



ENVIRONMENTAL
INVESTIGATION
AGENCY

Doors wide open

Europe's flourishing illegal trade in hydrofluorocarbons (HFCs)





ABOUT EIA

We investigate and campaign against environmental crime and abuse.

Our undercover investigations expose transnational wildlife crime, with a focus on elephants, pangolins and tigers, and forest crimes such as illegal logging and deforestation for cash crops like palm oil. We work to safeguard global marine ecosystems by addressing the threats posed by plastic pollution, bycatch and commercial exploitation of whales, dolphins and porpoises. Finally, we reduce the impact of climate change by campaigning to eliminate powerful refrigerant greenhouse gases, exposing related illicit trade and improving energy efficiency in the cooling sector.

OUR CLIMATE WORK

EIA has almost three decades of experience working with international bodies, governments, enforcement agencies and industry to tackle illegal trade in refrigerants. It began in the 1990s when we exposed the illegal trade of chlorofluorocarbons (CFCs) in Europe.

EIA's pioneering investigations shone a light on the illegal trade in Ozone-Depleting Substances (ODS) across the globe. Our exposés and advocacy helped increase awareness of the illegal trade among Parties to the Montreal Protocol on Ozone-Depleting Substances and spur action to curtail it, including through the adoption of ODS licensing systems.

EIA UK

62-63 Upper Street,
London N1 0NY UK
T: +44 (0) 20 7354 7960
E: info@eia-international.org
eia-international.org

Environmental Investigation Agency UK
UK Charity Number: 1182208
Company Number: 7752350
Registered in England and Wales

CONTENTS

Summary	4
HFC customs data analysis	6
EIA industry survey	14
Illegal trade in HFCs	16
Methods of illegal trade	18
Action being taken by EU member states to address illegal trade in HFCs	20
Regulatory Loopholes and Tools to Combat Illegal Trade	22
Conclusions	25
Recommendations	26
References	27

Summary

More than 80% of companies surveyed were aware of or suspected illegal HFC trade and 72% had seen or been offered refrigerants in illegal disposable cylinders.

Hydrofluorocarbons (HFCs) were introduced as replacement chemicals for Ozone-Depleting Substances (ODS), which are being phased out by the Montreal Protocol due to their impact on the ozone layer.

Although HFCs do not deplete the ozone layer, they are potent greenhouse gases, with global warming potentials (GWP) of the commonly used HFCs ranging between 675 and 3,922.¹ In the past two decades, global emissions of HFCs have soared and, in 2015, baseline emissions were predicted to reach 4.0-5.3 billion tonnes of carbon-dioxide equivalence per year (GtCO₂e/year) by 2050.²

Furthermore, as relatively short-lived climate pollutants, their global-warming impact, typically measured over a 100-year time horizon, actually impacts over just a few decades. Given the dire need for urgent emission reductions, cutting HFC use is one of the most effective tools to help prevent runaway climate change.

The need to address HFCs has long been recognised by the European Union (EU). Initially, EU legislation focused on addressing HFC leakage from cooling equipment. In 2014, the EU significantly strengthened the old F-gas Regulation, including an economy-wide phase-down in HFC supply and a number of bans on HFC use in certain equipment and products.³ The new F-gas Regulation aims to cut HFC use by 79% by 2030 over average use during the 2009-12 period. Starting in 2015, it stipulates a step-wise decrease in HFC supply, with major reductions from the

baseline of 37% in 2018 and 45% in 2021. In 2017, in anticipation of the 2018 supply cut, HFC prices skyrocketed.⁴

As early as 2016, and despite huge stockpiling of HFCs in 2014 before the F-gas Regulation came into effect, reports of illegal (non-quota) HFCs in European markets began to emerge. Major HFC producer Honeywell claimed that 10 million tonnes CO₂e of HFCs had been illegally imported in 2015, equivalent to more than 5% of the total allocation.⁵ Such reports have since grown both in frequency and severity, with 2018 witnessing a deluge of reports of illegal HFC use and trade throughout the EU.⁶

In late 2018, EIA conducted two surveys, the first to determine the status of EU member state efforts to comply with the F-gas Regulation and the second to obtain data and views on the illegal trade directly from key industry stakeholders.

This report summarises information from these surveys and presents an analysis of customs and HFC Registry data, which supports claims from prominent industry stakeholders that large quantities of illegal HFC refrigerants are entering the EU market.

Reports from industry indicate that large-scale illegal HFC trade and use is occurring in an absence of effective enforcement by member states. More than 80% of companies surveyed were aware of or suspected illegal HFC trade and 72% had seen or been offered refrigerants in illegal disposable cylinders.

Customs data for 2018 demonstrates that a large number of EU member states significantly increased HFC imports, despite the major HFC supply cut of 37%. EIA's analysis of European customs data indicates that bulk HFC imports in 2018 were too high for compliance with the 2018 quota. If EU-based HFC production and equipment authorisations are assumed to be at 2017 levels, the amount of HFCs placed on the market in 2018 would be 117.5 MtCO₂e, some 16.3 MtCO₂e above the available quota of 101.2 MtCO₂e. This could be characterised as open smuggling of HFCs (i.e. imports openly shipped through customs without quota). In addition, there is clearly some level of cross-border smuggling of HFCs which is under the radar of customs authorities. There are significant discrepancies between Chinese export and European import data that could indicate fraudulent import declarations.

EIA's customs data analysis also indicates an additional 14.8 MtCO₂e were imported in 2017, over and above that reported by companies to the HFC Registry under the F-gas Regulation. The significant discrepancies between EU customs data and HFC Registry data need to be examined further at company, country and EU level.

Given the availability of cheap HFCs outside the EU, it is not surprising that much of the illegal trade is reported to be occurring at EU border countries. The current HFC reporting system does not allow customs authorities

to determine whether or not HFC shipments are within quota and a number of loopholes in the system allow unscrupulous traders to reap quick profits, exploiting a demand for cheap HFCs with little risk of punitive measures.

Illegal trade of HFCs undermines the F-gas Regulation, results in additional HFC emissions that fuel global warming and significantly reduces government income and the profits of legitimate businesses. Continued availability of HFCs outside the HFC phase-down schedule will hinder the uptake of climate-friendly technologies and ultimately threaten the success of the F-gas Regulation and the EU's climate goals. EIA is concerned that the illegal trade, along with stockpiling of HFCs in 2017, has produced a false sense of security in terms of availability of HFCs to meet the phase-down steps from 2018 onwards. Future quota cuts will be difficult to meet unless the transition to low-GWP alternatives is accelerated.

There is an urgent need for all EU member states and the European Commission to immediately improve enforcement of the F-gas Regulation and implement additional measures to accelerate the transition to HFC alternatives.

EIA's analysis of European customs data indicates that bulk HFC imports in 2018 were too high for compliance with the 2018 quota.

Below: ISO tank in transit



HFC customs data analysis

EIA utilised HFC customs data from Europe (Eurostat)⁷ and China (CTI)⁸ to examine trade in bulk HFCs from 2016-18 and to compare EU-reported HFC imports and exports to company reported HFC Registry data presented by the European Environment Agency (EEA).

The analysis is relatively complex due to the range of codes used by the international Harmonised System (HS) and European Combined Nomenclature (CN) system. At the international level (including Chinese customs data), six-digit HS codes 290339 and 382478 are used to cover all HFCs and some other chemicals. HS code 290339 covers fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons, including HFC-32, HFC-23,

HFC-125, HFC-143a, HFC-152a, HFC-134a, HFC-1234yf, HFC-1234ze and other saturated and unsaturated fluorides. HS code 382478 covers mixtures containing perfluorocarbons (PFCs) and HFCs (but not containing CFCs or HCFCs). It includes HFC-507A, HFC-404A, HFC-410A and HFC-407C as well as other HFC and PFC blends.

European trade data adds an additional two numbers to each code, with distinct codes for some widely used HFCs and HFC blends. Therefore the data can more clearly define imports and exports of specific HFCs subject to the HFC phase-down, including on a CO₂e basis (see Table 1).

CN CODE	Chemical name	HFC	Blend components
2903 39 21	Difluoromethane	HFC-32	
2903 39 23	Trifluoromethane	HFC-23	
2903 39 24	Pentafluoroethane and 1,1,1-trifluoroethane	HFC-125, HFC-143A	
2903 39 25	1,1-difluoroethane	HFC-152a	
2903 39 26	1,1,1,2-tetrafluoroethane	HFC-134a	
2903 39 27	Pentafluoropropanes, hexafluoropropanes and heptafluoropropanes	Incl. HFC-245fa, HFC-236fa, HFC-236ea, HFC-227ea	
2903 39 31	2,3,3,3-tetrafluoropropene	HFC-1234yf	
2903 39 35	1,3,3,3-tetrafluoropropene	HFC-1234ze	
2903 39 39	Other unsaturated fluorides	Other HFOs	
3824 78 10	Containing only 1,1,1-trifluoroethane and pentafluoroethane	HFC-507A	HFC-143a/HFC-125
3824 78 20	Containing only 1,1,1-trifluoroethane, pentafluoroethane and 1,1,1,2-tetrafluoroethane	HFC-404A	HFC-142a/HFC-125/HFC-134a
3824 78 30	Containing only difluoromethane and pentafluoroethane	HFC-410A	HFC-32/HFC-125
3824 78 40	Containing only difluoromethane, pentafluoroethane and 1,1,1,2-tetrafluoroethane	HFC-407C	HFC-32/HFC-125/HFC-134a
3824 78 80	Containing unsaturated hydrofluorocarbons	Incl. HFC-448, HFC-450A	

Table 1: EU trade codes for key HFCs and HFC mixtures

Customs data for 2018 indicates significant over-supply of HFCs to the European market

European customs data shows that bulk⁹ HFC imports fell in 2018 compared to 2017 but increased compared to 2016 (See Figure 1). Taking the Global Warming Potential (GWP) of the HFCs based on the CN codes of the imports,¹⁰ EIA estimates that bulk HFC imports in 2018 represented 119.4 MtCO₂e, while exports represented 48.5 MtCO₂e. If the exports are subtracted from the imports, it can be estimated that 70.9 MtCO₂e of HFCs were placed on the market from bulk trade (see Table 2).

