



Deutsche Umwelthilfe



Evaluation and impact assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gases. Written response to “Briefing paper for stakeholder workshop: Preliminary findings 6 May 2021”

Preliminary findings of the evaluation and impact assessment for amending the EU F-Gas Regulation were presented and discussed in a stakeholder workshop on 6 May 2021. This briefing collates the comments and requests for further evaluation by civil society organisations that are listed at the end of the briefing.

Performance of the Regulation to Date – Comments on Key Findings

General Comments - In response to the conclusion in the Briefing paper that the “Regulation has been mostly effective in meeting its original objectives”, we note the illegal HFC trade has not been adequately considered. Although difficult to quantify, it is clear that illegal HFC trade has been occurring at significant levels since 2018.

For example, EIA’s analysis of 2018 customs data suggests that as much as 16.3 million tonnes carbon dioxide equivalent (MtCO_{2e}) of bulk HFCs were illegally and openly (declared as HFCs at customs) placed on the market in 2018, more than 16% of the quota.¹ In addition, an unquantified amount of HFCs were smuggled under the radar of customs, as indicated by numerous seizures during that year. For example, Bulgarian customs reported 78 separate smuggling attempts between April and December 2018, seizing a total of 2,114.9kg of refrigerant, mainly R134a and R404A.² The EFCTC estimated that in 2019, up to a maximum of 31 MtCO_{2e} could have entered through EU borders illegally.

We also note that POM and use prohibitions were implemented successfully and have been observed to be effective. According to the briefing: “*This partly related to the fact that prohibitions have been easily understood by industry and end-users.*” At the same time, there is continued unnecessary use of high-GWP F-gases in some sectors. This speaks to the need for additional Annex 3 prohibitions in those sectors that were not covered or were inadequately covered in the 2014 Regulation.

Exempted gases - We are concerned that the CO_{2e} quantity of HFCs used for MDIs increased by about 45% over 2016-19 and would like to see additional data to better understand the nature of the use of gases exempted from the phase-down. We request that the consultants provide a detailed analysis of the use of exempted gases since the start of the F-Gas Regulation (weights and types of HFCs and HFC blends on an annual basis, delineated by type of exemption).

We also request that the consultants investigate whether it is possible that HFCs being imported under exemptions, in particular the MDI exemption, are being diverted to illegal uses. This

would require an analysis of exemption-related HFC trade and placing-on-the-market and reported exemption uses of HFCs.

HFC Prices – The Briefing paper states that most of the costs were due to increased gas prices, but these are distributed over a large number of end users and are offset by profits in the HFC supply chain. As noted by participants to the stakeholder workshop, there was a significant increase in HFC prices in 2018 which potentially brought large profits to HFC producers and quota holders.

We would like to see additional analysis of the impacts of HFC price increases at the various levels of the refrigerant supply chain since the entering into force of the F-Gas Regulation, including an estimation of the windfall profits to the main quota holders and refrigerant producers.

Unsaturated HFCs (HFOs) - The Briefing paper notes that for a few replacement substances there may be undesirable environmental effects that require further monitoring. According to the Briefing paper: "This relates to the generation of environmentally persistent and accumulative trifluoroacetic acid (TFA) as a breakdown product of unsaturated HFCs in the atmosphere and its subsequent accumulation in the aqueous environment." We request that the evaluation further examines the current and future impact of HFOs and HCFOs across all sectors in which they are used, including consideration of the full lifecycle of the chemicals and the feedstocks used for their production.

