GREEN SCIENCE POLICY INSTITUTE

The Green Science Policy Institute is comprised of scientists collaborating with leaders from business, academia, NGOs, and government towards healthier and more sustainable products. Given our decade-long history of studying PFAS and collaborating with PFAS scientists on PFAS exposure, health, and ecological harms, we would like to express our full support for the restrictions outlined in Regulation (EC) No. 1907/2006 (REACH) Proposal for a Restriction of Per- and polyfluoroalkyl substances (PFASs). We support the use of only time-limited derogations and a broad PFAS definition that includes fluoropolymers and fluorinated gases.

While collaborating with businesses to phase out PFAS, we have found that all were able to reduce PFAS and have functional products and successful businesses after the phase-out. Examples include KEEN shoes (who wrote about their work here), IKEA, carpet manufacturers, cosmetics manufacturers and retailers, outdoor gear companies, and furniture and textile manufacturers. Some of these companies phased out PFAS from their products after learning of the environmental and health harms, while others were compelled to do so by legislation. Greater restrictions of PFAS in the European Union would move more industries towards using safer materials. In most product uses, PFAS are not needed or their functionality can be replaced with a safer alternative.

Regulating PFAS as a class is both urgent and scientifically justified. PFAS are defined by their intrinsic persistence or ability to convert into other persistent PFAS due to the strength of their C-F bonds. The extreme persistence of PFAS is by itself a basis for treating PFAS as a class, as the restriction proposal discusses. PFAS chemicals, once released, continue to accumulate in the environment and organisms. They can exhibit high mobility, leading to global contamination and widespread health harm. Numerous studies have shown that many PFAS have varied and serious toxicological impacts on people. Treating PFAS as a class helps address the problem of "regrettable substitutions," where one known hazardous PFAS is replaced with another similar chemical of uncertain hazards that may very well cause equal or worse harms. Studying the health harms of individual chemicals once they are already in commerce is both inefficient and does not effectively prevent harm from chemicals that require a high burden of proof to demonstrate safety (or lack thereof).

Both fluorinated gases and fluoropolymers must be included in the regulated class of PFAS. Even in cases of lower acute toxicity (e.g. from fluoropolymers), the production and end-of-life phase of both fluorinated gases and fluoropolymers require or generate highly hazardous and/or persistent PFAS. For instance, 80% of environmental contamination of highly toxic and mobile PFCA chemicals is attributed to fluoropolymer production and use. Fluoropolymer production further releases "super pollutant" PFAS (including HCFC-22 and HFC-23). Many fluorinated gases (including HFOs that are commonly used refrigerants) ultimately degrade into trifluoroacetic acid, which is a persistent drinking water contaminant and toxic to aquatic and human life. Furthermore, for fluoropolymer end-of-life, we do not have adequate systems in place to handle their disposal to prevent further contamination as they degrade into microplastics. Remediation of PFAS contamination, with its global and pernicious reach, is a

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more difficult and costly endeavor than restricting use of PFAS to all but its essential uses, especially as technologies to mineralize PFAS lag.

The concept of essentiality has also been used too liberally by industries profiting from PFAS usage or those who are unaware of the (lack of) necessity of the functionalities that PFAS often provide. For example, we showed that when used for stain-resistance on furniture textiles, PFAS only worked in very specific scenarios, and that fabric choice made the most difference when determining whether or not stains were visible. For this and other uses, the essential-use approach should be used to determine whether or not PFAS are truly necessary. We urge ECHA to consider that the more PFAS used today, the more PFAS will remain in our products, bodies, water, soil, air, and wildlife for the foreseeable future. Therefore, all uses of full exemptions or time-unlimited derogations should be removed from the proposed PFAS restrictions. Specifically, a time limit should be imposed for fluorinated gases used as refrigerants in buildings where current building codes and standards prohibit the use of alternative refrigerants. Safer alternatives are already in use, but a time-restricted regulation is needed to encourage further use, so that HFO and HFC gases can be eliminated due to their high global warming potentials and persistent breakdown products. The restriction of these harmful chemicals should not wait for outdated building codes to be corrected.

A commonly propagated argument is that restriction of PFAS is in direct opposition to necessary clean energy goals. This is a false dichotomy, and with proper investment and scale-up of alternatives, few uses of PFAS will be truly essential to clean energy technologies. For some of the most important clean energy technologies in use today, including solar panels, hydrogen fuel cells and electrolyzers, and lithium-ion batteries, there are viable PFAS-free alternatives for all components already existing on the market. The semiconductor industry has also shown progress toward removal of PFAS with inexpensive PFAS-free surfactants for photoresist etchants now being used industrially. A time-limited derogation for these sectors will help spur innovation, and time-unlimited derogations are unnecessary. We have included a list of companies making these alternative products in Section V.

In conclusion, we strongly encourage ECHA to proceed with strict, time-bound restrictions of all PFAS uses to protect human and ecological health, encourage the circular economy, and set an example for the rest of the world that it is time to move on from forever chemicals.

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