The calculation for the amount placed on the market (POM) under the HFC phase-down is essentially bulk HFCs physically placed on the market (import

minus export plus EU production) added to issued authorisations for HFCs contained in imported refrigeration, air-conditioning and heat pump equipment. Exemptions under Article 15(2) (e.g. HFCs used as feedstock, for use in military equipment or metered dose inhalers) are subtracted from the POM, which is all calculated on a CO₂e basis.¹¹

In 2017, HFC production of 49.6 MtCO₂e and authorisations of 11.1 MtCO₂e were reported. In addition, the 2018 quota was reduced by 14.2 MtCO₂e to account for exemptions.* If these values are used as a proxy for 2018 data (which is not available), the estimated quota-relevant POM in 2018 would be 117.5 MtCO₂e. **This is some 16.3 MtCO₂e above the 2018 available quota of 101.2 MtCO₂e.**

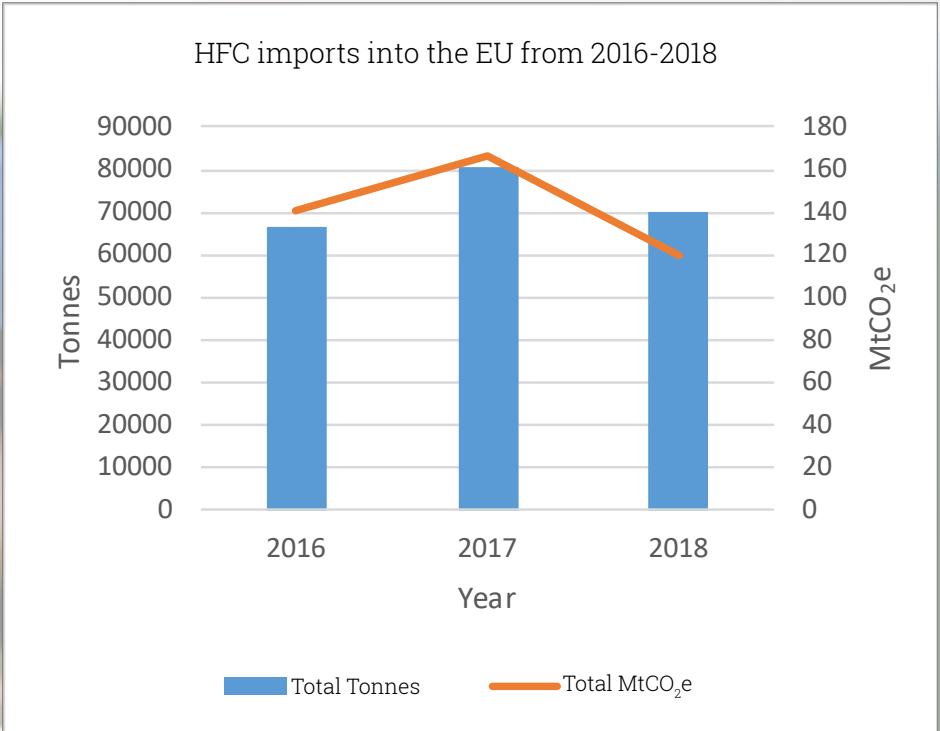


Figure 1: HFC imports into the EU from 2016-2018 according to European customs data

Year	Tonnes			MtCO ₂ e		
	HFC imports	HFC exports	Imports minus Exports	HFC imports	HFC exports	Imports minus Exports
2016	66,405	24,144	42,261	140.78	44.26	96.51
2017	80,440	24,321	56,119	166.58	47.91	118.68
2018	69,988	24,348	45,640	119.42	48.47	70.95

Table 2: 2016-18 import and export of HFCs according to European customs data

*based on the amount subtracted from the baseline in order to calculate the 2018 quota of 101.2 MtCO₂e, as per Annex 5 of the F-Gas Regulation. Discussions with industry suggest that exemptions may be as high as 17 MtCO₂e, however there is no available data to confirm this.

HFC imports country by country

The overall reduction in 2018 imports (See Figure 1) is primarily due to a reduction in reported imports to the Netherlands, the largest importing country in the EU. There is, however, a worrying trend of significantly increased imports over 2016-18 in a number of countries that could indicate illegal trade hotspots. For example, imports of HFCs in 2018 were more than 100% higher than 2016 imports in Austria, Belgium, Denmark, Greece, Ireland, Latvia, Malta, Poland, Portugal, Romania and Sweden (See Figure 2).

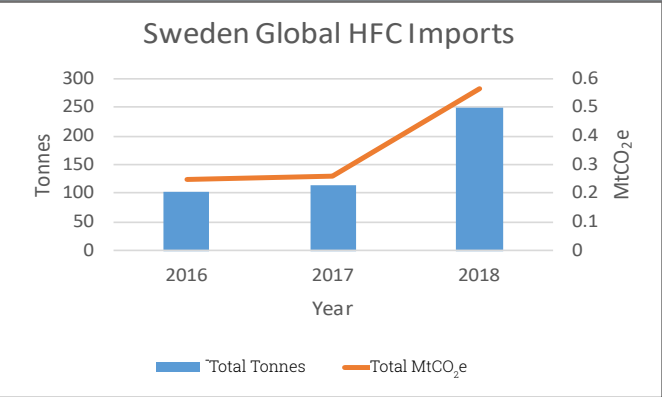
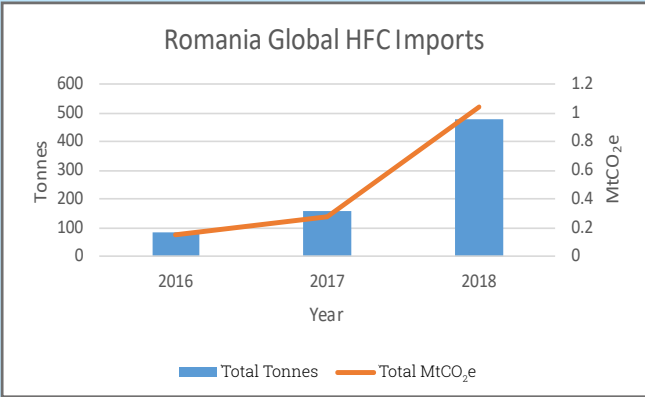
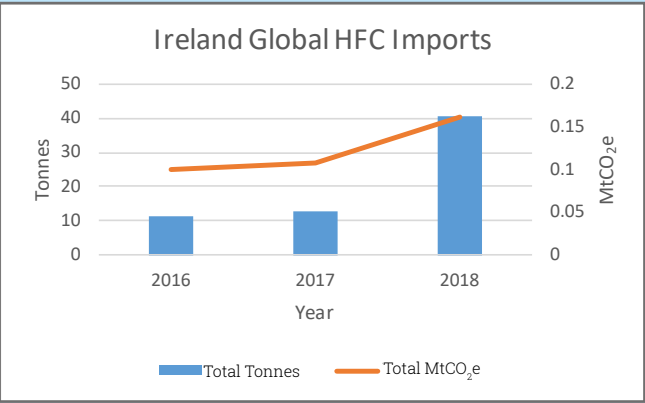
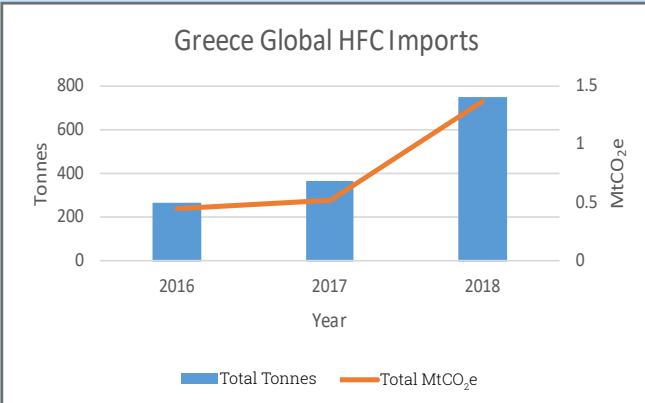
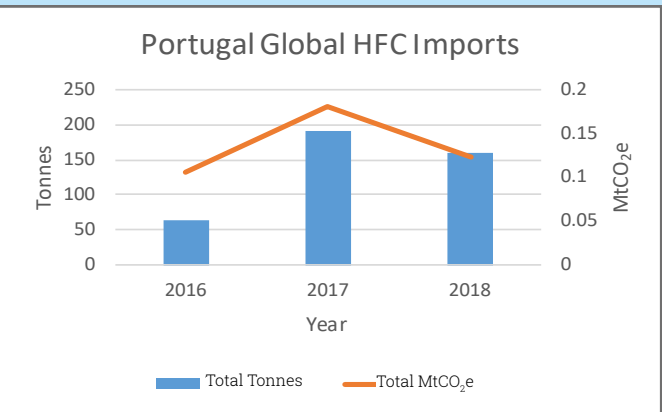
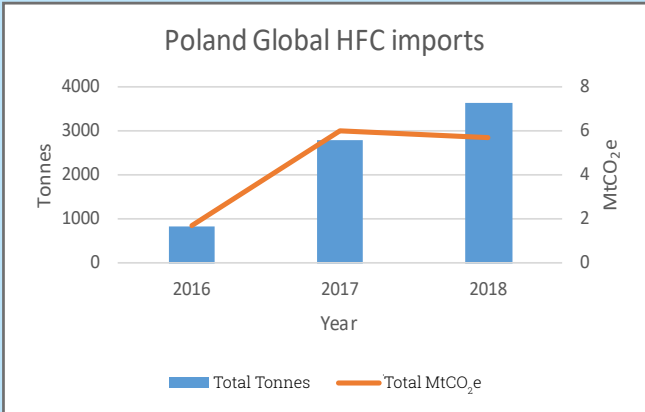
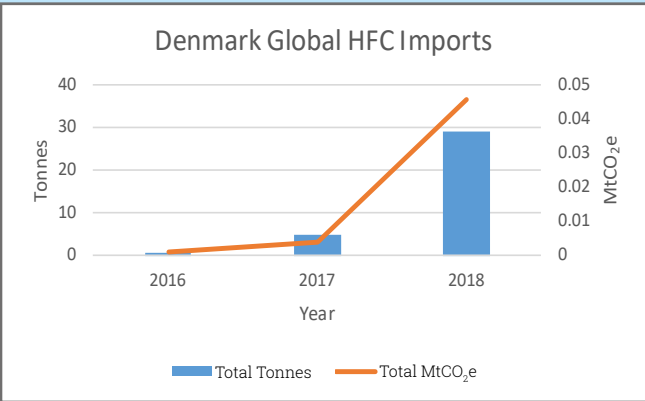
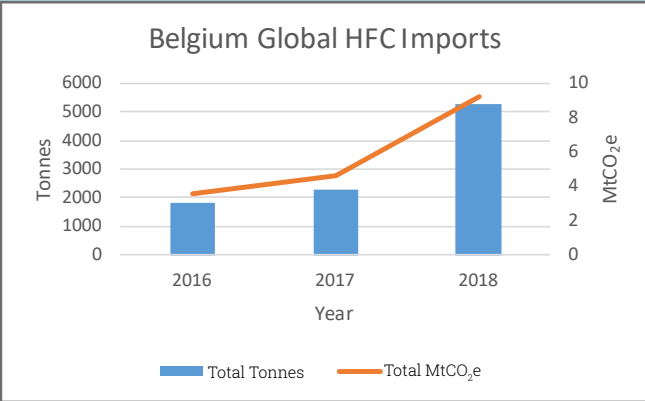
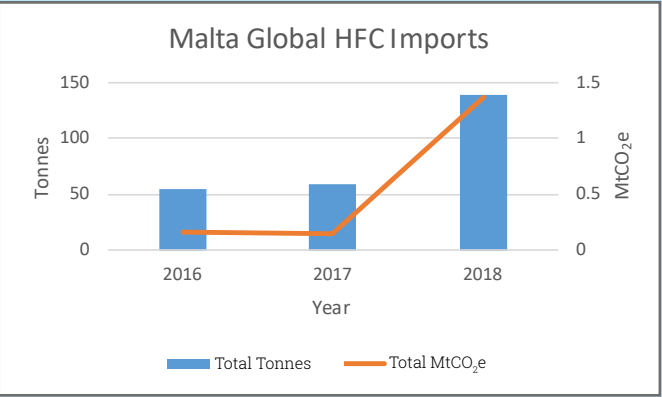
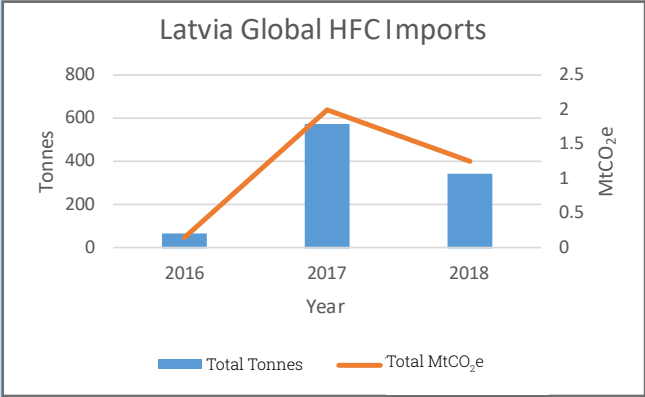
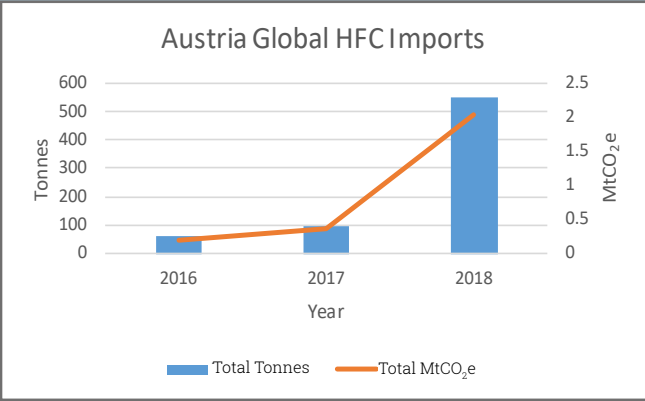