HCFC-22 is used as a feedstock in the production pathway of many HFCs including HFOs. This includes, for example, HFC-1234yf of which 10,294 tonnes were supplied to the EU market in 2019.³ HCFC-22 production results in by-production of HFC-23 with a GWP₁₀₀ of 12,400. Through various legislative (including the Kigali Amendment) and voluntary decrees, HCFC-22 manufacturers are encouraged to collect and destroy HFC-23. However, a 2020 paper published in Nature reported on atmospheric measurements of HFC-23 which indicated emissions in 2017 were at an all-time high of 15.9 Gg/yr.⁴

Together, China and India represent 73% of reported global HCFC-22 production. Based on the pledged reductions from China and India, researchers expected emissions to be in the region of 2.4 Gg/yr by 2017, with China's reductions accounting for the majority of the expected reduction of 17.1 Gg/yr in 2017 (15.2 Gg from China, 1.9 Gg from India). According to China's monitoring and verification reports, China reported that 98% of HFC-23 production in 2017 was incinerated, implying emissions were under 300 tonnes. India has not reported on HFC-23 emission rates, however in 2016 an order from India's Ministry of Environment, Forest & Climate Change asked industries to "urgently and immediately" destroy HFC-23.⁵ India has repeatedly referred to the commitment at the Montreal Protocol.

It therefore seems likely that HFC-23 by-product emissions are being misreported, or there are new sources of HFC-23 emissions, or there is a combination of the two. A preprint article posted on researchsquare.com describes how CF₃CHO (HFO-1234ze) ultimately decomposes partially into HFC-23 in the atmosphere and suggests that the production of HFOs might be partially responsible for the observed increase in atmospheric HFC-23.⁶

Very high-GWP HFCs - The evaluation should supply clear data on the continued use and supply of all very high-GWP HFCs and HFC blends (e.g. above GWP 2000), including HFC-404A and HFC-23. The data should indicate the sub-sector in which the high-GWP HFCs are being used. For example, the 2020 EEA reports a supply of 45 tonnes of HFC-23 in 2019. We would like

to understand which subsectors continue to use significant quantities of this climate super-pollutant.

It is important that the evaluation covers the use of HFC blends. Data reported by the EEA does not supply data on HFC blends, therefore it is difficult to understand the implications of continued high consumption of (for example) HFC-125, which is used in multiple blends which are used for multiple purposes.

Specifically with respect to HFC-404A, we would like the consultants to model the impact of the servicing ban (Article 13(3)) and the POM bans on high-GWP HFCs in refrigeration equipment and present scenarios for future use and emissions of HFC-404A by sub-sector.

Objectives and envisaged policy options for amending the Regulation

In response to the list of policy options for further assessment of impacts outlined in Table 7, we have the following comments and recommendations:

Raising ambition in line with the European Green Deal and alignment with the Montreal Protocol

The need for more ambition from the F-Gas Regulation is very clear, in the context of the European Green Deal and the 2030 and 2050 climate targets (Fit for 55 upcoming legislative package and the European Climate Law). Therefore, the EU should be striving to ensure ongoing EU leadership on this issue at international level, starting with an ambitious domestic programme. This ambition should be met with clear POM restrictions on HFCs in products and equipment as well as strengthening the phase-down steps and enforcement. We note that phasing-out HFCs is a highly cost-effective way to contribute to meeting climate targets. According to the briefing: "Average emission reduction costs on average €1 / CO₂e tonne, much lower than estimated in the original impact assessment." Alignment with the Montreal Protocol should consider that the Kigali Amendment will need to be strengthened in the relatively near future in order to meet global net-zero targets.

It is also important that the Regulation is updated to align it with the other EU Green Deal objectives, namely the Zero Pollution action plan⁷ and Biodiversity protection. The Regulation must also be brought in line with the Do No Significant Harm (DNSH) principle as enshrined in the Taxonomy for Sustainable Finance. The European Commission will be working on a PFAS strategy within the Sustainable Chemicals Strategy and the F-Gas Regulation should take stock of the provisions included there.

Increasing HFC phase-down ambition

- **A1** - HFC phase-down ambition – we support strengthening of the phase-down steps before and after 2030, including as early as 2024.
- **B2** – Remove MDI and semiconductor manufacturing exemption from the phase-down. We request that all exemptions are reviewed with a view to removing the exemption at the earliest date possible.
- **B3** - We request the impact assessment to consider an HFC production phase-down that mirrors the EU consumption phase-down, not the slower production phase-down

mandated by the Kigali Amendment, which otherwise leaves a surplus of production at a global level.

