

FLUOROPOLYMERS AND F-GASES CONTRIBUTE TO THE GREEN DEAL AGENDA

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CONTEXT

With the aim of making Europe the first climate-neutral continent, the [European Green Deal](#) outlines the transformation of our modern society, profoundly reshaping its cross-sectoral foundations in a more sustainable way. The European 'Green Deal' is the EU's response to the challenges posed by climate change: it identifies targets and objectives and foresees a myriad of sectorial policy initiatives to achieve its main. In all this, 'decarbonization' is paramount. Specific 2030 and 2050 emissions- reduction goals have been established, reaching almost all economic sectors. Achieving the net zero emissions target must however be constructed in a highly parameterised and cost-optimised way. A delicate balance must be constantly sought, fostering the crucial contributory role to be played by industries, and where technological innovation and European competitiveness are continuously stimulated.

In this context where the European Green Deal envisages strong decarbonization commitments, the implementation of the Chemicals Strategy for Sustainability (CSS) could indirectly hamper the achievement of these objectives. In fact, as the CSS proposes to move towards a so-called "hazard based approach" for what the EU defines "the most hazardous substances", there is a risk of seriously undermining the use totally safe and crucial substances to achieve the Green Deal decarbonisation's objective. This trend is reflected within many initiative of the CSS, such as the revision of the restriction process under the REACH Regulation, the addition of new hazard classes for PMT/vPvM substances, the definition of Safe and Sustainable by Design, the integration of the essentiality concept in the REACH revision process, and the recent proposal for a ban on all PFAS ("except for those deemed essential").

"One fundamental policy objective should not be contradicted by other legislative and regulatory actions"

CASE STUDY: HOW DOES FLUOROPOLYMERS AND F-GASES CONTRIBUTE TO THE EU DECARBONISATION?

To achieve the Green Deal decarbonisation objectives, all sectors of our economy should play a role. This is done through generating energy from more sustainable sources, cleaning current energy production, implementing resource efficiency measures and address the overall greenhouse gas emission balance. To this end, Fluoropolymers and F-gases fulfil a critical function as outlined in the next paragraphs.

Fluoropolymers are biologically stable and chemically inert in presence of virtually any chemical or mechanical stress, are negligibly soluble in water, non-bioavailable, non-bio accumulative and non-

toxic, non-wetting, non-stick, and highly resistant to temperature, fire, and weather. Articles made with fluoropolymers are **virtually maintenance free** and **offer excellent electrical properties**. These are a unique combination of properties that no other chemistry matches, making them of outmost importance for several sectors and industries both in Europe and worldwide.

F-gases, on the other hand, **are refrigerants and fluids with a unique performance and safety profile**. They offer three main properties: *cooling, heating and insulation (blowing agents)*. They are essentially applied in several sectors: air-conditioning and refrigeration (mobile and stationary), heat- pumps, as well as foam-blowing agents, followed by propellants and solvents (and others, to a lesser extent). Latest generation substances, in addition to having **ultra-low global warming potential (GWP)** – historically the key driver behind innovation – also meet high performance requirements.

Fluoropolymers and F-Gases are at the forefront of achieving the targets of the green deal. Many sectors driving the decarbonisation path, including telecommunications, semiconductors, construction & insulation, medical, manufacturing and defence, food supply, energy and mobility need these products.

Some are highlighted here below.

Decarbonation goals served by FGASES

The EU's successful ongoing market transition to lower global warming potential (GWP) F-gases, driven by the F-gas Regulation, should continue to help the EU to achieve its Green Deal ambitions. F-gases make the following critical contributions to meet net-zero goals:

- Accelerating the EU's shift to sustainable and **smart mobility by significantly reducing the GWP of automobile air conditioning**.
- Playing a vital role in the **EU Farm to Fork Strategy** by transport and refrigeration that ensures food security and reduces food waste in the EU cold chain.
- Increasing the energy efficiency and **climate-proofing of buildings through foams and heat pumps**. This contributes substantially to the EU's Renovation Wave initiative and **is fundamental to the Heat Pumps business that the RePowerEU strategy is aiming for**.

F-gases do not pose significant environmental risk since they are used in closed systems and recovered at the end of life. F-gases are not meant for release in the environment except in very specific applications such as pressurized inhalers for asthma treatment. Additionally, the existing F- gas Regulation and the MAC Directive specify a robust recovery mechanism for all substances within its scope. It is expected that the revision of the F-gas regulation being worked on currently will further upgrade the existing requirements on the containment of the life-cycle and end-of-life emissions

They have already been through rigorous regulatory approval processes in the EU and deemed safe for their intended use throughout their entire lifecycle. **They are not classified as persistent, bioaccumulative or toxic (PBT) under REACH. However, the developments foreseen in the REACH revision and the current restriction on PFAS could de facto pave the way for their phasing out.**