Figure 2: HFC imports from 2016-18 according to European customs data

Calculated on a CO₂e basis, in 2017 European customs data indicates HFC imports of 166.6 MtCO₂e, 12.1 MtCO₂e higher than the HFC Registry data (see Table 3).



Comparison of customs data with reported data

The EEA produces an annual report on HFC data reported by companies to the HFC Registry according to the requirements of the F-gas Regulation. The latest EEA report analysed 2017 reported data, concluding that the HFC phase-down is operating within quota, although EU-wide bulk POM of HFCs increased from 2016 to 2017, from 159.1 MtCO₂e to 166.6 MtCO₂e. This was just 0.4% below the 2017 quota limit (170.3 MtCO₂e) compared to previous years where POM was 4-6% below the limit.¹²

Although a few cases of quota exceedance were reported in 2017, both by importers of bulk HFCs and equipment importers, these were balanced by companies that did not fully use their quotas.

Import Data

EIA compared 2016 and 2017 bulk import data according to HFC Registry data (presented by the EEA) and European customs data. For European customs data, EIA excluded HFCs and PFCs that do not fall within the quota (i.e. HFOs and PFCs).

Both HFC Registry and European customs data show a more than 10% increase in bulk imports, on a tonnage and CO₂e basis, from 2016-17, suggesting stockpiling (see Table 3). In fact, according to HFC Registry data, bulk HFC imports on a CO₂e basis in 2017 were the highest level in 10 years, other than in 2014 when significant HFC stockpiling took place. European customs data indicates that the increased imports come from China as opposed to the second largest trading partner, the USA.¹³

According to European customs data, 2016 bulk imports were lower than those reported to the HFC Registry by 2,557 tonnes, while in 2017 the imports according to the European customs data are higher by 728 tonnes. However, if the CO₂e of the imports are calculated, based on the GWPs of the reported CN codes, the discrepancy between the two sets of data is much higher in 2017 than in 2016. **Calculated on a CO₂e basis, in 2017 European customs data indicates HFC imports of 166.6 MtCO₂e, 12.1 MtCO₂e higher than the HFC Registry data** (see Table 3).

Year	HFC imports (tonnes)			HFC imports (MtCO ₂ e)		
	HFC registry	European customs	Difference	HFC registry	European customs	Difference
2016	68,962	66,405	-2,557	142.2	140.8	-1.4
2017	79,712	80,440	728	154.5	166.6	12.1

Table 3: Comparison between HFC Registry and European customs bulk HFC import data

Export Data

Since an increase in HFC imports might be balanced by an increase in HFC exports, EIA also examined European export statistics, comparing them to HFC Registry data.

The export data shows a larger discrepancy between HFC Registry data and European customs data than the import data. European customs data shows significantly lower exports in 2016 and 2017 than data reported to the HFC Registry (see Table 4). In 2017, European customs data reports 24,321 tonnes of HFCs exported from the EU, compared to 29,120 tonnes reported to the HFC Registry. If CO₂e exports are calculated according to the CN codes, the data indicates that only 47.9 MtCO₂e HFCs were exported in 2017, while companies reported exports of 50.6 MtCO₂e to the HFC Registry, a difference of 2.7 MtCO₂e.

Taking the import and export data together, the European customs data indicates that a significantly higher amount of HFCs (5,527 tonnes) was placed on the European market in 2017 than was reported to the HFC Registry. In CO₂e terms, the discrepancy is 14.8 MtCO₂e, equivalent to 8.7% of the total quota (see Table 5).

There are a number of possible explanations for these discrepancies, including:

- incorrect CN codes have been used for imports or exports
- companies not registered to the HFC Registry are importing significant quantities of high-GWP HFCs
- registered companies have misreported import data to the HFC Registry (e.g. reported high-GWP imports as lower-GWP)
- registered companies have misreported export data to the HFC Registry (e.g. reported exports but actually sold the HFCs on the European market)

• a large number of small imports of 100 tCO₂e or less (which are exempt from the phase-down) account for at least part of the 728 tonne import discrepancy. This seems unlikely since the average GWP of the 728 tonnes of HFCs would have to be over 16,500 to account for the 12.1 MtCO₂e discrepancy. In addition, according to the EEA, some companies importing amounts under 100 tCO₂e still report to the HFC Registry.

Given that reports to the HFC Registry are self-declared (only companies importing over 10,000 tCO₂e are subject to audit) and there is limited or no cross-checking with customs data, there is great potential for manipulation of HFC Registry reported data. **EIA is concerned at the discrepancy between European customs and HFC Registry data of 14.8 MtCO₂e, which represents approximately 8.7% of the 2017 quota.**

Year	HFC exports (tonnes)			HFC exports (MtCO ₂ e)		
	HFC registry	European customs	Difference	HFC registry	European customs	Difference
2016	27,414	24,144	-3,270	50.7	44.3	-6.4
2017	29,120	24,321	-4,799	50.6	47.9	-2.7

Table 4: Comparison between HFC Registry and European customs HFC export data.

Year	Imports minus exports (tonnes)			Imports minus exports (MtCO ₂ e)		
	HFC registry	European customs	Difference	HFC registry	European customs	Difference
2016	41,548	42,261	713	91.5	96.5	5.0
2017	50,592	56,119	5,527	103.9	118.7	14.8

Table 5: Difference between HFC Registry and European customs import/export combined data

Chinese customs data highlights further inconsistencies

A comparison of European customs import data (import of CN codes included in HS codes 290339 and 382478 from China) with Chinese customs export data (export of HS codes 290339 and 382478 to the EU) during 2016-17 reveals additional variations, with the Chinese data consistently higher. According to European customs import data, 51,858 tonnes of HFCs were imported from China to the EU in 2016 and 67,820 tonnes in 2017, whereas Chinese customs export data puts these figures at 57,753 and 70,023 tonnes, a difference of 5,895 and 2,203 tonnes respectively (see Table 6).

	2016	2017
EU HFC imports from China (tonnes) – European customs data	51,858	67,820
Chinese HFC exports to EU (tonnes) – Chinese customs data	57,753	70,023
Difference between European and Chinese customs data (tonnes)	5,895	2,203
Percentage difference between European customs and Chinese customs data	10.2%	3.2%

Table 6: Comparison between European customs import data and Chinese customs export data

If the average GWP of 2016 bulk imports is assumed to be 2,062, as per HFC Registry data reported by the EEA, the additional 5,895 tonnes of HFC imports would equate to 12.2 MtCO₂e, equivalent to more than 7% of the 170.3 MtCO₂e quota allocation for the year.