- **B5** - We request that the prohibition for exports of bulk HFCs from the EU to any country not party to the Kigali Amendment as of 2033 is brought forward to 2028, since this is the latest date for the first control obligation of any Party to the Montreal Protocol.

Prohibiting F-gases in products or equipment

The impact assessment should consider all POM equipment prohibitions (including HFCs, PFCs/PFC blends, SF₆) that are potentially technically feasible according to the maximum substitution scenario in Table 7. We therefore request that new POM prohibitions are considered for: small and large industrial refrigeration systems; all stationary air-conditioning and heat pump sectors (large split AC, VRF, rooftop units, small and large heat pumps); and chillers.

In considering all POM prohibitions, we request that the impact assessment considers the lowest possible GWP limits according to the maximum substitution scenario (i.e. as low as 5), rather than limiting only to GWP 150.

We support the policy measures suggested in Table 7 of the briefing, and request that additional POM prohibitions and adjustments to the policy measures are considered, including:

- **Condensing Units.** Condensing units are not included in Table 7. The impact assessment should consider a new POM prohibition for condensing units containing HFCs with GWP >5, given the availability of energy efficient condensing units using carbon dioxide, propane and propene already on European market.
- **Stationary Refrigeration.** The list of policy options includes the option to remove the exemption for stationary refrigeration below -50°C. We note that the proposed policy would allow the use of recycled or reclaimed HFCs with a GWP of 2500 or more. We do not support this continued exemption for recycled or reclaimed HFCs given the lifetime of the equipment, the impact of these high-GWP emissions and the limited supply over the medium term of recycled/reclaimed high-GWP HFCs. This exemption would merely perpetuate the use of very high-GWP refrigerants.
- **Multipack centralised refrigeration systems.** We request that the impact assessment considers strengthening the POM prohibition on centralised systems in line with the maximum substitution scenario, i.e. to remove the exemption for centralised refrigeration systems with a rated capacity of less than 40kW and to remove the exemption which allows the use of fluorinated gases with a GWP of <1500 in the primary circuit of cascade systems.
- **Servicing and maintenance of refrigeration equipment.** We support the policy to remove the exemption for servicing and maintenance of refrigeration equipment. We request that in addition the impact assessment considers bringing forward the end date of the exemption for reclaimed and recycled F-gases from 2030 to 2024.
- **Electrical switchgear.** We welcome the new POM prohibition for electrical switchgear but request further elaboration on what evidence could be required to “show that no other suitable alternative is available on technical grounds” to avoid the creation of a possible loophole. Given that “the majority of the SF₆ demand is intended for export in equipment, but manufacturing emissions occur already within the EU”, we would welcome additional policy options to reduce emissions from EU production as well as EU consumption of equipment containing SF₆. Furthermore, the maximum substitution scenario should assume a replacement of SF₆ in switchgear with lower-GWP alternatives for export as well. Together with switchgear, other electrical equipment (gas

insulated lines, bushings, instrument transformers) which use SF₆ as an insulator should be included in the POM prohibitions.

