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**A Resilient Industry Requires
Advanced Performance
Materials such as
Fluoropolymers:**

Our Sustainable Solution
for Your Competitiveness



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More Competitive and Sustainable





Chemours and APM Sustainability Goals and Actions



Our Corporate Responsibility Commitment

We invest in responsible chemistry that meets today's needs while providing a better future for all.



Corporate Responsibility Commitment Goals

We announced 10 bold goals in 2018, grouped into 4 pillars, to bring responsible chemistry to life by 2030.

OUR PILLARS



Environmental Leadership



Innovation and Sustainable Solutions



Community Impact



Greatest Place to Work for All

We recognize our environmental leadership and actions toward a circular economy are important to you

Sustainability Goals: Environmental Leadership



Environmental Leadership



Climate

- Reduce absolute Scope 1 & 2 greenhouse gas emissions by 60%
- Reduce Scope 3 emissions by 25% per ton of production
- Journey to net-zero operations by 2050



Water Quality

- Reduce air and water process emissions of fluorinated organic chemicals by 99% or greater**
- We are the first and only company to make this public commitment

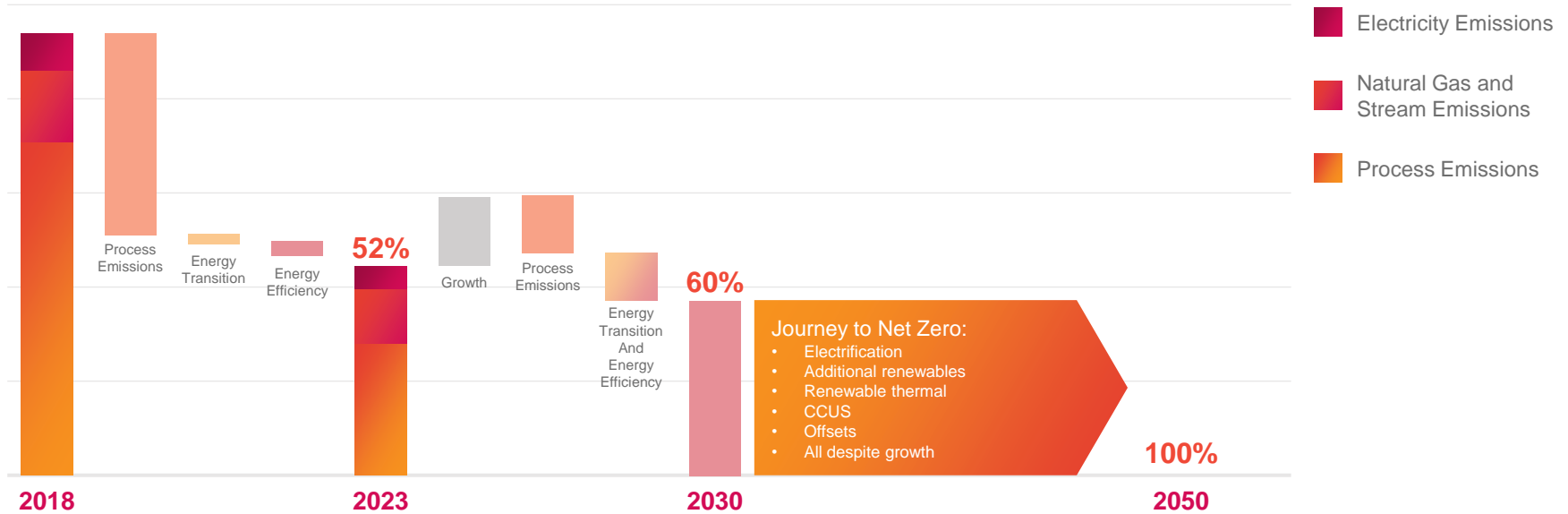


Waste

- Reduce landfill volume intensity by 70%**

Chemours Carbon Reduction Roadmap

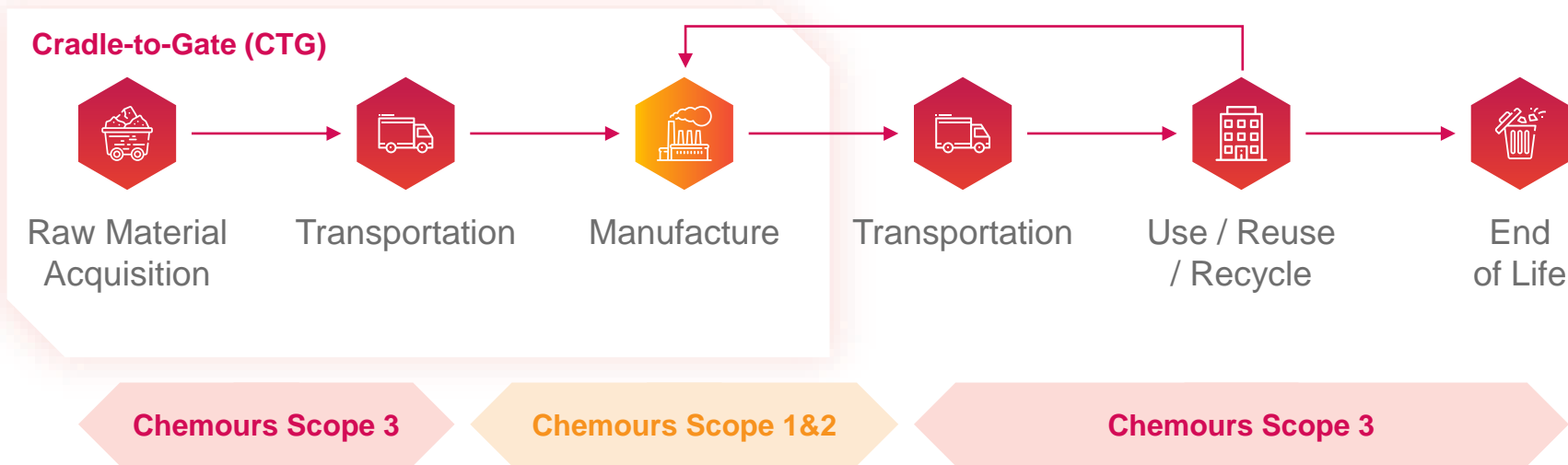
Chemours Carbon Reduction Roadmap



Let's examine the pivotal role that our Advance Performance Materials business plays in achieving our sustainability goals

Product Carbon Footprint (PCF)

We understand the importance of a low cradle-to-gate PCF and a traceable, credible method to report it



The carbon and fluorinated organic compound reduction projects Chemours has completed to date have positively impacted our product carbon footprint

