Position Paper

Electromagnetic Fields and Human Health

TenneT
Taking power further

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Electromagnetic Fields and Human Health

Electric and magnetic fields are generated wherever there is electricity. What are electrical and magnetic fields? Do they pose a health hazard? Has the government imposed a maximum on field strength? This position paper provides an overview of the relevant issues.

Electric and magnetic fields are created whenever electricity is generated, transmitted or used. Such fields cannot be felt or seen. The term ‘field’ is used here in the physical sense. By comparison: you could also refer to the heat generated by a heat source as a ‘heat field’ or ‘thermal field’.

What are electrical and magnetic fields?

Electric fields

Electric fields result from the operating voltage of the power line and are therefore constant. The intensity of the electric field generated by a high-voltage line is highest at ground level immediately below the line’s lowest point (i.e. exactly in the middle of the line section between two pylons, where the conductors are closest to the ground). The field intensity decreases with distance from the conductor. Electric fields are well shielded by houses, forests etc.

Magnetic fields

Magnetic fields result from the electricity transported of the power line. The field depends on the current intensity and the configuration of the conductors. With distance to the power line the level of the magnetic field decreases rapidly, The strength of magnetic fields generated by TenneT’s power lines remain well below the legal maximum of 100 µT under all circumstances.

Electric and magnetic fields are created whenever electricity is generated

Health

In the late 1970s, researchers began to investigate whether electric and magnetic fields could potentially be harmful to human health. Many studies have been conducted since, and we now know much more about the possible impact of these fields on human health.TenneT frequently receives questions about EM fields and their effects on human health.

Several population screening studies have been conducted to examine this question. These have produced no more than the slightest indication of a possible connection, but no evidence. Such studies try to find out, for instance, whether people living near high-voltage lines are more likely to have or develop certain diseases than people living elsewhere. No clear, uniform conclusions could be derived from the research conducted. No link between the presence of these fields and various diseases has ever been demonstrated in laboratory studies with test animals, cell cultures and human volunteers. What's more, such a link could not be explained by any biological mechanism currently known to science.

What is the legal limit value?

The Netherlands and Germany adopted the European standard of 100 µT for magnetic fields and 5 kV/m). These values are satisfied by our overhead lines in operation.

In 2005, however, the Dutch Ministry of Housing, Spatial Planning and the Environment issued an advisory document on electric and magnetic fields generated by overhead high-voltage lines. This document makes a distinction between existing and new situations regarding magnetic fields. The limit value of 100 µT recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) applies to existing situations.

As far as new situations near overhead high-voltage lines are concerned, the Dutch government advises local and provincial authorities and high-voltage grid operators to minimize long-term human exposure to a magnetic field strength of more than 0.4 µT. Consequently, no homes, schools and the like can be built on the strip of land underneath and on both sides of a new overhead high-voltage line. When new high-voltage lines are constructed in the Netherlands, measures must be taken to ensure that the field intensity does not exceed 0.4 µT in existing buildings.

In Germany comparable arrangements for magnetic fields do not exist. However, the values even right below overhead lines underrun the limit value considerably. The German "Strahlenschutzkommision (SSK) of the German Government continuously monitors recent scientific publications and checks if the limit value needs to be changed. In the recent recommendation from 2008 the SSK claims that there is no scientific evidence for possible health hazards and that recent studies do not lead to a change of the limit value.

TenneT is Europe's first cross-border grid operator for electricity. With approximately 20,000 kilometres of (extra) high voltage lines and 36 million end users in the Netherlands and Germany we rank among the top five grid operators in Europe. Our focus is to develop a Northwest European energy market and to integrate renewable energy.

Taking power further

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