ChemSec – submission to public consultation:
Restriction of Per- and polyfluoroalkyl substances (PFAS)

General introduction

ChemSec strongly support the overall aim of the proposed restriction of Per- and polyfluoroalkyl substances (PFAS) – to restrict these substances as a group, as promised in the Chemicals Strategy for Sustainability. As described in the dossier the PFAS situation must be considered a crisis.[1] The multitude of PFAS contamination sites,[2] the existence of PFAS in our blood[3,4], especially severe for the younger population,[5] and the widespread contamination of our drinking water[6,7] – among many indications – are important signs that action must be taken.

The proposed restriction is addressing these concerns in an adequate way. The persistent property, together with the other hazardous properties, in combination with the widespread use has led to a human health and environmental crisis that must be considered an unacceptable risk.

The concern is also shared among representatives from the financial community where more than 50 investors with US $11 trillion under management (See Figure 1) have asked the world's biggest chemical producers to phase out PFAS.[8] There is also a support for a broad PFAS ban among companies, we have now gathered over 100 companies in the PFAS movement, supporting the restriction (See Figure 1).[9]

Figure 1. Members of the PFAS Movement and the IIHC – Investor Initiative on Hazardous Chemicals

PFAS production and use has led to a planetary crisis despite warnings decades ago

Without doubt, the PFAS crisis, both from an environmental perspective as well as a health perspective, is beyond serious, and must be considered as a global crisis. We have over 17,000 contaminated sites,[2] according to a conservative estimation, our teenagers,[5] along with everyone else[3,4] have high concentrations in the blood, and the planetary boundaries have been surpassed.[10] Even the rainwater has been shown to contain concentrations PFAS that are above the safe levels.[10]

The knowledge of the detrimental effects of PFAS has been known (but not available to everyone) for many decades and despite this, the emissions has continued.[11]

The PFAS restriction is aimed at the persistent PFAS compounds, and rightly so, since persistence is a problematic property, leading to increased concentrations in the environment, in animals, in humans, and over time resulting in levels effecting our biological systems and the human health. Like the considerations made for microplastics, persistence in itself is a property which needs to be regulated.[12]

Besides the persistent properties, common to all PFAS under the restriction, these substances have a range of different other hazardous properties, including either B or M as well as endocrine disrupting effects and carcinogenicity.[1]
Due to these problematic properties, many stakeholders have identified PFAS as a family of substances that must be substituted. Companies commit to phase out PFAS,[9] investors divest from producers of PFAS,[8] and consumers are actively stepping away from PFAS containing products.[14]
It is also important to point out that the social costs connected to PFAS, from human health issues and environmental remediation of water and soil, are staggering. In a conservative estimation they were estimated to €16 trillion annually.[15] These costs will, unfairly, end up on the society and on individual persons. Handling the PFAS crisis is necessary to reduce this unfair impact, for example, there is a need to treat large parts of the European drinking water to reach safe levels.[6,7]

PFAS must be tackled as a group

Chemicals have historically been the subject of *regrettable substitution* too many times, especially within the PFAS family this has been the go-to solution when regulation has restricted the use of certain (very few have been regulated) PFAS. Examples of this are the move from PFOA/PFOS to GEN-X as process aids for production of fluoropolymers and the move to HFOs instead of HFCs as refrigerants.[16,17]
The number of PFAS has been estimated from a few thousand to several millions, which, consequently, gives endless possibilities for moving from one PFAS to another, if they are regulated substance-by-substance. Therefore, the only way to regulate PFAS is as a group of substances. And, as already shown above, persistency, the common trait of all the PFAS under the restriction, needs to be regulated.
To achieve an effective regulation, the group approach is the only way forward. In addition, this method would give predictability for the entire value chain, affording a simpler regulatory landscape and facilitate the transition towards safe and sustainable chemicals.
Since the restriction proposal is aimed at the persistent members of PFAS it is important to not deviate from that aim, and to ensure that all persistent PFAS are regulated. More specifically, it is important to not exclude any relevant substances, and to include sub-groups such as fluoropolymers and F-gases. Both these sub-groups are persistent chemicals (or break down to persistent chemicals) and should be treated as such.
For fluoropolymers, the polymeric structure does not warrant an exclusion, their life cycle is very problematic; from production, during use phase, as well as during end-of-life, and in general the full life cycle is poorly understood.[18] The fluoropolymers cannot be considered as “polymers of low concern”, the scientific evidence points in the other direction and there are studies showing that polymers indeed are found in human blood[4] and can cross cell membranes.[19] In addition, the formation of micro- and nano plastics from fluoropolymers has been shown by identification of PTFE in different biota.[20,21]
In addition, it is important to understand that the claim that a large part of fluoropolymer use is “essential for society” is exaggerated, society can manage without fluoropolymers.[15,22] In many cases the use of fluoropolymers is connected to products which are not essential.[15,23]
The F-gases that fall under the structural definition of the restriction proposal are persistent PFAS or degrade to persistent PFAS like trifluoroacetic acid (TFA). The specific regulation for F-gases (the F-gas regulation[24]) is regulating the global warming potential of these

