
ENTSO-E Position Paper on the Draft “EC Regulation on fluorinated greenhouse gases- dated 7/11/2012

14 March 2013

ENTSO-E supports the initiatives of the European Commission taken to reduce the greenhouse gas emissions in order to reach the objective set for 2050 for a reduction of 80-95% compared to levels in 1990. Contributing to the limiting of climate change is an urgent matter for all.

Some research and development projects are currently being led by ENTSO-E members, aiming at finding alternative solutions to the use of SF₆, one of the fluorinated greenhouse gases that the European Commission intends continuing to reduce with its proposal. For the time being, only pilot projects with AIS (Air Insulated Substations) vacuum or nitrogen solutions for 72.5 kV are developed, with plans to extend these technologies up to 145 kV in the coming years.

Regarding Gas Insulated Substations (GIS) and circuit breakers for AIS substations at transmission voltages levels above 150 kV, there will be no alternative for SF₆ by 2020, at least with the same performance standards in terms of reliability, energy efficiency, insulation properties and space availability. When substations are constructed, SF₆ makes volume savings possible. Even underground solutions can be made. In case of circuit-breakers, the SF₆ technology offers much better and reliable switching performance characteristics than any other media which could be used.

In parallel to research and development projects, ENTSO-E members continuously take initiatives to reduce their SF₆ emissions, initiatives which have been stimulated in some countries by the adoption of voluntary national schemes and which contribute to the achievement of the objectives set by Regulation 842/2006.

ENTSO-E contributed to the EC web consultation on reducing fluorinated greenhouse gas emissions held in December 2011. ENTSO-E welcomes the proposal of the European Commission for a revision of Regulation 842/2006; however ENTSO-E recommends taking into account the below suggestions in order to reflect the reality of our industry and to reach effectively the climate objectives of the EU.

SF6 Legislation – Commission version 7 November 2012	ENTSO-E recommendation	ENTSO-E justification
ARTICLE 1 – Definitions	<p>ENTSO-E recommends amending the Article 1 with the following sentence:</p> <p><i>« Leakage », abnormal release of fluorinated greenhouse gases, which is higher than the leakage rate specified as part of the design of the equipment if any.</i></p>	<p>ENTSO-E considers that article 1 should include a definition of the word leakage, in order to distinguish between leakages which are part of the design of the electrical switchgear¹ and abnormal leakages resulting from accidental release. Regarding electrical switchgear, only abnormal leakages should be concerned by the scope of the regulation.</p> <p>Electrical switchgears used by TSOs containing SF6 are closed systems. IEC Standard 62271-1 provides a definition for closed systems, which includes a leakage rate. This leakage rate is specified as part of the design of the electrical switchgear.</p> <p>Considering this leakage rate on the whole service life of electrical switchgears (calculated per year), an abnormal release of SF6 occurs when the leakage rate observed is higher than the specified leakage rate of the equipment. This definition of abnormal leakages is taken over from the IEC/TR 62271-303 (future IEC 62271-4) standard dealing with SF6 handling procedures.</p> <p>Considering the leakage rate specified as part of the design of high voltage electrical switchgears, hermetically sealed system does not apply to high voltage electrical switchgears.</p>

¹ The international standard for high voltage switchgear and control gear CEI 62 271 – 1 (5.15.2) stipulates that the leakage rate should not exceed for SF6 and SF6 mixtures, 1 % or 0.5 % per year for the service lifetime of the equipment. For pre-1998 equipment, the equivalent design leakage maximum is 1% and 3%.

ARTICLE 2 – Preventions of emissions

2.2 « Operators of equipment that contains fluorinated greenhouse gases shall take precautions to prevent their unintentional release (hereinafter "leakage") ».

Following ENTSO-E remark on Article 1, « unintentional release » refers to abnormal release of fluorinated greenhouse gases, higher than the leakage rate specified as part of the design of the equipment if any.

TSOs have investigated the possibility of reducing their SF₆ emissions resulting from leakage and gas-handling losses during dismantling. The solutions range from adapted purchase policies to improving the detection of leakage and modifying repair methods:

Purchase

- Inclusion of SF₆ volume and leakage rates in the evaluation criteria when purchasing new switching equipment
- Specification of maximal annual SF₆ leakage rates beyond normal equipment warranty period

Detection

- Monitor the SF₆ pressure which ensures the dielectric behaviour of the equipment;
- Yearly reporting on SF₆ leakage and report each re-filling in order to detect abnormal leakage rates (higher than 0.5 % per year)
- Use of infrared camera to locate accurately and rapidly leakages higher than 2 kg/year when wind and temperature conditions are favourable

Repair

- Develop techniques which minimise gas-handling losses during dismantling
- Set priorities to repair first the higher leakage releases

Decommissioning

- Procedures to reclaim and reuse the SF₆ gas when dismantling old SF₆ switch gear in order to reduce SF₆ gas release to absolute minimum
- Invest in new SF₆ gas extraction equipment to obtain a higher vacuum when extracting the SF₆ gas