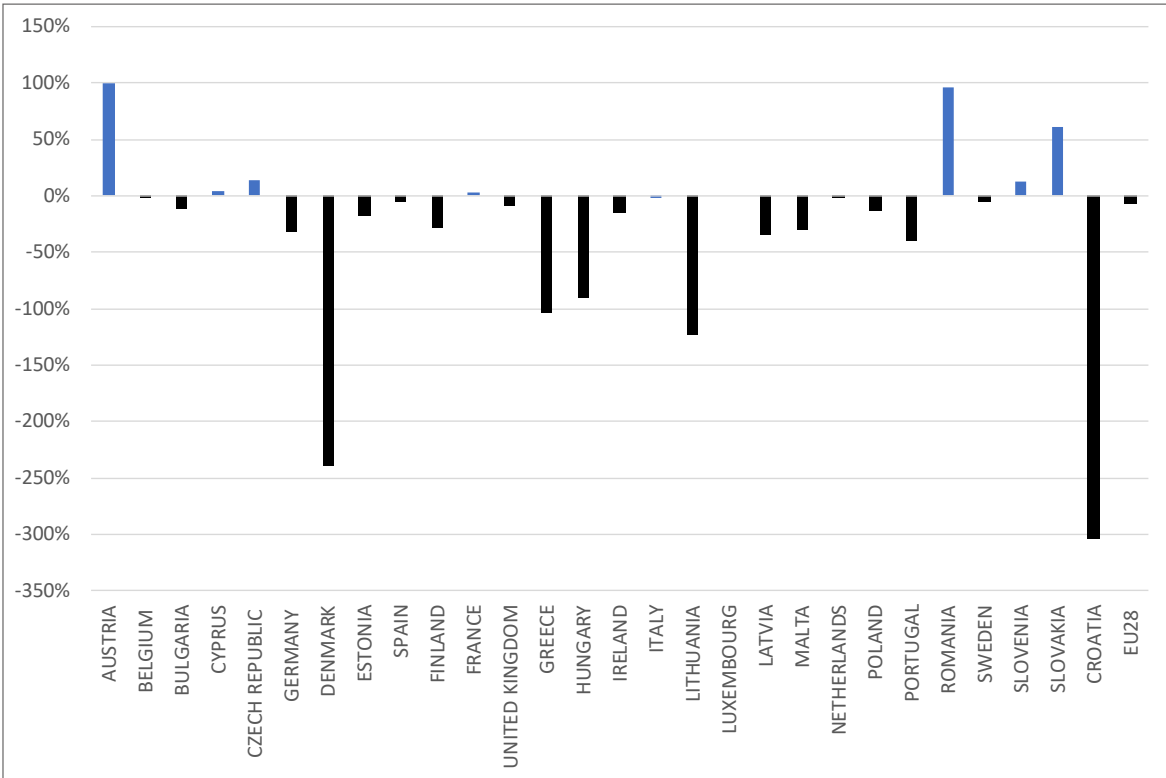


Figure 3: European customs import data compared to Chinese customs export data as a percentage of European import data for 2016 and 2017 combined.

If the average GWP of 2017 bulk imports is assumed to be 1,938, as per HFC Registry data reported by the EEA, the additional 2,203 tonnes in 2017 imported into the EU would equate to 4.3 MtCO₂e, equivalent to an additional 2.5% of the quota.

EIA acknowledges the need for caution in drawing conclusions from EU and Chinese customs data comparisons. For example, discrepancies may potentially be explained by time lag between export and import or where the exporter has incorrectly assigned a transit country as the final destination point. However, the trade discrepancies are quite pronounced in some specific countries and bear further examination. Over the 2016-17 period, Chinese export data was more than 100% higher than European import data in Denmark (238%), Greece (104%), Lithuania (123%) and Croatia (304%) (see Figure 3). Luxembourg is another outlier; Chinese trade data shows an export of 3,000kg to Luxembourg in 2017, but European customs data has zero imports during 2016 or 2017 (for this reason it was excluded from the graph).

Other notable discrepancies include Latvia, which in 2017 imported 16.1 tonnes of pure HFCs (HS code 290339) according to European customs data and 245 tonnes according to Chinese customs data. Similarly, Malta imported 3.8 tonnes of pure HFCs in 2017 according to European customs data but 31.3 tonnes according to Chinese customs data. These discrepancies could be an indication of undeclared or mis-declared imports and illegal trade.

2017 stockpiling

It is also clear from the HFC Registry data, customs data and 2018 HFC price signals (see Box) that significant stockpiling took place in 2017 in preparation for the 2018 cut. Bulk HFC imports to the EU as a whole were 21% higher in 2017 than in 2016.¹⁴ The customs data shows a significant spike (more than 200%) in 2017 imports in Denmark, Latvia and Poland over 2016. The increase in imports to Poland is also supported by the significant increase in Polish companies reporting imports. In 2015, 27 companies reported bulk imports; this rose to 53 in 2016 and 181 in 2017, far higher than any other EU country.¹⁵

The EEA report (based on HFC Registry data) also notes that there is a reserve of quota authorisations (i.e. authorisations for placing HFC-containing equipment on the market) built up by equipment importers during 2015 and 2016. The reserve was partially used up in 2017, the first year that imports of HFC-containing equipment had to be covered by the phase-down. It is currently almost twice the amount of actual annual equipment imports,¹⁶ therefore a reasonable assumption is that the reserve will be fully used up for equipment imports in 2018 and 2019.

EIA is concerned that stockpiling of bulk HFCs in 2017, the reserves of authorisations and illegal imports have created a false sense of security in terms of the supply of HFCs from 2018 onwards. Given the steep cut in supply in 2018, future stockpiling will not be possible and a further cut in 2021 is likely to be difficult to achieve unless a faster transition to low-GWP alternatives is achieved.



HFC prices

HFC prices have been closely monitored by Öko-Recherche on behalf of the European Commission since the start of the F-gas Regulation. The data include prices reported by 25 service companies (in Estonia, France, Germany, Italy, Portugal and Spain) and 23 Original Equipment Manufacturers (OEMs).¹⁷



HFC prices in Europe began seriously rising in 2017 in anticipation of the 2018 HFC quota cut. By the second quarter of 2018, the price of HFC-410A was 859% higher for OEMs and 833% higher for service companies than in 2014. Similar price hikes have been seen for other HFCs, with the highest price increases for those HFCs with the highest GWP (e.g. HFC-404A).

According to the latest Öko-Recherche report, prices in 2018 have flattened out to a large extent and demand for refrigerants, despite the large quota cut, was said to be low.¹⁸ Potential reasons for this given in the report include stockpiling in previous quarters (i.e. in 2017), increased care in handling refrigerants, reduced demand due to transitions to lower GWP technologies and possible illegal trade in refrigerants.

HFC-404A prices in particular dropped in 2018; after reaching a high of 1,190% of the 2014 baseline in quarter one, prices paid by service companies dropped in the next two quarters to 1,042%. Companies indicated that large HFC-404A quantities were available on the market, due to large quantities stockpiled in 2014, virgin quantities supplied at low prices (i.e. illegal trade) and reclaimed quantities.

EIA industry survey

In September and October 2018, EIA sent a questionnaire to a range of heating, ventilation, air-conditioning and refrigeration (HVACR) representatives, including industry associations, refrigerant suppliers and contractor associations. The survey requested information on refrigerant prices, the scale and severity of illegal HFC use, potential drivers of illegal trade, awareness of current penalty regimes in member states and recommendations for improving enforcement of the F-gas Regulation. Responses were received from 18 companies, primarily refrigerant suppliers and industry associations, in 11 EU member states (see Fig 4, results at a glance).

Price Rises

In all, 95% of the 18 companies reported that customers had expressed concern relating to refrigerant price rises over the previous 12 months. Nine companies gave detailed price information; price rises were on average between 136-147% for high-GWP refrigerants (HFC-404A, HFC-410A, HFC-134a, HFC-407C and HFC-407F) while prices for HFC-1234yf decreased by an average of 14%.

The survey data revealed some significant regional price variations that might be an indicator of illegal trade. For example, the average price of HFC-404A in September 2018 quoted by two refrigerant suppliers and an association in Greece and Cyprus was €44.80/kg, compared to an average price of €140.09/kg in two companies in Denmark (taking out the impact of the tax) and Belgium. Similar variations were quoted for other high-GWP gases (e.g. HFC-410A cost €37.50/kg in Greece/Cyprus compared to €105.48/kg in Denmark/Belgium).

Refrigerant supply

Some 66% of respondents experienced refrigerant supply problems over the 12-month period preceding September 2018, particularly for HFC-404A and HFC-134a. Several companies indicated the supply situation was more severe in 2017 and eased up in 2018, albeit with very high prices.

Price increases in HFCs were of greater concern to users than supply problems. All but one company had received complaints about refrigerant prices. One respondent noted the link to supply problems since customers were reducing the amount of stock kept in warehouses, given the high prices. Another explained how high prices fuel illegal trade: "The reason [for] importing illegal material is mainly the incomprehensible rise in prices."¹⁹

Awareness of illegal trade

In response to the question "Are you aware of or suspect ongoing illegal HFC use (non-quota HFC use or illegal cross-border trade) in the sector/country you work in",

Results at a glance

*September 2017 to September 2018

● Yes ● No

Have you experienced any refrigerant supply problems in the last 12 months?

67% Yes 33% No

Have any of your members/clients expressed concern about refrigerant price the last 12 months?

94% Yes 6% No

Have any of your members/clients expressed concern about refrigerant supply the last 12 months?

17% Yes 83% No

Are you aware of or suspect ongoing illegal HFC use?

83% Yes 17% No

Have you or your clients directly experienced HFC theft?

heard about it anecdotally 17%
offered suspect HFCs 22%
direct experience 22%
none 39%

Are your clients/members aware that the use of disposable cylinders is illegal in Europe?

94% Yes 6% No

Have you seen or been offered refrigerants in disposable cylinders?

72% Yes 28% No

In your view, are your clients/members adequately aware of the impact of the 2018 reduction step under the HFC phase-down, as well as the other measures under the EU F-Gas Regulation?

some/most of industry are aware 24%
59% Yes 17% No

Is there an adequate supply of affordable low-GWP alternatives in your area/sector?

47% Yes 53% No

Are you aware of any actions your national government is taking to tackle illegal trade of HFCs?

17% Yes 83% No

Figure 4: EIA industry survey – results at a glance

15 out of 18 companies answered 'yes'. Three companies noted receiving anecdotal and media reports, while just three companies were unaware of illegal HFC use. The widespread use of disposable cylinders was repeatedly mentioned, while many companies also stated their belief that illegal HFCs were being placed on the market in refillable containers, either by companies outside the quota system or companies placing amounts over their allocated quota. Eastern Europe was repeatedly mentioned as a potential source of illegal HFCs, along with several non-EU countries including Albania, China and Turkey.

Five companies mentioned web-based platforms, including eBay and Facebook, as a source of illegal sales. Informal sales through SMS texts were also mentioned several times.