substances, and therefore there is a need for the substances with hazardous properties, like persistency, to be regulated under REACH.
For the F-gases, they are the source for large emissions[1] and there is an abundance of alternatives.[25] In addition, the concentration of TFA in our waters has been shown to increase during the last decades and been found to accumulate in the human food chain.[26,27]
In summary, all persistent PFAS must be included in the restriction. The proposed restriction uses the OECD definition to define the scope of the restriction (with a few non-persistent exception) which will ensure that regrettable substitution can be avoided. Due to the historical prevalence of regrettable substitution within the PFAS family, it is important to use this approach.

PFAS alternatives are becoming available at speed and even outperforms PFAS in several uses, including important applications for the green transition.

The availability of alternatives to PFAS is, for many uses, large and displays a variety of different solutions. For the largest emitters, TULAC and F-gases/refrigerants there are already today enough alternatives to substitute the use of PFAS.[28,25]
In addition, tools for understanding PFAS uses, and potential alternatives are available.[28,29]
As seen before, legislation is a major driver for innovation[30] and already now the plethora of alternatives is growing fast, including for the uses considered to be “difficult”.[31]
Development of alternatives have been shown to be less cumbersome than expected and lead to less expensive alternatives,[32] as well as possible even if the PFAS versions were considered to be irreplaceable.[33,34,35,36]
New technologies have been developed for use cases where even PFAS has been found to not meet the requirements and that way debunking the theory of PFAS being the only way to achieve sufficient durability and inertness.[37]
It is important to remember that only a small part of the PFAS uses are attributed to uses that can be considered to be “essential”,[15] and the derogated uses in the restriction proposal have been given sufficient time to develop alternatives for uses as well. It is worth pointing out that, for many uses, the transition times are very long, 13.5 years.
In summary, the alternatives are, or will be during the transition times, available. The important issue is to ensure is that the work done supports the upcoming solutions and not protects the incumbents. The green transition can this way include a move towards safer chemicals in products, ensuring a further step in the direction of a green and sustainable future Europe.
This restriction proposal itself is an important reason for companies daring to put resources into innovation of alternatives to PFAS. For these investments not to have been in vain, it is important that the restriction is not watered down. In fact, more and more alternatives are becoming available, also for uses where a derogation is proposed, including semiconductors and fuel cells.[31] The innovation flourishes, much is happening, and it is important to support this movement towards safer and more sustainable solutions.

Conclusions

The urgency to resolve the PFAS situation is increasing every day. The multitude of reports, articles, studies, and books, describing the dire situation is a clear indication that we need to reduce the amount of PFAS being produced – and we need to do it fast!

Many relevant stakeholders are convinced that the issue needs a new way forward, including politicians, brands, retailers, chemical producers, investors, - the entire value chain - agree that we need to act.

The proposed PFAS restriction is the best way to, in an efficient and legislative predictable way, phase out the use of PFAS.

To reduce the potential for regrettable substitution we need the restriction to be *comprehensive* and *include all relevant persistent PFAS*, and we need the derogations to be *only* for uses where there are no viable alternatives today.

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