The Great Grid Upgrade

Cross Border Connection

nationalgrid

# Electric and magnetic fields (EMFs)

October 2025

**Just like the many and varied electrical appliances in our homes, our equipment creates electric and magnetic fields (EMFs). Some people worry that EMFs have negative health effects. We take these concerns seriously. We want to keep the public, our contractors and employees safe.**

## What are EMFs?

EMFs are produced wherever electricity is used. Electric fields are produced by voltage, and magnetic fields are produced by the current flowing through a conductor, in this case wires.

The operating voltage of equipment tends to be fixed – for example a 400,000 volt (400 kV) overhead line always operates at around 400 kV – so the electric field from the overhead line stays at a constant level.

The magnetic field produced from a substation or overhead line can go up and down because the current goes up and down depending on the electricity demand.

Background EMFs are actually present in all homes that use electricity. Electrical appliances and wiring normally used in houses generate a magnetic field.

## What are the safety limits for EMF exposure?

In the UK there are exposure limits in place to protect against electric and magnetic field effects.

Those exposure guidelines have been set independently by an international commission of scientists who carefully review all of the research which has investigated EMFs and health effects and then set those limits on exposure. The UK Government has adopted these guidelines which are those from ICNIRP (International Commission on Non-Ionizing Radiation Protection) along with an additional precautionary policy. These are set in the National Policy Statement for electricity networks infrastructure and are built into the consenting process for new overhead lines.

All National Grid equipment is designed to ensure the EMFs produced will always be below the limits set to protect us.

National Grid staff at work in a substation

## What EMFs would Cross Border Connection in England produce?

Cross Border Connection in England would be primarily comprised of a new substation and 400 kV overhead line. **Please see our consultation materials for more information on our proposed infrastructure.**

The overhead line produces EMFs, and National Grid ensures, even at maximum capacity, these remain below the safety limits set by the UK Government. The EMFs are highest directly under the overhead line but reduce very quickly as you move away from the line. At the highest field, directly under the line, the safety limits will still be complied with.

Equipment from substations also produce EMFs, and these do not reach much beyond the boundary fence. These fields will be lower than those created by the overhead lines, and therefore also below the safety limits in place to protect us. Our substations are designed to limit EMFs, adhering to strict, independent safety guidelines. They are also securely fenced with clear warning signs to prevent unauthorised access.

A 400 kV overhead line

## Are EMFs from your assets harmful?

We take safety extremely seriously. All of our electricity equipment is designed to produce EMFs below the limits set by the UK Government that are in place to protect us all.

Exposure limits have been set independently by an international commission of scientists who carefully review the research on EMFs and health effects and then set those limits on exposure. After decades of research, the weight of evidence is against there being any health risks of EMFs below the guideline limits.

## What further information and research is available to the public?

Further information is available in the booklet 'EMFs; The Facts' published by The Energy Networks Association (ENA) and on the dedicated National Grid EMFs website: **www.emfs.info**

**You can contact National Grid's EMF helpline:**
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