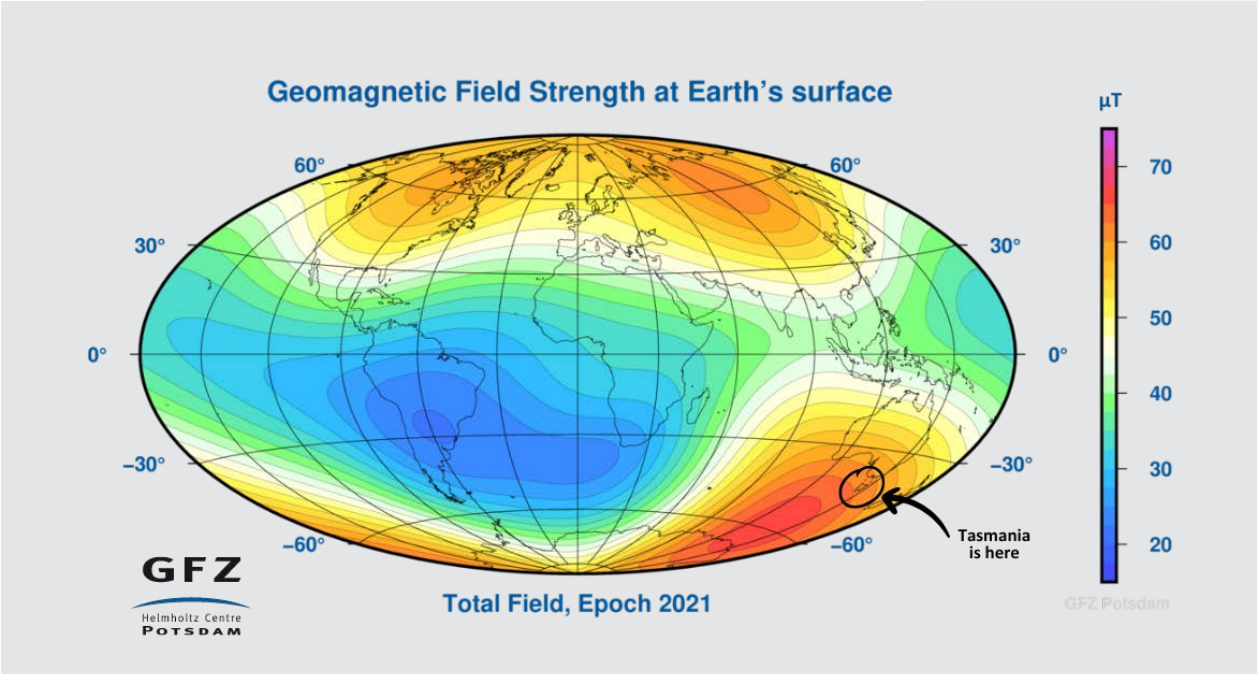
The power industry in Australia has a proactive management program specific to EMF at power frequencies (50 Hz). In conjunction with this, the Federal Government's Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) maintains continual oversight of emerging research into the potential health effects of EMF exposure from powerlines and other electrical sources in order to provide accurate and up-to-date advice. ARPANSA publishes guidelines for EMF exposure relating to all relevant situations to ensure community safety and the safety of electricity industry staff who work at much closer distances.

Independent scientific studies examining the potential health effects from exposure to EMF have been undertaken around the world for more than 50 years.[1] This includes more than 2,900 studies at a cost of more than $490 million. Based on the findings of credible public health authorities, the body of scientific research on EMF does not establish that exposure to EMF at levels below the recognised guidelines cause or contribute to any adverse health effects.

The World Health Organisation has also undertaken extensive research into EMF and has advised that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.[2]

Besides the magnetic field generated by power lines, there is also a naturally occurring static background magnetic field that is generated by four main natural sources and varies across the surface of the earth.

The primary source of the ambient geomagnetic field is the core field, which varies between 20 μT and 70 μT at the earth's surface.



A map of the distribution of typical geomagnetic field strength across the globe is illustrated above. As is evident in the plot, the core field is relatively intense in the Tasmania region (approximately 65 μT) and remains relatively constant.[3]

Prudent Avoidance Approach to the design, location and operation of our network

Recognising the ongoing community interest and scientific research into the potential health effects of EMF, TasNetworks has adopted the Prudent Avoidance Approach outlined in the Energy Network Association's EMF Management Handbook. This involves, where possible:

- locating proposed transmission infrastructure to ensure it does not materially add to EMF levels that already exist in a typical household environment
- providing information to the public regarding the latest findings from independent and credible scientific research into potential health impacts
- designing transmission lines to reduce EMFs in accordance with best practice guidance in the handbook.

Through this approach, the Tasmanian transmission network is operated within the EMF levels recommended by ARPANSA and the EMF general public exposure guideline limits recommended by the International Commission on Non-Ionizing Radiation Protection.

The proposed North West transmission developments will operate within these guideline limits.

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1 Energy Networks Association, EMF Management Handbook, https://www.energynetworks.com.au/resources/fact-sheets/emf-management-handbook/

2 World Health Organisation, Radiation: Electromagnetic Fields, https://www.who.int/news-room/q-a-detail/radiation-electromagnetic-fields

3 GFZ Helmholtz Zentrum Potsdam, https://www.gfz-potsdam.de/en/section/geomagnetism/topics/sources-of-the-earthsmagnetic-field/core-field/

Further information about EMF

Energy Networks Australia
www.energynetworks.com.au

Australian Radiation Protection and Nuclear Safety Agency
www.arpansa.gov.au

International Commission on Non-Ionizing Radiation Protection
www.icnirp.org

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