Theft

Seven out of 18 companies reported that they or their clients had either experienced HFC theft or been offered HFCs they suspect to be stolen. Reported HFC thefts were located in Germany, Greece, The Netherlands and the UK. One German refrigerant supplier reported a large-scale theft in July (of over 800 cylinders) and an attempted theft from its Munster headquarters and two thefts from its Dutch branch. One refrigerant supplier noted a rise in offers of refrigerants from companies that do not normally deal with refrigerants.

Disposable cylinders

Disposable cylinders facilitate illegal trade because they are easy to transport and difficult to trace; they have been banned in the EU since 2007.

EIA asked whether respondents were aware that disposable cylinders were illegal and if they had been offered HFCs in disposable cylinders or seen any in use. Only one respondent felt that its clients/members were unaware of the ban. Despite this, 72% of respondents had seen or been offered refrigerants in disposable cylinders. Respondents from Denmark and Greece noted that although their clients are aware of the ban, they may still buy disposable cylinders as they are cheaper and easily available. The automotive sector was highlighted as an area where they are used heavily. Trading platforms such as eBay and Facebook were mentioned as key selling tools for disposable cylinders.

Awareness of the HFC phase-down

EIA asked if respondents felt their clients were adequately aware of F-gas Regulation measures, in particular the impact of the 2018 reduction step. Ten out of 17 respondents (59%) felt their clients and members were adequately aware, four (24%) felt that some or most of industry were aware, while three companies felt their clients were not adequately aware. Given 2018 is the third year of implementation with a significant cut in HFC use, this lack of awareness, which will result in higher ongoing demand for HFCs than expected, is of concern.

Supply of low-GWP alternatives

Asked if there was an adequate supply of affordable low GWP alternatives available, eight out of 17 respondents (47%) stated there was. Several other companies noted there was adequate supply; however, they were expensive (five), transitional substances only (three) or technical challenges remained (one).

Industry views on government enforcement action against illegal trade in HFCs

Only three out of 18 companies were aware of government action to address illegal HFC trade. Croatia, Italy and the UK were the only countries where respondents were aware of enforcement actions being taken, although no prosecutions were reported. EIA also asked what governments should be doing to enforce the F-gas Regulation. Almost half of the companies responded that greater capacity to inspect and investigate illegal trade was required (including market surveillance) and many companies noted the need for higher penalties and better enforcement by customs. Companies also noted the need for more information at the contractor and customs levels, and that additional actions to remove barriers to the adoption of low-GWP alternatives (including training and safety standards) should be addressed.

Industry views on actions it can take to reduce illegal trade

Fourteen companies had suggestions on how industry itself can tackle illegal trade. The most common response was to lower prices of new refrigerants, followed by speeding up the availability of compressors working with low-GWP refrigerants and raising awareness among clients of illegal trade and the availability of alternatives. Carrying out market surveillance, putting pressure on authorities to carry out more inspections and implementing training for the servicing sector were also mentioned.

Illegal trade in HFCs

The information provided by industry stakeholders alongside multiple media reports and trade data analysis suggests a growing prevalence of illegal HFC use impacting countries across the EU. In November 2018, the European association of refrigeration, air-conditioning and heat pump contractors (AREA) published a member survey covering 16 countries. Results of their industry survey showed over three quarters of the respondents were aware of illegal trade of higher GWP products. AREA stated that illegal trade was most significant in EU border countries, with the number of cases growing throughout 2018.²⁰

In early 2019, Coolektiv, a 'Committee of Experts' including refrigerant producers Chemours and Honeywell, refrigeration components association

Asercom, German refrigerant suppliers Westfalen and Frigoteam Handels and retailer Rewe stated that illegal refrigerants entering Europe in 2018 were equivalent to 20% of the legal HFC quota. Chemours claims that in 2018 around 22.5 MtCO₂e were illegally imported into the EU ²¹

Figure 5 illustrates potential trade routes for smuggled HFCs according to industry reports and intelligence gathered by EIA. Industry stakeholders report that illegal HFCs are entering the EU from Russia and Ukraine in the north-east and from Turkey and Albania in the south-east. Poland has been repeatedly highlighted as a first point of import for illegal HFCs entering through Ukraine and shipped directly from China.

PROZON, a Polish NGO dedicated to reducing emissions of ODS, has expressed concern about “massive and growing” HFC smuggling entering Poland through the border with Ukraine and from Turkey (via Romania, Bulgaria, Hungary and Slovakia). It has also raised concerns that companies exceeding quotas is an even bigger problem.²²

Italian industry sources have pointed to Albania, Malta, Poland and Greece (via Turkey) as the source of most black market HFCs in Italy. One source claimed that ISO tanks of illegal HFCs are entering Italy from Croatia, a statement supported by the fact that Chinese trade data shows significantly higher exports to Croatia than Croatia's import data (e.g. 480.8 tonnes compared to 57.3 tonnes in 2017).

Media reports have also highlighted illegal HFC trade in the Baltic States. In August 2018, the customs authority of Estonia reported “a significant increase” in the number of attempts to import refrigerant from outside the EU, with more than 200 attempts to bring illegal cylinders across the border from Russia.²³ The same report suggested Lithuania’s exchequer had lost up to €5m in 2018 due to increased sales of illegal refrigerants.²⁴ A refrigerant supplier from Latvia reported to EIA a drop in sales in 2018 of 44% due to illegal refrigerants on the market.²⁵

Greek industry raised strong concerns about the high levels of ongoing illegal HFC trade in responses to EIA's survey. All Greek respondents mentioned Albania and mainland Turkey as non-EU countries from which illegal HFCs were arriving; one specified trucks coming over the border as the method of smuggling. EIA spoke with multiple industry sources at Chillventa 2018 who reported that illegal refrigerants constituted 50-80% of the total market in Greece, Bulgaria and Romania. In July 2018, 14 Greek HVACR representatives wrote to the Greek Government claiming that illegal refrigerants from Bulgaria, Albania, Macedonia and Turkey were costing the Greek state over €20 million in lost VAT and taxes.²⁶

Areas with different taxation rates were also cited as source points, for example the Faroe Islands, which is not subject to the Danish HFC tax, was mentioned by a respondent to EIA's survey as an entry point for suspect HFCs into Denmark. This could partly explain why China's customs data shows an export of more than 10 tonnes of HFC mixtures to Denmark in 2017 while European customs data shows no imports from China.

The prevalence of illegal HFC-134a in the mobile air-conditioning (MAC) servicing market has been repeatedly raised. In Italy, about 5-10% of the mobile air-conditioning HFC market is estimated to be illegal²⁷



Figure 5: Potential trade routes for illegal HFCs entering the EU

WHY IT PAYS TO BREAK THE LAW

In March 2018, a two-day inspection of cars crossing the Polish-Ukraine border at Dolhobyczow highlighted the lucrative nature of black market trade in HFCs.

Three attempts to smuggle HFCs hidden in LPG tanks were prevented by customs officers. The cars contained between 64-90 litres of refrigerant; two of the cases were confirmed to be smuggling HFC-134a, with a market value of PLN4,600 (€1,060)-PLN6,500 (€1,510). The culprits were fined between 15-21% of the market value.³¹

According to PROZON, the culprits and the cars, with refrigerant still in them, were sent back to Ukraine, leaving them at liberty to make another attempt at smuggling the HFCs into Poland.³²

This not only highlights the potential scale of illegal HFCs flooding into Poland from non-EU border countries but also shows the need for more effective enforcement through confiscation of illegal refrigerant and higher fines to deter repeat offenses.

while PROZON estimates at least 30% of HFC-134a currently used in Poland's MAC servicing sector is from questionable or simply illegal sources.²⁸ A refrigerant supplier in Croatia stated: "We think that [a] much bigger problem are refrigerants imported into the EU and placed on the market outside of quota system. This practice is the most obvious in automotive aftermarket where according to the info we get from the market, the vast majority of HFC-134a being sold by automotive spare parts dealers in Croatia had probably been placed on the EU market outside of quota system".

The use of illegal disposable cylinders has also been repeatedly reported in the media, showing up in the UK, Ireland, Germany, France and The Netherlands.²⁹ According to a recent news article, after a tip-off from Dutch customs authorities, the Dutch inspectorate seized 123 disposable cylinders of HFC-134a from a car parts warehouse in Rotterdam that had been imported outside of the EU quota system.³⁰

Traders reported that illegal use was incentivised by the lack of enforcement; even if caught, fines and penalties are too low to act as a deterrent, especially in comparison to the profits that can be made on the black market.

Methods of illegal trade

There are two distinct mechanisms with respect to the illegal trade of HFCs in the EU. The first can be characterised as open smuggling of HFCs. This is where companies import non-quota HFCs through the normal customs channels. EIA's analysis of 2018 customs data suggests that as much as 16.3 MtCO₂e of bulk HFCs were illegally placed on the market in this way in 2018 and more than 14.8 MtCO₂e in 2017. The companies responsible could be registered in the HFC Registry or not, although one would expect the latter to be picked up by customs authorities as it is a simple matter to check if a company is registered or not.