- **Transport refrigeration.** We request that a maximum substitution scenario analysis for transport refrigeration is added to Table 10, showing uptake of low-GWP alternatives including CO₂ and cryogenic liquid nitrogen. Emissions from transport refrigeration systems can account for as much as 40 per cent of a vehicle's total emissions – both from high leakage rates and the continued use of high GWP HFC-404A.
- **Apply requirements for prevention of F-gas emissions to substances listed in Annex II.** We request that this provision is also applied to other by-products and fugitive emissions during the manufacturing process. F-gases and ODS are produced in significant quantities in chemical plants throughout the EU.⁸ In 2019, 178,316 tonnes of ODS were produced, mostly HCFCs, CTC and TCA, primarily for feedstock use inside the EU (85%).⁹ Other than the well-known example of HFC-23 by-product, there are few restrictions on the reporting or release of by-product and fugitive emissions, despite the fact that emissions can be significant.¹⁰ Neither the F-Gas Regulation nor the ODS Regulation regulate by-product or fugitive emissions of F-gases and ODS at chemical plants in the EU, other than through Article 7. As a result, the EU is unable to monitor and mitigate emissions of these gases effectively, many of which are super greenhouse gases and associated with other environmental impacts. The impact assessment should consider policy measures to limit fugitive and by-product emissions from the production of HFCs, including from feedstocks, in particular by setting out reporting and monitoring obligations and other measures to ensure that production is carried out under strictly controlled conditions and destruction efficiencies are in line with the best available techniques (*e.g.* at least 99.9%).

In addition, measures should be considered to monitor and address the environmental risks posed by the breakdown of unsaturated HFCs, including the generation of trifluoroacetic acid, TFA.

Improving implementation and enforcement

With respect to the policy measures envisaged in Table 9, we request the following additions and amendments.

Detailed rules to empower customs/surveillance authorities and facilitate use of Single Window Environment for Customs (C2)

- Include minimum penalties for non-compliance. Minimum penalties should be based on a multiplier of the value of HFC seizures and be levied by the Commission, in addition to requiring criminal sanctions for specific violations in Member States.
- Treatment of products and equipment illegally placed on the market and illegal containers. We request that a fund to financially support destruction of seized HFCs is considered.

Strengthen obligations of economic operators to prevent illegal trade (C3)

- With respect to limitations for transit (T1) and similar procedures, we request that transit is included in the Single Window Environment for Customs. We also support the inclusion of designated ports of entry into EU and Transit procedure clearance/closure points.

- The impact assessment should consider mandatory authorisation for transporters/handlers of HFCs.
- Strengthen the obligation on destruction of HFC-23 by-production. We support the establishment of a certification framework with full traceability and transparency for HFC-23 by-product destruction and the requirement for producers and importers to report on compliance with this provision in their annual reports. In addition, the EU should only import HFCs from countries that have ratified and are in compliance with the provision on HFC-23 by-product destruction in the Kigali Amendment.¹¹
- EU Market Surveillance Framework - The impact assessment should consider the establishment of an EU market surveillance framework to oversee compliance with the HFC phase-down, setting out specific oversight and obligations, including for online advertisements, illegal advertisements and traceability along the supply chain, among others. The EU market surveillance framework should also promote and ensure cooperation among market surveillance and customs authorities at the national level.

Limit market players to legitimate participants (C4)

- Quota allocation – the suggested policy measure is the “Introduction of a registration and/or quota allocation price”. The impact assessment should look at both options and also quota auctioning.

More comprehensive monitoring (C5)

- We support further assessment of measures aimed at improving due diligence on F-gas supply chain such as mandatory certification and documentation throughout the bulk F-gas supply chain.
- For operators of switchgear and electrical equipment, reporting should extend to all alternatives with GWP >1. Better reporting would give a better estimation of SF₆ emissions given that atmospheric measurements may be underestimated.

Additional Considerations

- Alongside adding flexibility to amend Annex I and II with a delegated act in line with scientific findings, flexibility should be added to amend the GWP figures of F-gases in line with scientific findings. Furthermore, 20-year GWPs should be included alongside 100-year GWPs to better reflect the environmental impact of these substances.
- Extended Producer Responsibility (EPR). The impact assessment should consider the benefit of a policy measure to require the establishment of EPR schemes for HFCs that meet certain minimum requirements, to be detailed in the legislation with further rules adopted via implementing or delegated acts.
- Incentive schemes and Green Public Procurement (GPP). The impact assessment should require member states to improve low-GWP technologies incentive schemes, include low-GWP criteria in energy efficient technologies incentive schemes and to review and revise GPP policies to promote the introduction of alternative technologies.
- Standards. The issue of unjustified barriers for the transition to natural refrigerants posed by safety standards is raised several times by the study. The impact assessment should consider ways to address this problem. The standardisation request SR M/555 was supposed to address this issue in standards, but the barriers still remain. It appears necessary for the Commission to issue a new standardisation request, that can more

precisely target this issue and remove the barriers, such as in EN378. We recommend the consultants to take this into consideration.