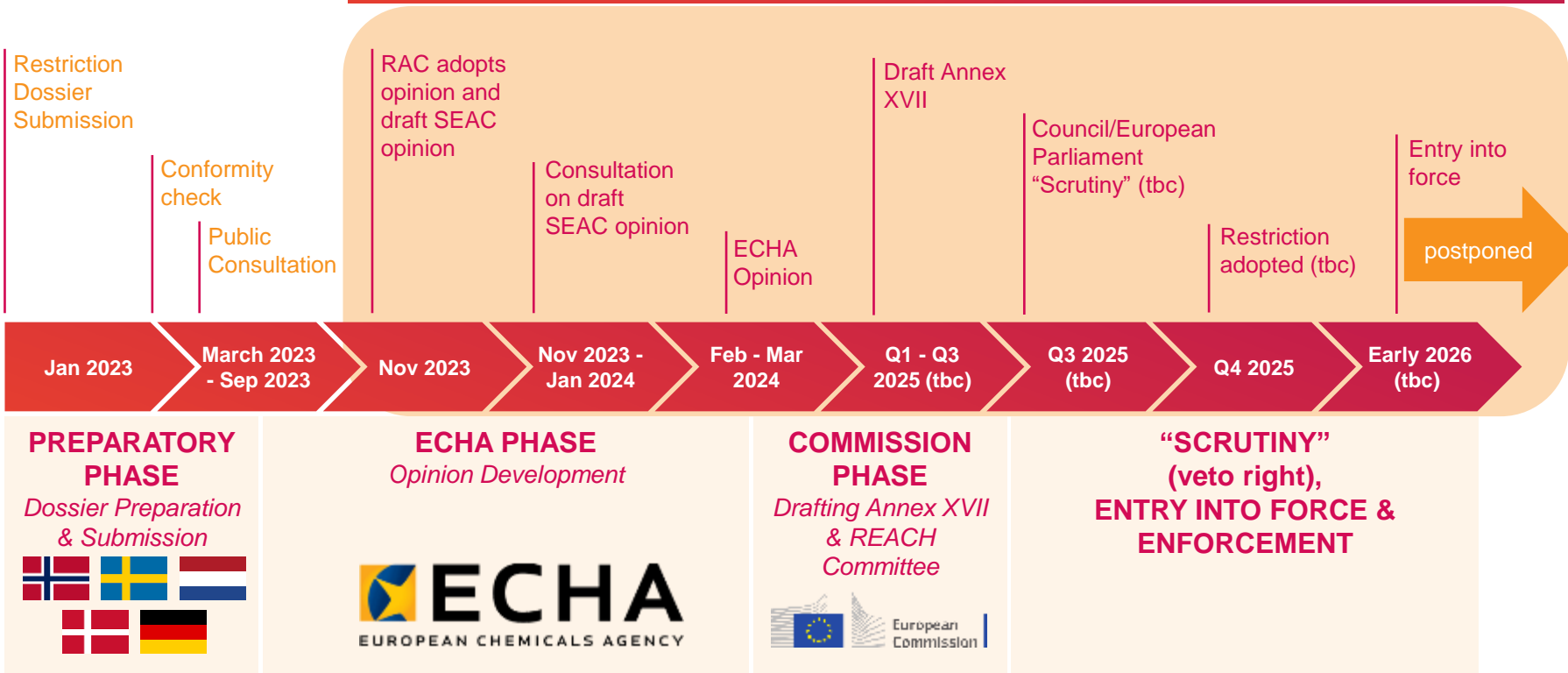


EU REACH PFAS Restriction Process and its Industrial Context



PFAS Restriction Timeline (2023-20???)

There is likely a minimum 2-year delay for RAC and draft SEAC opinions, pushing to 2025 or 2026, and all following steps will also be postponed for the same time at minimum



ECHA RAC and SEAC Latest Meeting Outcome

The sectors and elements **discussed for 2024** are:

MARCH 2024 MEETINGS

- Consumer mixtures, cosmetics, and ski wax;
- Hazards of PFAS (only by RAC); and
- General approach (only by SEAC).

JUNE 2024 MEETINGS

- Metal plating and manufacture of metal products; and
- Additional discussion on hazards (only by RAC).

SEPTEMBER 2024 MEETINGS

- Additional discussion on hazards (end-of-life) (only by RAC)
- Textiles, upholstery, leather, apparel, carpets (TULAC);
- Food contact materials and packaging; and
- Petroleum and mining.

DECEMBER 2024 **NEW AGENDA**:

- Continue TULAC;
- Continue Food contact materials and packaging; and
- Construction products

MARCH 2025 **NEW AGENDA**:

- F-Gas
- Transport
- Energy

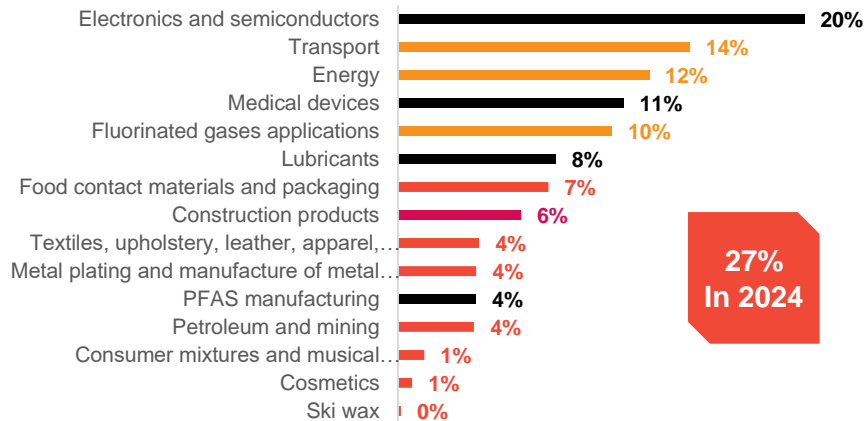
21%

6%

36%

UPFAS restriction proposal: share of comments by sector

(based on a pre-screening of all comments submitted)



Main FPs Comments from RAC:

