CLIMA-F-GAS-CONSULTATION

Subject: the report Öko-Research, on SF6 and alternatives in electrical switchgear and related equipment

Vincennes on the 2020, April 27th.

The Dehon group has fully supported the European regulations 517/2014 EC and has continuously worked to ensure its success.
We have been a key player in HVACR and fin chemical for several decades. As such, it has been and remains at the forefront of players involved in the chlorinated and fluorinated greenhouse gas substitution process with the implementation of Montreal and Kyoto protocols.
Our company has always played a proactive role in the different phases of this substitution by ensuring the promotion of the most effective actions to reduce emissions while continuing to have operator and user safety as a concomitant concern.
We were forerunners in the implementation of fluorinated greenhouse gas waste recovery and recycling by ensuring thorough monitoring of products until their end-of-life thereafter resulting in the implementation of associated regulation.
This proactive role is acknowledged by various national and international bodies, (the company is a distinguished contributing member to the Nobel Prize awarded to the IPCC).

The scope of the report Öko-Research, on SF6 and alternatives in electrical switchgear and related equipment, represent a real concern for us.
Unfortunately, we do not share the conclusions of this report.

Indeed, the following issues need to be taken into account in this possible regulation:

- the projected deadlines for manufacturers and operators on the different voltage levels.
-the life of the equipment which are between 20 and 30 years.

Furthermore, we are in favour of strengthening in the European regulations the system of reporting installed masses and emissions, covering the life cycle of equipment by harmonising the assessments of the Member States:

- Ensure a process for monitoring installed masses and SF6 emissions and the traceability of equipment containing SF6.
- Optimise and standardise the entire reporting system at European level.
- Promote the use of regenerated SF6 for maintenance and therefore perpetuate existing equipment, thereby reducing the quantities of virgin products placed on the market.

We hope that you will consider our arguments and, given the importance of this subject, We are at your disposal for any further information you may require.
Please do not hesitate to contact us for any further information.
Please accept, Madam, Sir, the assurances of my highest consideration.

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Comments on the the report Öko-Research, on SF6 and alternatives in electrical switchgear and related equipment

Rerefence Texte	Öko-Recherche Briefing paper: SF6 and alternatives in electrical switchgear and related equipment
	Article comments
1 Introduction	It is exaggerated to write that SF_6 can produce toxic by-products without any more detail. SF_6 is classified as non-toxic and non-flammable, and does not have any carcinogenic, mutagenic or repro-toxic (CMR) characteristics. It is only in high voltage systems that a deterioration of SF_6 is possible in a very small quantity / proportion contained in a hermetically sealed system. Furthermore, this deterioration is perfectly mastered during the reclamation of used SF_6. Any alternative solution must have the characteristics required by the industry, in particular with regard to electrical, physical, environmental, health and safety.
2.1 Different types of switchgear	The description of the equipment is incomplete, and the functions of the equipment should be specified.
2.2 Medium voltage switchgear - general Paragraph 5	The functions should be explained and completed (missing the isolating switch, earthing switch and fuse switch).
2.2 Medium voltage switchgear - general Paragraph 5	• *Air-insulated switchgear (AIS) is mainly used in primary distribution. As the name reveals, it is using air as insulation. Vacuum or SF6 is used for breaking. Compared to systems using SF6 as the insulating medium, AIS tends to have a larger footprint and electrical parts may be exposed to environmental influences. AIS have a significant market share in applications where these aspects are not critical, i.e. in rooms with controlled climate offering sufficient space. An example is primary distribution in industry. In the current market for new secondary distribution (RMU), AIS does not play any role of importance;* We don't understand the phrase: “AIS does not play any role of importance” : confused