A recent shipment seized in Rotterdam is an example of this. An illegal shipment of 600 cylinders of HFC-134a was directly imported from Turkey by sea container. The shipment was openly imported with the correct commodity codes, however the Dutch importing company was not registered in the HFC Registry.³³

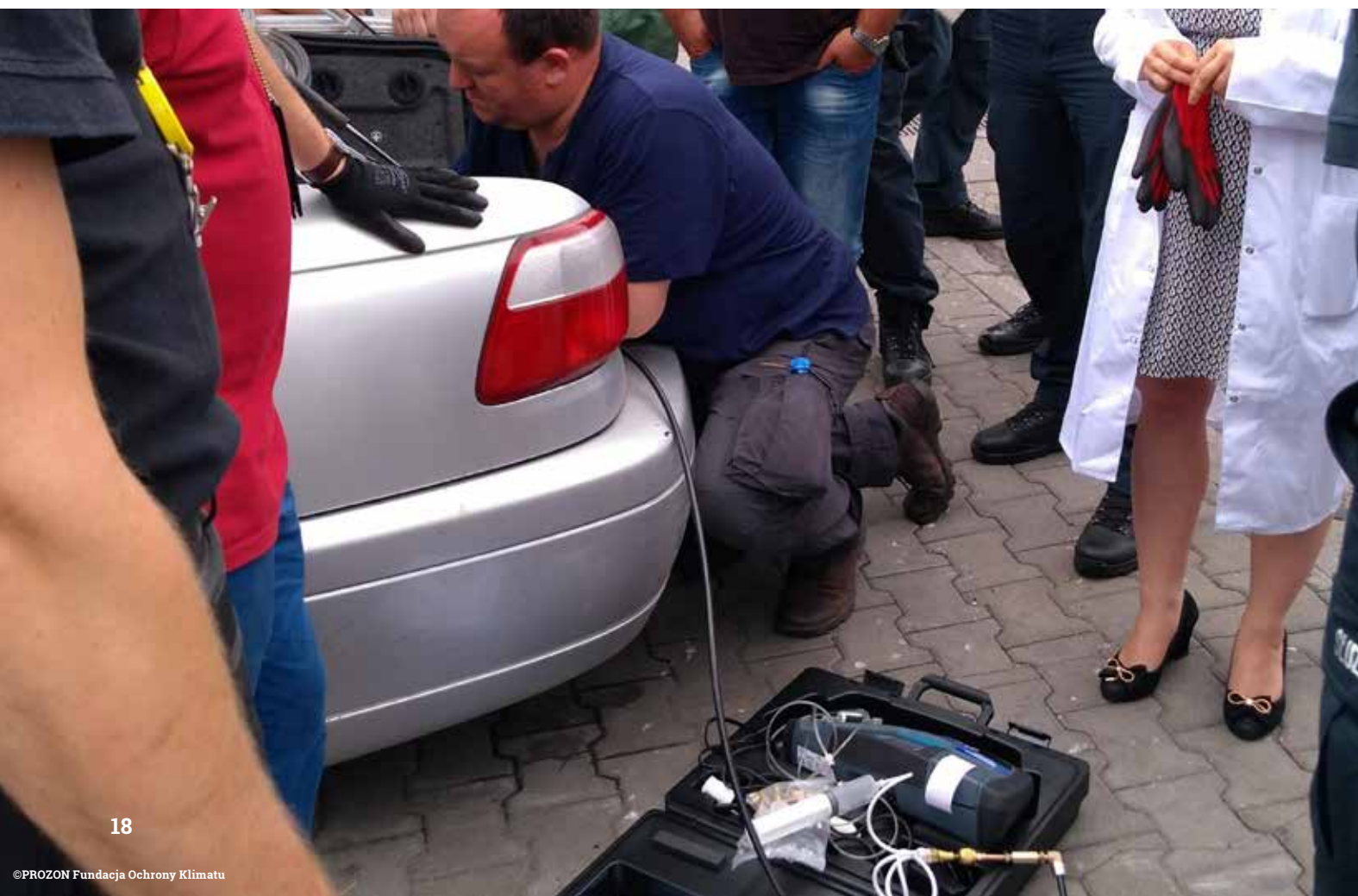
The second mechanism, which is much harder to quantify, is the more traditional smuggling of HFCs across borders. This can occur outside customs channels altogether or where HFCs are concealed either physically or through fraudulent documentation of HFC shipments (e.g. mislabelling the type, purpose

or destination of the HFC shipment). The significant discrepancies between Chinese export and European import data could be to some extent an indication of fraudulent import declarations.

Small scale/opportunistic smuggling via land and sea borders

There have been multiple accounts of relatively small amounts of illegal HFCs entering the EU via land borders in vehicles (see box 'Why it pays to break the law'). One Austrian stakeholder told EIA: "What we hear is that HFCs are brought in from Turkey or Serbia, via Bulgaria or Croatia, and in small quantities, i.e. in single use bottles, in private cars, mostly. So there's a few bottles here and a few bottles there. Mostly 134a, for use in MAC. I have now also heard that there's a lot coming in via Poland from Ukraine."³⁴ The Estonian tax and Customs Board claimed in 2018 there had been over 200 attempts to bring illegal cylinders of refrigerant across the border from Russia.³⁵ Bulgarian customs officers seized 12 disposable cylinders (six 10.9kg cylinders of HFC-404A and six 13.6kg cylinders of HFC-134a) from an empty minibus covered by a blanket. The bus was allegedly on its way to Western Europe from Romania.³⁶ German authorities stopped a vehicle crossing the

Below: Polish customs stopping smugglers with R-404A in LPG car tank



Above: Tanks and cylinders for F-gases

border from Poland containing seven 10kg cylinders of HFC-404A and eleven 12kg cylinders of HFC-134a. The occupants of the vehicle claimed to be en route to Romania but were unable to provide proof of ownership of the cylinders.³⁷

In April and May 2018, there were also reported incidents of refrigerants coming into southern Italy on fishing boats from Malta to Sicily (originally from Turkey). The number of fishing boats from Malta makes this difficult to monitor.³⁸

Offloading in transit

Instances have been reported of refrigerants coming through Greece 'in transit' from non-EU countries to other non-EU countries but then offloaded and replaced with empty cylinders to ship onwards.³⁹ EIA spoke with one Italian company which sent a shipment of HFC-134a to Serbia via Bulgaria; two weeks later it realised the disposable cylinders, intended for export outside EU, were illegally made available on the Italian market. The company filed an official complaint and found that the company in charge of the shipment had used fake papers. An investigation is ongoing.⁴⁰

Doors wide open

Large shipments of non-quota HFCs or HFCs in excess of quota

To date, EIA is not aware of any seizures of illegal HFCs shipped into the EU in large tanks or ISO tanks. However, one industry source claimed ISO tanks were coming into Italy from Croatia⁴¹ while others have claimed large-scale imports are entering Poland.⁴² In EIA's experience, such large shipments are rarely checked due to unfamiliarity with the process, lack of adapters needed to take a sample or lack of facilities to test the refrigerants. Industry insiders have noted concern that customs may only check if an importer is on the HFC Registry and do not always check the amount of quota it has or request the Document of Conformity (DoC) in the case of equipment imports.⁴³ Given that customs officials have no way of determining how much quota has already been used, the system is wide open to abuse (see Section on Regulatory Loopholes).

Illegal internet sales

Online platforms are a popular way of selling illegal HFCs. They allow sellers to reach a large network of potential buyers without necessarily being registered as an F-gas-licensed company. Some platforms simply give a number to call or text to arrange for a private sale. Some enforcement efforts have enabled suspicious adverts to be removed but the actual seller is rarely prevented from posting a new advert the following day. To date, EIA is aware of just one successful prosecution of illegal online HFC selling, in Italy.⁴⁴



Above: Screenshot of disposable cylinders of R-134a for sale on facebook in Greece

In July 2018, Cooling Post conducted a simple search of German site eBay Kleinanzeigen, finding 80 German vendors offering HFC-134a in disposable cylinders. By August, this number had increased to 120 vendors. Many vendors appeared to have access to reasonable quantities with offers of discounts for multiple cylinders.⁴⁵ In Italy, a presenter on a Canale 5 TV programme Striscia la Notizia successfully purchased (without an F-gas licence) an 800g bottle of HFC-410A from a seller on Amazon.⁴⁶

Action being taken by EU member states to address illegal trade in HFCs

If a company is known to have exceeded its HFC quota under the F-gas Regulation, the European Commission will reduce its next quota by double the amount by which it was exceeded. In all other respects, the burden of enforcement lies on the member states.

In September 2018, EIA contacted each EU member state requesting information on efforts to implement and enforce the F-gas Regulation. Thirteen responses

were received from the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, Germany, Luxembourg, the Netherlands, Poland, Slovenia and the UK.

The responses demonstrate a variety of approaches and some clear enforcement successes but EIA is concerned at the lack of strict penalties being applied, which reduces the deterrent effect for would be criminals.

Breach	Penalty
Intentional release of HFCs in breach of Art 3(1)	• Czech Republic – fine up to €39,000 • Cyprus – fine up to €5,000 (forward to Court of Justice if bigger) • Belgium – none • Denmark – fine or in severe cases imprisonment up to two years, case by case basis • Luxembourg – prison sentence one month - one year or fine €50,000 - €500,000 • Poland – fine apx €930-€3,500 • Slovenia – fines of €1,200-30,000 • UK – max penalty apx €225,000
Placing HFCs on the market without a quota in breach of Art 15(1) para 2	• Czech Republic – fine up to €39,000 • Cyprus – fine up to €5,000 (forward to Court of Justice) if bigger • Belgium – prison sentence eight days – three years, fines €160 up to €4,000,000. • Denmark – fine or in severe cases imprisonment up to two years, case by case basis • Luxembourg – prison sentence one month – one year or fine €50,000 - €500,000 • Poland – fine apx €1,400-€10,500 • Slovenia – fines of €1,200-30,000 • UK – max penalty apx €225,000
Placing equipment or products on the market in breach of Art 11 & Annex II	
Importing equipment containing HFCs without a quota in breach of Art 14(1)	
Importing equipment containing HFCs without a declaration of conformity in breach of Art 14(2)	• Czech Republic – fine up to €39,000 • Cyprus – fine up to €5,000 (forward to Court of Justice) if bigger • Belgium – prison sentence eight days – three years, fines €160 up to €4,000,000. • Denmark – fine or in severe cases imprisonment up to two years, case by case basis • Luxembourg – prison sentence one month – one year or fine €50,000 - €500,000 • Poland – fine apx €1,400-€10,500 • Slovenia – fines of €1,200-30,000 • UK – max penalty apx €225,000
Placing on the market non-refillable containers (e.g. disposable cylinders) in breach of Annex III(1)	• Czech Republic – fine up to apx €58,500 • Cyprus – up to €5,000 (forward to Court of Justice if bigger) • Belgium – Seizure of property and fines, potential destruction or re-export (decided by the Inspectorate) • Denmark - fine or in severe cases imprisonment up to two years, case by case basis • Luxembourg – prison sentence one month – one year or fine €50,000 - €500,000 • Poland – fine apx €1,400-€10,500 • Slovenia – fines of €1,200-30,000 • UK – max penalty apx €225,000

Note: Bulgaria did not have an English version available, Finland gave limited information and Germany/Austria did not give details

Table 7: Penalties for breaching provisions of the F-gas Regulation in member states

Right: F-gas LPG analyzer used by customs



The scale of penalties and their application has a big impact on illegal trade. The lucrative nature of selling black market HFCs in the EU means that large profits can be made through criminal activity. Unless penalties are high enough and imposed regularly, black market traders will simply factor penalties into regular business costs. Moreover, without proportionate and dissuasive penalties applicable across all member states, those with lesser penalties will undermine efforts undertaken by neighbouring countries.