- Limited evidence on the toxicity of polymeric PFAS: Fluoropolymers are persistent but generally not mobile nor bio-accumulative
- The full life-cycle of fluoropolymers needs to be considered to assess the risk, including manufacturing and end-of-life
- RAC noted that micro-sized and nano-sized fluoropolymer particles may become bioavailable and may result in (eco)toxicological effects
- Fluoropolymers are now assessed horizontally in all sectors, but their manufacturing will be discussed individually
- Strong focus on the emission at end-of-life

Germany



Decision-

Collection of the Conference of Economic Ministers due to the Heads of Office Conference on November 22, 2023 in Berlin

Item 2.3 on the agenda:

Restriction of per- and polyfluorinated alkyl substances (PFAS) – a threat to the existence of industry and medium-sized businesses

1. The Conference of Economic Ministers points out the enormous importance of PFAS, on which around 95 percent of all industrial products currently depend, and the significant impact of the Universal PFAS restriction proposal on many industrial sectors. In this regard, the Conference of Economic Ministers reaffirms its decision of 21/22. June 2023 (TOP 3.2 "New challenges for the current and future competitiveness of Germany as an industrial location", paragraphs 7, 10 and 11) and also shares the opinion of the heads of government of the federal states (MPK resolution from October 11th to 13th, 2023, TOP 3.2 Paragraph 7b)) that REACH restrictions should generally remain risk-based and there should be no total ban on PFAS.

2. The Conference of Economic Ministers welcomes the Federal Government's statements that a differentiated approach to PFAS is necessary, which, although with the necessary consumer protection in mind, should not be an over-regulation that would hinder growth and technological development. The Conference of Economic Ministers asks the Federal Government to take the following aspects into account and to advocate for a PFAS restriction "with a sense of proportion". Compliance with high environmental protection and safety standards in industrial plants must not jeopardise the achievement of climate protection goals or the digital and ecological transformation of the economy.

3. The Conference of Economic Ministers points out that PFAS enable materials to perform under extreme conditions (e.g. stability under extreme heat, pressure, exposure to acid) and are often not replaceable by other substances due to their special chemical properties. In the area of consumer products, substitution is likely to be possible comparatively quickly, possibly at the expense of compromises in product quality. However, in high-tech products in aerospace, semiconductor production and many other areas (e.g. medical products, safety, occupational health, energy production and storage, environmental protection) there are currently no alternative chemicals with the required properties. The Conference of Economic Ministers considers it unlikely that suitable alternatives will be found for all applications in a timely manner.

4. The Conference of Economic Ministers emphasises the role of the chemical industry and the subsequent value chains in the transformation towards climate neutrality. As long as there are no alternatives available for the PFAS needed for electrolyzers, lithium batteries, electric cars, wind turbines, heat pumps, hydrogen infrastructure, biogas plants, smart grids, air filters for environmental protection and fuel cells, a PFAS ban (even with time-limited derogations) will jeopardise the goals of the EU Green Deal. The Conference of Economic Ministers is also concerned that the manufacture, import and use of vehicles, smartphones, stents, heart valves or ventilators, protective equipment for medicine, fire services, police and defense as well as technical textiles and components for extreme conditions could be banned in the EU in the future. Even in cases where small amounts of PFAS are



July 2024

Letter from 2 German Lander Economic Affairs Ministers (Bavaria and Baden-W) to President VDL, calling for FPs exemption



Letter to Chancellor, July 2024, signed by 20 industry associations and 555 CEOs

3 Suggestions:

1. Convening a PFAS summit at the Chancellery
2. Temporary withdrawal, revision, and resubmission of the dossier
3. Separate consideration of fluoropolymers

December 2023

Motion of CDU in the Bunderstag to request government to change PFAS restriction

Critical Materials for Critical Applications: Fluoropolymers

Fluoropolymers are selected for critical applications because of their unique combination of properties. For many of the most critical applications, there are currently no viable alternatives to fluoropolymers.