ARTICLE 2 – Preventions of emissions

2.3 « Where a leakage of those gases is detected, the operators shall ensure that equipment is repaired without undue delay »

ENTSO-E would recommend adding the following:

« Where a leakage of the SF6 gases is detected, the operators shall ensure that equipment is repaired without undue delay, as long as the service security and the technical conditions allow it and that the environmental impact of this repair is acceptable (lower than in the case of no repair during the probable remaining lifetime of the equipment) »

ENTSO-E agrees that SF6 leakages shall be repaired as soon as possible, whilst not unduly risking the loss of service to customers. The delay for a leakage repair depends on the procedure required. If caulking is the best option, the repair can be quickly made. If dismantling is required for reparation, that implies a longer delay, the repair depending on the authorization of the system operator for an outage with long duration and without the possibility of quick restitution to the network in case of network problems. TSOs have to find an optimal balance between their concerns about service continuity and sustainable development (repair SF6 leakage).

However, ENTSO-E considers in some cases as not possible or not efficient to repair every leakage:

- Not possible: in some cases, the leakage is too small and cannot be located precisely
- Not efficient: in some instances, the total leakage volume could be much lower, even over the duration of years, than the quantity of SF6 which would be instantaneously lost during an invasive repair. It may be more efficient to allow the repair to be delayed until the next invasive maintenance is scheduled in order to minimise the SF6 release.

« Where a leak in the equipment has been repaired, the operators shall ensure the equipment is checked by certified persons within one month after the repair to verify that the repair has been effective ».

In our view it would unnecessarily increase the workload of the existing provisions if the check of equipment by certified persons was implemented.

TSOs monitor the SF6 pressure of their plant using equipment to detect leakages when they occur. Thus, the check of equipment by certified persons within one month after their repair to verify that the repair has been effective does not really make sense for TSOs.

<p>ARTICLE 2 – Preventions of emissions</p> <p>2.4b (and article 8.1b): certification of persons and undertakings carrying out installing, servicing, maintaining, repairing or decommissioning equipment</p>	<p>ENTSO-E welcomes the continuous improvement of the maintenance staff knowledge and skills. Being committed to the reduction of SF6 emissions since many years through ISO 14 001 management systems and voluntary agreements at national level; ENTSOE supports the certification of the personal in charge of SF6 recovery. However, it does not consider that certifying the maintenance staff in charge of gas refilling operations would reduce SF6 emissions.</p> <p>ENTSO-E agrees to limit the 5 year renewal of the certificate to practical tests as listed in the annexe of EC/2008/305.</p>	<p>SF6 operators are specialized and trained technicians. ENTSO-E considers that the training of the maintenance staff in charge of handling SF6 shall include a part on SF6 (environmental issues, SF6 handling...) but does not deem necessary that this entire maintenance staff shall be certified.</p> <p>TSOs' experience does not show indeed that SF6 is lost during gas re-filling: maintenance losses happen mainly during dismantling. Hence, ENTSO-E does not see the adding value to extend certification to the maintenance staff in charge of the gas re-filling operation. The manoeuvre is simple. Leakage, if any, is very limited. Such an extension would generate costs without added value for TSOs since it will double at least the amount of certified maintenance staff, without being really beneficial. It would be more rational that TSOs invest resources in developing more efficient methods for caulking or that better methods be developed for the recovering of SF6 gas when equipment is dismantled.</p> <p>Awareness raising through appropriate communication and training would be sufficient, in particular when TSOs implement an ISO 14001 environmental management system : regular controls of the staff awareness are then organised, with, as a follow-up, the correcting communication and training action plans if needed.</p>
<p>ARTICLE 5 - Record</p> <p>5.1. « Operators of equipment that contains fluorinated greenhouse gases not contained in foams, shall for each piece of equipment establish and maintain records »</p>	<p>ENTSO-E considers that keeping record for each piece of equipment would be rather difficult to apply especially based on weight figures. ENTSO-E considers also as completely unnecessary to provide information on the person who is carrying out the installation or maintenance. The choice of having such an indication in the records should be left at the local or company level.</p>	<p>ENTSO-E acknowledges that records are very important to follow SF6 flows. However, record keeping for each piece of equipment would be rather difficult to apply, involving a big cost with no benefits associated (except for the pieces of equipment with a high leakage rate). There are other methods that can be used in order to register SF6 emissions, that do not necessary involve recording each piece of equipment refills, such the use of one record per gas storage container, with containers dedicated to one use only (re-filling of gas compartments in a given area for instance).</p> <p>Each company should decide the most appropriate methodology for recording losses, depending on its own characteristics (equipment, installations, organisation, etc...).</p>

CHAPTER III

Although not mentioned explicitly in Chapter III, any restriction on SF6 gas amount - that would be imposed by new regulations - would most certainly jeopardize the trans-European grid expansion. For new high capacity transmission lines (400kV, 5000A), TSOs can only rely on GIL (Gas Insulated Lines) technology. Although alternatives in configuration without gas isolation are theoretically feasible, they are not always realistic considering the size of the high capacity transmission lines.