Measures to monitor and enforce the F-gas Regulation

- Member states reported on a number of activities undertaken to support implementation and enforcement of the F-gas Regulation. These included:
- publishing information on web-based platforms and through associations
 - production of an F-gas Regulation handbook for Custom Officers
 - including F-gases in Custom's Risk Analysis, risk-profiling for imports of bulk F-gases
 - organising workshops and seminars for stakeholders including customs
 - on-site customs training and use of mobile gas analysers
 - regular inspections at customs and regular in-country inspections/market surveillance
 - monitoring of online marketplaces such as eBay, including daily searches for illegal products and working with e-retailers to remove illegal products from sale, prevent them being sold and gather evidence about those involved in these activities
 - intelligence-led investigations
 - targeted campaigns – e.g. in Denmark aimed at marketing of split heat pumps to non-authorised persons, in the UK on the servicing ban.

Regulatory loopholes and tools to combat illegal trade

Control of HFC trade at the customs level

In order to place HFCs on the EU market, companies must apply for and secure HFC quotas which are allocated for free. Since 2017, imports of HFCs in pre-charged equipment have also required an HFC quota. Importers of pre-charged equipment must either have HFC quotas allocated to them directly or secure an “authorisation” from another HFC quota-holder.

Quotas and authorisations are not needed for imports of less than 100 tCO₂e of HFC per year (in equipment or as bulk gas). This is almost 70kg of HFC-134a or 25.5kg HFC-404A. Bulk HFCs supplied directly to an undertaking for export are also exempt from the phase-down, as are HFCs for military equipment, destruction, feedstocks, and, from 2018, MDIs.⁴⁷

Currently the European Commission is not generally obliged to cross check data reported by F-gas traders to the HFC Registry with EU customs data. If a company places more than 10,000 tCO₂e HFCs (almost seven tonnes HFC-134a) on the market in any one year it must have its report verified by an external auditor. However, it is not clear how transparent the auditing process is and whether auditors have any minimum standards they must adhere to.

All goods imported into the EU should be declared to the customs authorities of the respective member state using the Single Administrative Document (SAD), which is the common import declaration form for all the member states.⁴⁸ The SAD details information regarding the importer, exporter, CN Code, weight and units of goods, country of origin, destination and other key data contained in the Integrated Tariff of the European Communities (TARIC) database.⁴⁹ The information is self-declared by the importer and is not cross-checked with any information from the exporter. Other documents may be required, e.g. a Customs Value Declaration if the value exceeds €20,000 and transport documentation (e.g. a Bill of Lading or Air Waybill). For equipment containing HFCs, the F-gas Regulation requires a Declaration of Conformity (DoC), confirming that the HFCs inside the equipment are accounted for within the quota system of the F-gas Regulation (i.e. that they have quotas or authorisations covering the amount of HFCs in the equipment).⁵⁰

Customs have access to the HFC Registry where they can check whether or not an importer is registered and access the importer’s annual quota allocation or authorisation, although there is no access to information to let customs know how much a company has already imported.

Furthermore, the quota allocation and authorisation are measured in tonnes CO₂ equivalent, whereas the SAD

describes quantities in kilogrammes or tonnes. While it is potentially possible for customs to calculate the tCO₂e based on the GWP of the HFC or HFC blends being imported, this adds an extra administrative burden to the customs procedure. ASHRAE reports some 82 different HFC blends with varying GWPs that are subject to the F-gas Regulation.⁵¹

Even if an importer is clearly importing an amount in excess of the company’s annual quota (e.g. in one shipment), customs are still not able to determine that the shipment is in contravention of the F-gas Regulation since the importer could claim (legitimately or otherwise) that part of the shipment is for re-export outside the EU.

The lack of customs control is of particular concern given the influx of new companies reporting on F-gas activity since the F-gas Regulation began. A total of 1,699 companies reported during 2017, 33% more than the previous year.⁵² The increase is mostly due to the large increase in new companies reporting bulk HFC imports; some 564 companies reported imports of bulk HFCs compared to just 282 in 2015.

The current system is inadequate to confirm the legitimacy of new entrants and to prevent them from importing in excess of quota. Companies can simply shut down to avoid repercussions or mis-declare data to the HFC Registry.

It is clear that the current system does not allow customs officials to effectively enforce the F-gas Regulation. From EIA’s perspective, there are two potential solutions:

- 1. A per-shipment licensing system akin to the EU’s licensing system for ozone-depleting substances (ODS), whereby customs officials have documentation authorised by the exporter and importer within a system managed by the European Commission**
- 2. A real-time live updating of the centrally held F-gas register, whereby customs authorities can check if an importer has available quota. Additional documentation would be needed for imports which are destined for immediate re-export or when claiming another exemption to the quota system.**

HFC licensing

Trade in ODS has historically been controlled by licensing systems, as required by the Montreal Protocol. The Protocol considers a licensing system to be a scheme whereby a license is granted by a competent authority (here, the European Commission) for an individual to export and import controlled substances. To be effective, it should cover all controlled substances – whether new, used, recycled or reclaimed and regardless of the purpose of the export or import – and should be supported by a ban on unlicensed exports and imports. In addition to facilitating compliance with relevant reporting requirements, licensing systems help prevent illegal trade by allowing cross-checking of information between exporting and importing countries.⁵³

While a licensing system for ODS exists, the EU does not have an HFC licensing system, based on an early decision made by the Commission not to incorporate one in the revised F-gas Regulation. At the time, the Commission cited certain barriers, explaining its decision as follows: *“Unless required by an international agreement under the Montreal Protocol, a licensing system should not be envisaged for the HFC in order to reduce the administrative burden for the companies and authorities involved. Furthermore, the applicable customs codes do not (yet) distinguish between HFCs and other substances serving the same purposes.”*⁵⁴

Whether valid at the time or not, these barriers no longer exist; the Kigali Amendment adopted in 2016 makes clear that an HFC licensing system is now required while new CN codes for specific HFCs and groups of HFCs have been in place since 2015.⁵⁵

The F-gas electronic registry, with some modifications, could fulfil part of the function of an HFC licensing system. To do so, it would need to be electronically linked to the TARIC database employed by customs authorities, which contains the information declared

on the SAD.⁵⁶ The creation of an electronic link between the HFC Registry (HFC quota allocation in tCO₂e) and the information on the SAD (HFC imports by CN code) could allow a real-time comparison between actual HFC imports declared at the border and current available HFC quota in the HFC Registry.

In order to function, the SAD would need to contain information on the tCO₂e of HFC trade, not just the CN code since the CN codes for HFC imports are usually not sufficient on their own to calculate the tCO₂e.⁵⁷ The system would be further enhanced by future inclusion in the EU Single Window, assuming this becomes mandatory across the EU.

Other customs tools

The EU’s Import Control System (ICS) requires a pre-declaration from the carrier or authorised representative to be submitted prior to goods arriving in the EU.⁵⁸ The ICS has the potential to be a useful tool to combat illegal trade in HFCs as it can enable information from the exporter to be cross-checked with the self-declared information from the importer. However, discussions with industry suggest that this system is not always enforced.

Informal Prior Informed Consent (iPIC) is a voluntary program run by the United Nations Environment Program (UNEP) to provide participating countries with real-time access to licensing system data from other participating countries.⁵⁹ It currently focuses on ODS but some countries already include screening for HFCs and a newly updated version will allow for information on HFCs to be included. As Montreal Protocol Parties begin to implement HFC licensing systems, greater efforts should be made to enhance communication on HFC trade with key EU trading partners.

Below: Customs trained by PROZON at Gdansk container terminal



Non-refillable containers

The EU first banned placing non-refillable (disposable) containers of ODS on the market in the EU ODS Regulation in 2000 and then again in 2009.⁶¹ It later banned placing non-refillable containers of HFCs on the market in the F-gas Regulation in 2006 and then again in 2014.⁶² The justification for this prohibition was emissions-related, namely non-refillable containers “are designed to be disposable, which means that any fluorinated gas left in such containers will eventually be emitted to the atmosphere.”⁶³

The F-gas Regulation defines a non-refillable container as “a container which cannot be refilled without being adapted for that purpose or is placed on the market without provision having been made for its return for refilling.”⁶⁴ This definition, which was not included in the EU ODS Regulation, therefore creates an exception for disposable containers where “provision ha[s] been made for its return for refilling.” It complicates enforcement since it is not clear what evidentiary requirements one must meet to show provision has been made for its return for refilling and no guidance has been forthcoming from the Commission.

Although it is often relatively easy to detect disposable cylinders, it is not always easy to prove that they have been placed on the market since the start of the ban in 2006. From a compliance and enforcement perspective, a use ban (without the return exception) would be superior to the current POM provision since it avoids the additional burden on authorities to prove whether or not the non-refillable container was placed on the market prior to the ban entering into force.

Non-refillable containers are popular globally as they allow refrigerant sellers to avoid investing in a fleet of refillable containers and their disposable nature means they can be freely traded. These attributes also make them attractive to black market traders, as highlighted in EIA's industry survey and multiple media reports. The use of non-refillable containers is not banned by the Montreal Protocol; however, Decision XIX/12 asks Parties to consider banning the use of non-refillable containers on a voluntary basis.⁶⁵ In addition to the EU, India, Canada and Australia have all banned HFCs in disposable cylinders. Given the entry into force of the Kigali Amendment, efforts should be made to pursue a ban on HFCs in disposable cylinders at a global level.

THE COST OF FREE HFC QUOTAS

Under the F-gas Regulation, HFC quotas are allocated for free. Most of the quotas (89%) are grandfathered to incumbents, primarily the large producer companies and some major distributors, allowing monopolistic price increases of legal HFCs (which in turn supports lucrative black markets for illegal HFCs). The other 11% of HFC quota each year is divided evenly between new entrants. After three years, new entrants become incumbents.

Allocating quotas for free encourages profiteering from quota trading, given the volatility of HFC prices. Allocating HFC quotas at cost would reduce the incentive to trade quotas and help secure important financial resources to support enforcement of the F-gas Regulation.⁶⁶

Lost profits due to illegal HFC trade

Governments are losing considerable tax revenues due to the illegal HFC trade, through direct loss of VAT and import duty, but also through the indirect impact that illegal trade has to lower the price of legal refrigerants. A recent report from Polish NGO PROZON estimated that Poland's treasury lost €7 million in 2018 due to illegal refrigerant imports valued at €55 million, some 40% of Polish demand.⁶⁶

A previous report suggested Lithuania's exchequer had lost up to €5m in 2018 due to increased sales of illegal refrigerants.⁶⁷ In July 2018, 14 Greek HVACR representatives wrote to the Greek Government claiming that illegal refrigerants from Bulgaria, Albania, Macedonia and Turkey were costing the Greek state over €20 million in lost VAT and taxes and posing a threat to the environment and public health.⁶⁸

These reports demonstrate that the illegal HFC trade is causing significant financial impacts on multiple EU states, as well as on legitimate businesses that are seeing profits squeezed by the low prices of illegal refrigerants. Ironically, poor enforcement is often blamed on the lack of finances available to build sufficient capacity to tackle it.