Unsurpassed protection against chemical permeation or attack, even under the harshest conditions

Exceptional performance and durability across temperature and pressure extremes, for safer, more efficient transportation

Enabling ultra-low-loss and high-speed data transmission, even at higher frequencies and temperatures

Excellent chemical, thermal, and mechanical stability, plus tunable conductivity and low permeability – enabling the hydrogen economy, advanced electronics, semicon, xEV, chemical processing, and more



All Sectors Are Connected, One Sector Cannot Exist Without the Others

TRANSPORTATION
automotive, heavy duty, train,
marine, aerospace



ENERGY
H2E, solar, wind, nuclear,
Oil & Gas



**CHEMICAL
INDUSTRY**



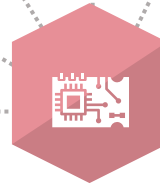
**INDUSTRIAL
MACHINERY**



**MEDICAL &
PHARMA**



**ELECTRONICS &
SEMICON**





A PROPOSED SOLUTION

Responsible Manufacturing
and End-of-Life Management
as Key Enabler



Defining Responsible Manufacturing



Every stage of fluoropolymer manufacturing—from the earliest stages of raw materials and monomers to the creation of polymers—is completed responsibly, with thorough management of raw materials, polymerization aids, and the resulting polymers that are used in various product applications.

OUR DEFINITION

Our holistic, environmental approach to the invention, production and use of high-performance materials essential to societal advancement

invention



PURPOSEFUL PRODUCTS

production



CONSCIENTIOUS CREATION

use

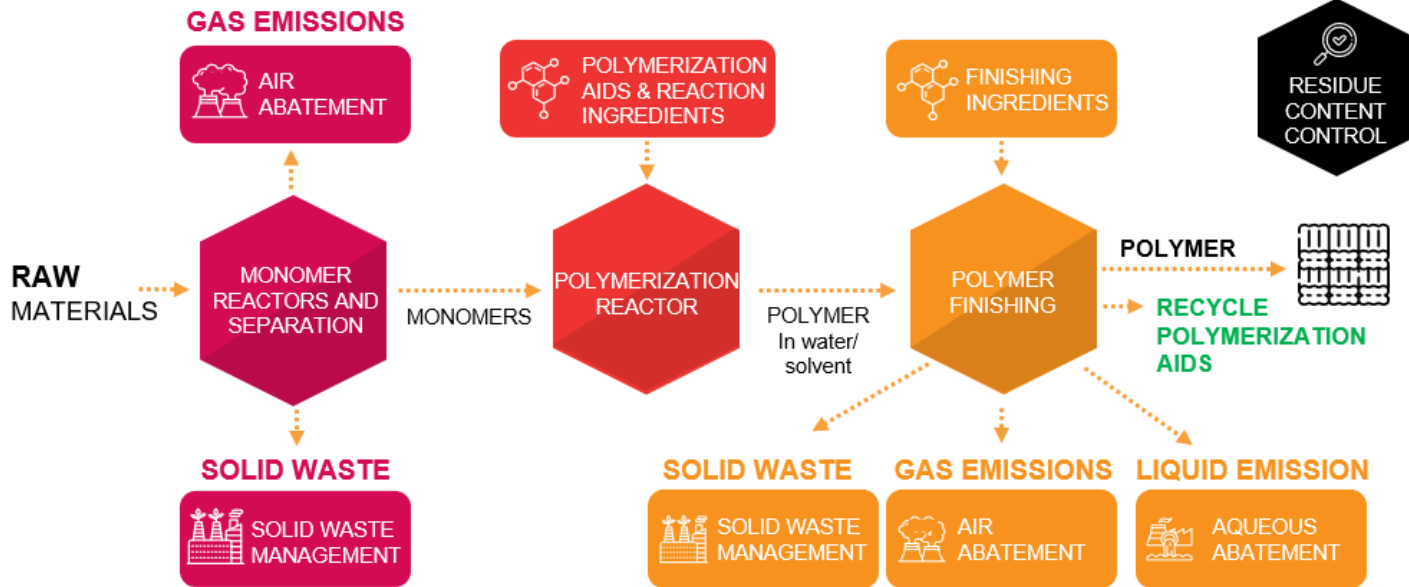
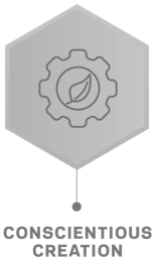


MINDFUL MARKETS

Our definition is the most comprehensive in the industry, as it encompasses everything from the invention of our products to their use in application and industry.

How Fluoropolymers Are Made

PFAS, or poly-fluoroalkyl substances, are a large and diverse family of chemistries that contain carbon-fluorine bonds, the strongest chemical bonds in organic chemistry. **Fluoropolymers, a specific class of PFAS, possess a unique and vital combination of properties** that allow them to withstand the most challenging and high-stress conditions.