- Reporting of data should be strengthened, and thresholds for reporting reduced to a minimum or removed. The Kigali Amendment does not have reporting thresholds. It is important to understand use of Annex II gases, in particular those with concerns over environmental impacts. The use of reclaimed/recycled refrigerants should also be reported, as well as data to support compliance with Article 7 and the Kigali Amendment provision on HFC-23.
- The impact assessment should consider ways of building in a review of HFC uses and policy measures to discourage new uses of HFCs.

24th May 2021

Environmental Investigation Agency (EIA)
Climate Advisers Network
Environmental Coalition on Standards (ECOS)
Environmental Action Germany (Deutsche Umwelthilfe e.V. – DUH)
Legambiente
2Celsius
European Environmental Bureau (EEB)
ECODES
ZERO - Associação Sistema Terrestre Sustentável

For further information, contact clareperry@eia-international.org

References

¹ EIA (2019). Doors Wide Open: Europe's flourishing illegal trade in hydrofluorocarbons (HFCs). Available at: <https://reports.eia-international.org/doorswideopen/>

² See <https://www.coolingpost.com/world-news/polish-f-gas-crackdown-nets-107-tonnes-of-illegal-hfcs/>

³ EEA report Fluorinated greenhouse gases 2020.

⁴ K.M. Stanley et al. (2020). Increase in global emissions of HFC-23 despite near-total expected reductions. NATURE COMMUNICATIONS | (2020) 11:397 | <https://doi.org/10.1038/s41467-019-13899-4> | www.nature.com/naturecommunications

⁵ <https://pubs.acs.org/doi/full/10.1021/cen-09444-govcon004>

⁶ Campbell, J.S., Kable, S.H. & Hausen, C.S. (2021). Photodissociation of CF₃CHO provides a new source of CHF₃ (HFC-23) in the atmosphere: implications for new refrigerants. Available at: <https://www.researchsquare.com/article/rs-199769/v1>

NB: this is a preprint, a preliminary version of a manuscript that has not completed peer review at a journal.

⁷ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'. Available at: https://ec.europa.eu/environment/pdf/zero-pollution-action-plan/communication_en.pdf

⁸ European Environment Agency (2020). *Fluorinated Greenhouse Gases 2020: Data Reported by Companies on the Production, Import, Export and Destruction of Fluorinated Greenhouse Gases in the European Union, 2007-2019* (EEA Report No 15/2020). Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2020>

⁹ European Environmental Agency (2020). *Ozone-Depleting Substances 2020* (webpage). Available at: <https://www.eea.europa.eu/publications/ozone-depleting-substances-2020/2020>

¹⁰ Touchdown Consulting (December 2012). *Feedstocks Uses of ODS: Information Paper on Feedstock Uses of Ozone-Depleting Substances*. Available at: https://ec.europa.eu/clima/sites/clima/files/ozone/docs/feedstock_en.pdf
Proceedings of the National Academy of Sciences of the United States of America (February 2021). *Unexpected Nascent Atmospheric Emissions of Three Ozone-Depleting Hydrochlorofluorocarbons*. Available at: <https://www.pnas.org/content/118/5/e2010914118>

¹¹ Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (Kigali, 15 October 2016), Articles 2J(6) and 5, available at https://treaties2023.un.org/doc/Treaties/2016/10/20161015%2003-23%20PM/Ch_XXVII-2.f.pdf.