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2.2 Medium voltage switchgear - general Paragraph 6	• *Solid insulated switchgear (SIS) solutions for secondary distribution have been commercially available for decades. The footprint of products up to 24 kV currently marketed is equal to solutions using SF6. Market share all over Europe is in the lower single digit percentage, partly due to the slightly higher investment compared to SF6 products. In some member states and regions, however, final users adopted this technology and, hence, the market share locally is much higher.* *State of the art SIS designs combine solid insulation with air at ambient pressure in a hermetically sealed tank. Environmental factors like dust, dirt, salt, humidity do not affect the performance of the equipment.* There is no evidence to confirm the wide availability of these systems that do not use SF_6 for secondary distribution. Also, the TR report show a similar, not equal, carbon footprint. Customers have not adopted without SF_6 systems because of their limitations. It would be advisable to detail according to the voltage, where they are used, etc... The overall environmental impact of non-SF_6 life cycle solutions must also be taken into account. The recovery and recycling of valuable raw materials is problematic, especially metals. On the other hand, the combination of solid insulation with air at ambient pressure in a hermetically sealed tank solution are not always compatible and depends on the pressure.
2.3 Assessment of new alternatives for medium voltage switchgears Paragraph 1	*In addition to traditional existing solutions without SF6, there are a number of new alternatives that have become available more recently, are already used in electricity distribution or are still being piloted. These are mostly GIS designs using alternative gases and blends of gases as insulating medium. Some gas blends consist of natural substances only (N2, O2, CO2), others use synthetic substances (e.g. fluoronitriles or fluoroketones). The solutions are designed to have similar properties to SF6 switchgear with regards to use of space or reliability* These solutions are not industrialised and available on a large scale. In most of cases, they are only proprietary technologies.
2.3 Assessment of new alternatives for medium voltage switchgears Table 2	The title of the table need change for : Example of new alternative solution(..) The table need to be revised. Considering the importance given by the grid operators to the GIS architecture, we think that it is necessary to differentiate between AIS and GIS. Even if it means making two distinct tables because the availability of equipment is not identical. The solutions must obviously integrate all the models of functional units used today. By the same, switchgear for substations, a distinction should be made between the standard voltage ranges 12 kV, 17.5 kV, 24 kV and 36 kV in order to correctly represent the status of the solutions available or under development.

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2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Paragraph 1	*Except where explicitly mentioned, physical dimensions and electrical ratings of these alternatives are identical to products using SF6. The weight of solutions using enhanced gas pressure may be slightly higher. Alternatives listed indicate that, in principle, there is no general technical barrier for using SF6 free switchgear in new installations in the MV segment* This claim is unsubstantiated. It is necessary to verify that all the models by studies and experiments in terms of volume and duration, minimum operating temperature, size, purchasing cost, operating costs, regulation, operating complexity. Similarly, the aspects of "lifetime" and MCO are not addressed, particularly for gas mixtures.
2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Paragraph 2	*Regardless of the technology option and voltage levels, in the course of the consultations, manufacturer representatives reported additional investment costs after industrialisation in the range between 5% to 20%, with some conditional exceptions down to 0% and up to 30%. Of course, for new alternatives, cost information is based on manufacturers' claims and at this stage they can only provide indicative figures expected after full upscaling of manufacturing* We do not agree with these assertions. These claims are unsupported and unsourced.
2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Paragraph 3	*Differences of operational efficiency of existing switchgear and new alternatives are negligible. In particular in the case of RMUs, the average current running through the switchgears' components is far below rated values and hence operational losses on average are about one order of magnitude lower than rated losses* We disagree with this unsubstantiated assertion. The assessment of operational qualities must take into account the performance of the various prescribed electrical functions, safety, maintenance and service life of the equipment. It is essential that these concepts be tested and experimented with over a sufficient period of time to be able to assess the maturity of the solutions proposed or envisaged as require in F-Gas regulation.

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2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Paragraph 4	*Like SF_6 products, all new SF6 free as well as some of the commercially existing alternatives are sealed for life, thus from a maintenance perspective, such alternatives are comparable to the GIS solutions using SF_6* We disagree with this unsubstantiated assertion. The indication of hermetically sealed alone is not enough to compare systems. Maintenance must take into account all the parameters of the equipment.
2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Paragraph 5	*For those solutions using natural substances only, recovery of the gas at the end of life is not required. Thus, the costs at this stage of the life cycle is lower than for systems using SF6 or alternative gas blends using synthetic substances . However, it is not possible to reliably quantify this potential cost advantage* The percentages mentioned are in opposition to those cited in the ESI-SF6 project published by Ecofys in 2010, where BAT allow emissions of 0.9% in 2030.
2.3 Assessment of new alternatives for medium voltage switchgears Summarizing assessment of alternatives in Table 2 Last Paragraph	*These steps take some time. The needed period may however be around 2 years for standard applications in primary distribution (MV switchgear in substations) and the most common RMU configurations, whereas other applications may need a few additional years for market readiness.* The full process takes around 5+ years to allow additional preliminary investigations and large-scale experiments to be carried out over a sufficient period of time: - to evaluate the robustness and performance of the different solutions; - to update standards and specifications; - evaluate the conformity of products to requirements.

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3 End users' perspective on SF6 free alternatives	These experiments should be listed in an annex, specifying their characteristics: - the scope and content of the experiments, distinguishing between HV and MV and GIS and AIS. - the volume of the experiments (number x duration).
3 End users' perspective on SF6 free alternatives Paragraph 2	*Some users express concerns regarding technical performance, cost and health and safety issues related to SF6 free alternatives. However, whereas the initial investment costs are indeed likely to be somewhat higher (at least in the short term), manufacturers already have some experience with using SF6 free solutions and they are performing tests on their new equipment that in principle should alleviate the other concerns related to space constraints and reliability.* The maturity of the solutions must be confronted with all the requirements.

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