Decarbonation goals served by Fluoropolymers

- Fluoropolymers are used in various components of renewable energy installations and are instrumental in meeting the EU's target of renewable energy consumption, as aimed at in the Renewable Energy Directive (REDIII). In **photovoltaics and solar thermal installations**, the energy generation is directly dependent on the right exposure to the sun and are fully exposed to the elements. The protection by fluoropolymers shields them effectively from heat, water, UV abrasion and chemical stress. They increase the efficiency and coating results in decreased need of mechanical cleaning. Like PV, wind farms are directly exposed to the environment. FPs ensure the smooth and safe operation of wind turbines and decrease their overall downtime through specialized coating and lubricants.
- Fluoropolymers also help enable the recently published Hydrogen Strategy, which sets an ambitious target for renewable clean 'green' hydrogen in the energy mix by 2050, since they are added to **membranes in hydrogen electrolyzers**, fuel cells and flow batteries so that charged particles can travel and prevent cross-contamination. Without them, newer generations of electrolyzers for the cheap and safe generation of hydrogen would be unthinkable and we would have to resort back to more expensive and unreliable forms of hydrogen generation by using fossil fuels.
- **(Lithium-Ion) batteries** could not be used on a large scale without Fluoropolymers making them flame retardant, thermally stable and extending lifetime, thus lowering the levelized cost of energy.
- For the next generation of decarbonised cars and other road transport carriers, fluoropolymers are utilized in automobile components such as fuel lines, fuel hoses, O-rings, turbocharger hoses, and hoses in hydraulic systems, as well as electric vehicles, for their unique combination of properties. They help prevent leaks and breakdowns, while reducing GHG emissions – especially important given Euro 7 emission standard with a CO2 emission target of 95 grams per kilometer, as well as the **Zero Emissions cars foreseen in the current proposal of legislation.**
- Finally, fluoropolymers are critical in enabling 5G data transfer speeds and digitalization – which is a key requirement to **making** the EU a world leader for fully automated and connected mobility systems, as outlined in the European Commission's Digital Strategy. Fluoropolymers are used in the production of semiconductors that are needed to continue to enable technology and systems, and which are supported by the recently released European Chips Act.

Circularity Perspective

The broad sectoral usage of Fluoropolymers and F-gases demand highlighting their circular aspects. Fluoropolymers provide the longevity to various sort of applications, leading to **less**

waste, thus less impact on the climate and environment. At the same time, they greatly **reduce the amount of potential leaks** of other chemicals, while **increasing the overall efficiency** of the parent application.

Regarding end-of-life, the industry is **undertaking measures to close the loop** for Fluoropolymers as much as possible. F-gases are by design circular as they are mostly used in closed systems and can be recovered and reused after the application has met its intended end of life¹.

HOW COULD THE CSS UNDERMINE THE DECARBONISATION GOALS?

The CSS sets a new vision for the EU's chemical policy where a toxic-free environment is pursued and the use of "substances of concern" in products is minimized. In this context, the European Commission has already given their indications on what a substance of concern is² and has shared its plan to reduce the use of substances with these hazard properties as much as possible, no matter what the actual risk of exposure to these hazards is or how this is controlled (the so-called hazard- based approach to the management of chemical).

This approach, which is being reflected within the revision of the restriction process of the REACH Regulation ("essentiality" concept) or the definition of Safe and Sustainable by Design, concretely aims at phasing out some chemicals based on intrinsic properties before proceeding with any risk assessment.

In fact, if we look at the latest draft of the Safe and Sustainable by Design criteria shared by the Joint Research Centre, substances of concern will be directly excluded from being granted this label just because of their hazard properties, without making any further consideration on how the risk is managed or what these substances enable, nor considering the fact that potential alternatives might have other environmental, safety or performance hazards/ disadvantages, which might create other issues (regrettable substitution).

As explained above, for fluoropolymers and f-gases hazard properties are well managed and the Industry is actually taking strong commitments to go even further in the management of these related risks. Therefore, taking a pure hazard-based approach towards the management of chemicals will not only risk of banning substances which use is completely safe but also risk of eliminating all the benefits that these substances enable in products.

As a matter of fact, some substances displaying hazard properties may never pose a risk to consumers nor users either because consumers never come into contact with these substances or because the conditions for these hazard properties to be triggered are not

¹ The containment and recovery is also addressed by the F-gas regulation, one reason more, why F-gases should be addressed in more detail by the upcoming F-gas regulation review.

² For instance, the proposal for a Regulation establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC includes a definition of substance of concern in its Article 2 point 28.

presented in real case scenarios. The generic risk approach must include these assessments when opting for a restriction.

These are just few of the examples that show the path that the CSS is undertaking.

If a different approach is not taken within the upcoming revision of EU chemicals legislation, this concerning trend will risk of *de facto* hampering the EU Green Deal decarbonization' goal. Therefore, this represents a real risk of contradiction between the CSS and the EU decarbonization' goals.

THE WAY FORWARD

Given the above, it is important that the EU approach is consistent overall. In this sense, we wish to draw the following conclusions:

- Fluoropolymers and F-gases are part of the solutions to decarbonizing our economy as they are widely used in applications central to a more circular economy, sustainable energy production and green mobility. Potential emissions from production sites can be lowered as much as technical possible, through harmonised requirements at EU level. This is industrially feasible and should be pursued, instead of banning classes of substances on the basis of their intrinsic properties;
- The implementation of CSS is setting a worrying path for fluoropolymers and f-gases. The current discussions on the revision of the REACH and CLP Regulation, on the introduction of the Safe and Sustainable by Design framework, or the PFAS restriction among others, represent an issue for fluoropolymers and f-gases which, in turn, risks of destabilizing the EU decarbonization commitments;
- A phase out of fluoropolymers or FGAS just on the basis of their hazards would not only severely impact the achievement of the Green deal objectives but would also render impossible the objectives of the EU Chip Act, the Digital Agenda, the (new) Batteries Regulation, the Sustainable and Intelligent Mobility Strategy and the Circular Economy Action Plan, to name but a few;
- A more reasonable approach would be to **reinforce and harmonize measures to avoid pollution, such as in the current Industrial Emissions Directive Revision, as well as in the current FGAS regulation revision**. Similarly any new product specific legislation ([ESPR](#) and others) should struck the right balance between the use of substances to increase products performances (energy, durability etc) and phase out substances that represent a risk for health or environment. The enhancement of regulatory measures to ensure that substances do not leak into the environment should be clearly the priority, to be able to balance the priorities of the CSS and the decarbonation agenda goals.