Fluoropolymers can be manufactured using specialty ingredients called **polymerization aids**, which help reduce surface tension to make polymers grow larger. **Whatever polymerization technology is being used, state-of-the-art emissions control technologies are required because fluorinated byproducts will be created regardless of the process or surfactant used.**

We Know Water Abatement

State-of-the-art technologies for Fluorinated Organic Compound (FOC) reduction are used to process millions of gallons of water each day



Fayetteville – Cape Fear River Barrier Wall

WHAT

\$400+M invested in an underground barrier wall adjacent to the Cape Fear River for groundwater abatement that spans over one mile (≈ 1.6 km), extending as deep as 100 feet (≈ 30.5 m) sub-surface

HOW

The barrier wall works in conjunction with a state-of-the-art groundwater extraction and treatment system

RESULT

>99% of captured PFAS compounds removed, significantly reducing the amount of PFAS compounds reaching the river



We Know Air Abatement

State-of-the-art abatement technologies, including thermal oxidizers, adsorption, fugitive emission detection and controls, and treatment of dilute vapor streams containing low-boiling compounds, reduce FOC and greenhouse gas emissions.



Dordrecht – Sequoia

WHAT

\$75 million invested in abatement technologies including air abatement

HOW

Air streams are captured and routed to activated carbon filtration

RESULT

Reduces emission of HFPO-DA and its salts to the air by more than 99%



We Know Polymerization Aids & Surfactants

Non-fluorinated polymerization aids/surfactants (NFPA/NFS) are not the solution to sustainability needs—nor is removing NFPA/NFS from the process altogether. This is because regardless of what surfactant or process is used in the manufacture of fluoropolymers, fluorinated byproducts are created and need to be abated.



PTFE with fluorinated and non-fluorinated surfactants

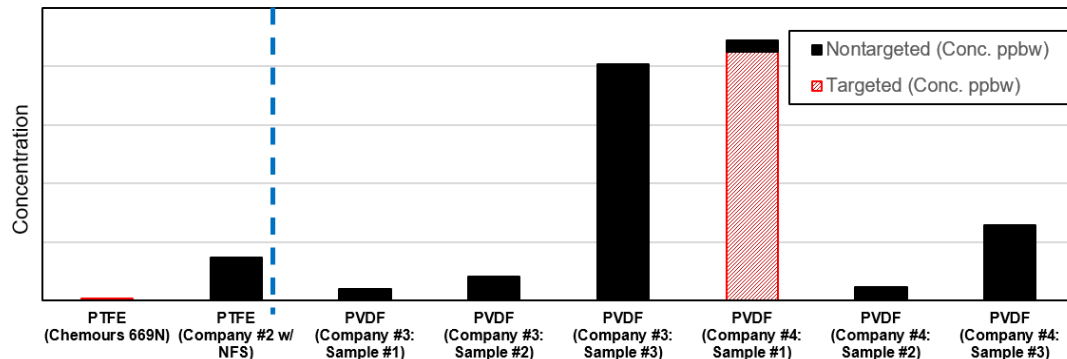
Using fluorinated polymerization aids:

Less than 150 ppb of detectable emissions & residues, mainly from FPA itself

Using NFS:

Generates several other sub-families of non-polymeric PFAS due to interaction between the NFS and the monomers, leading to 2,600-2,700 ppb of residue – significantly higher than when using FPA.

Comparison of Per- and Poly-fluorinated Residuals between Products



*Concentrations of nontargeted residuals are estimated through external calibration to a spiked reference standards.

**Some PVDF grades above are claimed to be produced without fluorinated surfactants

Industry Commits to Responsible Manufacturing

Fluoropolymer manufacturers in Europe have committed to the highest standards for manufacturing worldwide



Platform to promote and adopt state-of-the-art technologies to minimize non-polymeric PFAS emissions in manufacturing.



Minimize emissions of non-polymeric PFAS residues from polymerization aids.



Inform downstream users of fluoropolymers on their safe handling.



[Fluoropolymer Product Group](#)

Competing companies sharing innovation power to bring real solutions to real challenges that no one single company can solve on their own.



