

Position of the Transmission System Operators of ENTSO-E Public Exposure to extremely low frequency (ELF) electric and magnetic fields (EMF)

1. Transmission of electrical energy and EMF

This paper describes the position and needs of ENTSO-E concerning exposure of the general public to electric and magnetic fields (EMFs) generated by electricity networks, and in particular by new transmission connection developments.

The electrical transmission and distribution systems are mainly operated with alternating voltage at a frequency of 50 Hz in Europe. Hence, they create EMFs of Extremely Low Frequency (ELF), as is the case for all applications of electricity, including domestic appliances.

Successful and efficient transmission networks are central to delivery of EU policies on energy and climate change. The EU mandated ENSTO-E to produce a Ten Year Network Development plan (TYNDP). As underlined in the TYNDP, reaching the 20/20 targets¹, implies very substantial investments (42,100km of lines) for electricity transmission infrastructure across 34 European countries.

EMF issues are an important concern for the general public, and therefore a proper handling of the EMF issue is essential to meeting these needs and to delivering these objectives.

Within this framework, ENTSO-E wishes to stress the importance of the EU Recommendation on EMF (1999/519/EC) as a tool for a coherent policy and communication by all TSOs and authorities throughout the different EU member states.

2. EMF exposure limits

Assessment of the environmental impact of electric and magnetic fields goes back to the 1970s and was carried out by the World Health Organization (WHO) and the International Radiation Protection Association (IRPA). Subsequently the International Commission on Non-Ionizing Radiation Protection (ICNIRP) continued the work and developed its first guidelines in 1998 with a scientific basis and a structure of numerical basic restrictions and reference levels.

In 1999 the European Union published its Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC). This generally used the ICNIRP numerical values (e.g. reference levels for 50 Hz: 5 kV/m and 100 μ T for general public) but placed them in a practical policy framework taking account of the duration of exposure.

In 2010 the ICNIRP published new guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz) which are based on the same scientific principles but with numerous detailed changes (e.g. new basic restrictions based on the internal electric field instead of current density in the body, and reference levels for 50 Hz magnetic field now 200 μ T for the general public). But these do not automatically take effect in the European Union. The EU policy remains based on 1998 ICNIRP until EU revises the Recommendation (which would involve a process of consultation).

ENTSO-E considers it is vital that there is a clear, authoritative, and up-to-date recommendation on exposures in Europe. The present EU Recommendation is adequate and suitable in respect of exposure of the general population to electric and magnetic fields generated by high voltage electricity circuits.

¹ 20% RES integration, 20% increase in efficiency and 20% reduction of greenhouse gases.

The new ICNIRP guidelines would also provide acceptable values if implemented within the same framework.

3. ELF EMF and permissions for new transmission circuits

In most countries TSOs are facing very long and onerous permitting procedures and much opposition to transmission grid extension projects. Uncertainties regarding alleged long-term health effects of ELF EMFs lead to calls for precautionary measures. WHO, however, considers that any such measures should only be “very low cost”, and should not compromise the “health, social and economic benefits of electric power”.

The varied interpretations of the precautionary principle, and the lack of a clear common policy endorsed and supported by politicians and legislators, adds to the uncertainties of the public and contributes to considerable delays, legal actions, etc that severely restrict necessary developments of the transmission systems.

The TSOs recognize the genuine concerns of the general public regarding alleged health effects from electric and magnetic fields and are willing to take these concerns into account when selecting the optimal route for their infrastructure. They wish to encourage the provision of accurate and correct information to the general public as recommended by WHO.

Communication of correct information concerning the scientific position on ELF EMFs is essential.

TSOs, as developers of grid infrastructure projects, have a duty to inform the public and other stakeholders as much as possible. However, public perception often does not consider TSOs to be objective, despite using only scientifically confirmed and reliable results. Therefore other bodies, such as the EU, national government authorities and agencies, local government, medical and scientific bodies etc have the responsibility to inform the general public about the current state of research and the scientific position on ELF EMFs. All too often, opponents to projects or representatives of pressure groups communicate results of non peer-reviewed research and even misinformation.

In order to inform the public correctly, the following aspects need to be included in the communication:

- Significant exposure to various parts of the EMF spectrum is a fact of nature (e.g. the magnetic field of the earth, natural light);
- Any use of electricity, including household appliances, results in EMF exposure, which can sometimes be higher than from power lines (although clearly the exposure is not continuous);
- Even though research has been conducted for more than 30 years there is no scientific proven medical or laboratory evidence that demonstrates any long-term health effect;
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- Compliance with the ICNIRP and EU guidelines helps ensure that corridors for new power lines in the EU countries have a minimal impact on the environment.

ENTSO-E supports on principle the reviews and recommendations made by internationally recognised bodies such as ICNIRP and WHO, which are comprehensive and include all relevant scientific and medical disciplines, as the basis for any further decision-making in the field of ELF EMFs. Unjustified or unreasonable precautionary measures should be avoided. In some cases, even for new transmission lines, short-duration exposures above the ICNIRP and WHO recommendations, as allowed in the EU Recommendation, are not reasonably avoidable and still guarantee sufficient protection (as large safety margins were applied).

ENTSO-E asks the EU for support and a clear and proactive communication of its position in order to ensure the delivery of essential transmission infrastructure development at appropriate cost.

4. Further Development

EU and National Government policy goals on climate change and energy can only be achieved when TSOs can expand, reinforce and operate the transmission grid on time and within budgets in a manner acceptable to local communities. As more and more excessive precautionary measures are imposed, investment budgets, financed by the consumers through electricity tariffs, will become insufficient to achieve this goal. It is therefore essential that there is a clear recognition of the primacy of the internationally recognised reasonable limits, and clear communication of accurate information concerning EMF. This policy must be supported by the EU and all national governments. This includes a clear concept of basic restrictions and exposure limit values as well as a flexible adoption of a set of action values, taking account of the field level and duration of exposure.

ENTSO-E offers to contribute to a constructive discussion at the EC level creating a practical framework for the necessary grid extension in Europe.

Because environmental topics are becoming more and more important, and because of the likelihood of more HVDC lines being built, it will be necessary to develop the scientific understanding about DC EMFs and ion current streams. Therefore we support research on these topics.