

ENTSO-E Comments on the briefing paper for SF₆ and alternatives in electrical switchgear and related equipment

Brussels, 27 April 2020

TSOs have been working hard towards reducing their SF₆ emissions over the last decades through diverse and innovative techniques and the introduction of closed-cycle management of SF₆. They have achieved significant progress in these efforts over the last years. Therefore, ENTSO-E supports the EU commitment to reduce the global greenhouse gas emissions towards climate neutrality in 2050, and the TSO community is willing to provide support for the legislation development and commit efforts to reduce SF₆ emissions.

ENTSO-E remarks on the briefing paper for SF₆ and alternatives in electrical switchgear and related equipment:

- **Distinguish between medium voltage and high-voltage systems.** The HV (high-voltage) and EHV (extra-high voltage) inventory differs strongly from that of MV (medium-voltage), especially in terms of equipment design (e.g. sealed versus non-sealed systems), installed mass and emissions and requires to be investigated separately. Careful attention should be given to MV conclusions which can indirectly influence the HV and EHV. If study intends to make conclusions on HV and EHV, a full picture including HV and EHV equipment has to be provided (e.g. extending the study with complete overview for switchgears and related electrical equipment as the equivalent of paragraphs 2.2. and 2.3).
- **The document should address more widely the niche technologies.** The important element of niche technologies is not only the voltage, but also the short-circuit currents, which can reach up to 40 kA in MV and up to 80 kA in EHV. We suggest assessing the impact on the market potential and the niche use cases of alternative technologies before making conclusions on niche applications.
- Deadlines mentioned in the study for HV and EHV equipment are based on the manufacturers' timetable and are too optimistic, because **the following user phases are not addressed:**
 - **Homologation¹ and industrial deployment phase.** Following our experience, there is a time need for the transition from research and development phase to piloting and from piloting to full industrialization of new technology.
 - **Purchasing and project phase.** The permitting and regulatory approval phase for the projects are based on homologated technology at that time. The inclusion of newly available homologated technology is usually possible for new projects, which are not yet in permitting phase. This creates an extra delay between market ready solution and putting into operation.
 - **Market maturity development phase.** The legislative roadmap should include the time needed for different technology providers to emerge on the market allowing development of the competition between suppliers and avoiding direct dependence on one.

¹ Homologation guarantees a sufficient level of industrial Technological Readiness and consider all the operating and safety characteristics of the equipment i.e. to ensure that performance remains the same over the entire lifetime of the equipment (40 years).

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- **The economic evaluation should consider the whole life cycle and should entail the environmental evaluation.** The equipment costs compose about half of total life cycle costs for HV and EHV systems. To be complete, the economic evaluation should consider the costs over the entire life cycle, in particular, the costs associated with maintenance, environmental impact and end of life. Study should settle an environmental assessment methodology based on a life cycle analysis perspective as requested by the EC.

ENTSO-E and the TSO community will continue working on the development of SF6 alternative technologies and substitutive gases for existing fleet and support the EU ambition of climate neutrality by 2050. We welcome you to refer and use the recommendations and action proposals given in the updated “*ENTSO-E position paper on the reduction of SF6 emissions and introduction of alternative technologies*” (provided as an annex to this document).