Avoiding Regrettable Substitution and Considerations When Evaluating Alternatives



Lack of Equivalent Alternatives to Fluoropolymers



C-F Bond characteristics: strongest bond of organic chemistry

- There is limit to science and we need to recognize that no one will find something as good as C-F bond, and certainly not a new stable element in Periodic table
- C-F bond is unique because it creates a unique mixture properties: can make it without one but not if you need all of them

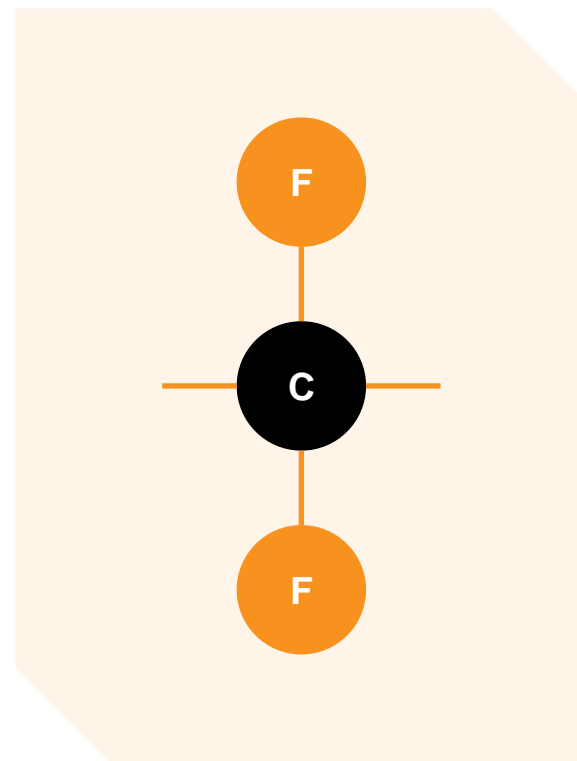


The same combination of properties does not exist with not-in-kind competitive polymers



There are places, applications where, if one accept compromise on one or several properties, then one can claim about alternative being good enough, but unlikely to be at the same level

- But then there might also be a risk of becoming less competitive because of lower performance
- Risk of early failure, contamination, higher costs, lower safety, etc...



Alternative Assessment and Risk of Going Too Fast



Holistic environmental impact analysis to compare alternatives should be provided, otherwise there is a risk of regrettable substitution

- Alternatives will likely have to be very resistant to temperature and chemicals and therefore, will highly likely be also persistent
- Alternatives, if relatively new, might not get the same experience/background of risk data and therefore, we should ensure no shortcut are made
- Alternatives should be also assessed for their entire life cycle, like what is claimed to be the reason to ban Fluoropolymers. Otherwise, why wouldn't it become a regrettable substitution that authorities want to avoid with a total PFAS ban



Risk of going too fast with Alternatives

- Industries that initially claim alternatives exist and agree to a compromise **will not receive derogation**. If, after 2-3 years, **they find the compromises unsustainable**, they will not be **able to reverse the regulations or request a derogation/exemption at that point**.

Need Harmonized Messages



Need the industry to have harmonized messages on needs of fluoropolymers vs. effort to move to alternatives NIK

- Fluoropolymers are used as key enablers in basically all fundamental industries and even when non-in-kind alternatives are promoted, they are very likely to depend upon Fluoropolymers (for example **Silicone**, which depend upon **Chloro-Alkali** industry, which depend upon Fluoropolymers membranes like **Nafion™**)
- Industry, by supporting the speech of looking for alternatives to Fluoropolymers, does not have a coherent approach to the fact that Fluoropolymers are different kind of PFAS, and can be regulated differently, and with more proportionated initiatives, rather than a total ban
- The consequence of deteriorating the image of Fluoropolymers industry can be highly negative for downstream industries which will continue to depend upon Fluoropolymers (supply, suppliers offer, etc...)



RECAP & SUMMARY

How We Help Your Company
to be More Competitive and
Sustainable



Recap & Summary

Fluoropolymers
are **safe** and
necessary for
societal
advancement.

Chemours offerings help you to be more competitive
AND sustainable

Higher-
performance
products

Fluoropolymers
technical
knowledge and
expertise

Regulatory
preparedness
and industry-
leading
advocacy

State-of-the-art
responsible
manufacturing
technologies
and
performance

Lower carbon
footprint

Chemours already employs a holistic, scientific approach to responsible manufacturing and can help lead the industry toward cleaner, safer fluoropolymer production.

Thank You!