Conclusions

A review and analysis of survey, HFC Registry and customs data alongside widespread media reports indicates that Europe is faced with a substantial level of illegal use and trade in HFCs.

EIA's analysis of 2018 customs data suggests that as much as 16.3 MtCO₂e of bulk HFCs were illegally placed on the market in 2018. This represents more than 16% of the 2018 quota and is in addition to illegal imports of HFC-containing equipment and illegal HFCs that are undoubtedly being smuggled under the radar of customs.

EIA's analysis also indicates a discrepancy between European customs data and HFC Registry data of at least 14.8 MtCO₂e in 2017, equivalent to 8.7% of the 2017 quota.

HFCs are being illegally imported in large and small containers, including in illegal disposable cylinders, and are sold on the market through various channels including web-based platforms. Illegal HFCs are coming into Europe from China directly and via EU-border countries, in particular via Russia, Ukraine, Turkey and Albania. Customs data discrepancies indicate key entry points are likely Denmark, Greece, Latvia, Poland and Malta, however all member states should take steps to examine customs data in relation to company data in the HFC Registry.

There is an urgent need to immediately improve enforcement of the F-gas Regulation, particularly at the EU border level. Member states need to seize, prosecute and apply sufficiently high penalties. Penalties that have been determined by member states are generally not high enough to deter HFC smuggling and are rarely applied. Those applied to date are primarily related to leakage and record keeping infringements, suggesting that awareness of illegal trade and/or capacity to act on it at customs level is low.

Enforcement of the F-gas Regulation is clearly hampered by the absence of a system whereby customs officials can determine if an import of bulk HFCs or HFC in equipment is covered by quota and have the power to prevent a shipment which takes an importer over its quota. This is an essential requirement of a licencing system, which is now required under the Montreal Protocol's Kigali Amendment, and should be implemented without delay.

This is particularly critical in light of the significant rise in the number of companies registered to trade. Thousands of companies are now, to some extent, legitimised at customs level through their company name being registered in the HFC Registry; however, customs has no way of assessing whether they are importing within their quota or reporting actual imports

to the HFC Registry. Allocating quota at cost would help deter illegitimate traders from joining as new entrants in the future.

The 100 tCO₂e exemption for imports also muddies the waters and encourages illegal trade. This amount is equivalent to almost 70kg of HFC-134a (GWP 1,430), which means that a company can legally import five 13kg HFC-134a cylinders without registering with the HFC Registry or having quota.

The widespread use of disposable cylinders in the illegal trade (including HCFC illegal trade) warrants efforts by member states to make legislative changes to ease the enforcement challenge. The current ban under the F-gas Regulation should be strengthened to ban the use (not just the placing on the market) of all non-refillable cylinders, no matter whether or not provision is made for their return. The EU and its industry should also work toward a global ban on disposable cylinders.

EIA believes that the illegal trade in HFCs and stockpiling of HFCs in 2017, alongside the reserve of authorisations built up by equipment importers since 2015 have produced a false sense of security in terms of meeting the phase-down target from 2018 onwards. Future supply cuts will not allow stockpiling, given the 2018 step is already some 48% of the baseline in real terms. Companies therefore could face HFC shortages in 2019 and 2020 and critical shortages in 2021 (when supply is again reduced) unless action is taken to speed up the transition to low-GWP alternatives and better manage HFCs in circulation through improved leakage control and reclamation.

Additional or stronger bans on HFCs in certain equipment (e.g. heat pumps and air-conditioners) would further support the right direction of the market, which in some sectors has failed to keep up with the phase-down. There also remain barriers to the adoption of climate-friendly alternatives created by outdated standards and a lack of training on flammable refrigerants.

Reclamation of HFCs, while increasing, is still falling far short of what is required to ensure a smooth phase-down and will be impacted by ongoing illegal trade which reduces the price incentive to reclaim. In 2017, 1,659 tonnes (3.9 MtCO₂e) was reclaimed, an increase of about 26% over 2016 and around 2% of the EU supply of virgin HFCs (in CO₂e terms).⁶⁹ In comparison, one industry analysis calculates that around 24 MtCO₂e of reclaimed HFCs would be required in 2018 for smooth implementation of the F-gas Regulation.⁷⁰

Recommendations

Recommendations for the European Commission and EU member states:

- Implement a fully functional per shipment HFC licensing system which allows customs officials to obtain necessary real-time information to determine if HFC imports are within the specified quota for a particular company. A first step towards this could be through a real-time quota system connecting the HFC Registry to the Single Window environment for customs and requiring the tCO₂e of any bulk or equipment import to be noted on the SAD. The real-time per shipment licensing system must ensure that a company stays within its quota at all times. For example, if a company wishes to export HFCs it can only receive that credit back on its quota once the export has occurred.
- Explore ways to improve reporting and monitoring of HFC trade with exporting countries, given that many of these countries are also ratifying the Kigali Amendment and will be implementing licensing systems. The iPIC system could be used to help monitor, record and collate all the data on HFC imports and exports even before controls come into force. The ICS could help provide export data to be cross-checked with import data at customs.
- Make the HFC Registry more transparent in order to improve accountability. Names of new entrants and data on quotas allocated to individual companies should be publicly available.
- Allocate HFC quotas at cost to reduce the pressure on customs from the rapid rise in new incumbents and to help fund the HFC licensing system.
- Revise the ban on non-refillable cylinders to prohibit the use of all disposable cylinders.
- Remove the exemption from the phase-down under Article 15(2) for producers or importers of less than 100 tCO₂e of HFCs per year.

Recommendations for EU member states:

- Ensure capacity-building, training and support for customs, including ensuring adequate refrigerant identifiers are available that are adaptable to test large containers.
- Carry out regular risk profiling (especially of bulk imports) and customs inspections.
- Set up a system to systematically compare reported data under the F-gas Regulation with customs data and investigate discrepancies.
- Provide greater resources to investigate illegal HFC trade, carry out regular market surveillance and inspections including online marketplaces.
- Increase penalties for Regulation infractions and ensure they are regularly applied and communicated through industry and media channels.
- Carry out regular targeted awareness raising and training and ensure effective dialogue between customs and environment ministries; for example, through workshops, webinars, production of customs handbooks etc. Consider formal information sharing agreements between customs, industry and regulators.
- Promote low-GWP energy efficient technologies through incentives, such as tax rebates, and additional bans on HFC-containing equipment.
- Invest in the installation and servicing sector, ensuring contractors are trained and equipped to work with flammable refrigerants and to ensure the efficient recycling and reclamation of HFCs.
- Reduce further demand for illegal HFCs by increasing incentives and reducing barriers to HFC reclamation.

References

1. E.g. GWP of HFC-32 is 675, GWP of HFC-410A is 2,088, HFC-404A is 3,922
2. Velders et al (2015). Future atmospheric abundances and climate forcings from scenarios of global and regional hydrofluorocarbon (HFC) emissions. Atmospheric Environment Volume 123, Part A, Pages 200-209. Available at: <https://www.sciencedirect.com/science/article/pii/S135223101530488X>
3. Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R0517>
4. Cooling Post (2017). 2017 ends with 60% price rise. Available at: <https://www.coolingpost.com/uk-news/2017-ends-60-price-rise/>
5. Cooling Post (2016). 10m tonnes of illegal F-gas enters Europe. Available at: <https://www.coolingpost.com/world-news/over-10m-tonnes-of-illegal-F-gas-enters-europe/>
6. As reported in Cooling Post, ACR Journal and racplus.
7. Eurostat Database (2018/19). Available at: <https://ec.europa.eu/eurostat>
8. China Trade Information (2018). Goodwill China Business Information. Available at: <http://www.b2bchina.com.hk/>
9. Bulk refers to HFCs not placed inside equipment.
10. For CN codes containing only one HFC the GWP stated in the AR4 are used. For CN codes covering multiple gases an average GWP has been calculated of all gases covered. E.g. For CN code 29033924 covering HFC-125 (GWP 3500) and HFC-143a (GWP 4470) an average GWP of 3985 has been used.
11. See Table A5.21 in European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
12. European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
13. European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
14. Eurostat Database (2018/19). Available at: <https://ec.europa.eu/eurostat>
15. European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. P13. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
16. EEA (2018)
17. Öko-Recherche (2019). Monitoring of refrigerant prices against the background of Regulation (EU) No 517/2014. Q3/2018 – January 2019.
18. Öko-Recherche (2019). Monitoring of refrigerant prices against the background of Regulation (EU) No 517/2014. Q3/2018 – January 2019.
19. Pers. Comm. (2018). EIA Illegal Trade Survey, OEM
20. AREA survey on availability & supply of refrigerants (Nov 2018) available at: <http://area-eur.be/news/installers-increasingly-aware-illegal-trade-refrigerants>
21. Cooling Post (2019). Illegal imports equivalent to 20% of quota. Available at: <https://www.coolingpost.com/world-news/illegal-imports-equivalent-to-20-of-quota/>
22. Cooling Post (2018). Banned R22 openly sold in disposables. Available at: <https://www.coolingpost.com/world-news/banned-r22-openly-sold-in-disposables/>
23. Cooling Post (2018). Baltic states hit by illegal imports. Available at: <https://www.coolingpost.com/world-news/baltic-states-hit-by-illegal-imports/>
24. Cooling Post (2018). Baltic states hit by illegal imports. Available at: <https://www.coolingpost.com/world-news/baltic-states-hit-by-illegal-imports/>
25. Pers. Comm. (2018). EIA Industry Survey.
26. ACR Journal (2018). Greece calls for action on illegal refrigerants. Available at: <http://www.acrjournal.uk/international/greece-calls-for-action-on-illegal-refrigerants>
27. Pers. Comm. (2018). Italian refrigerant supplier.
28. Cooling Post (2018). Poland swamped by illegal refrigerant. Available at: <https://www.coolingpost.com/world-news/poland-swamped-by-illegal-refrigerant/>
29. Cooling Post (2018). UK a hub for illegal refrigerant sales. Available at: <https://www.coolingpost.com/uk-news/uk-hub-illegal-refrigerant-sales/>
30. Cooling Post (2019). Dutch authorities intercept illegal R134a refrigerant. Available at: <https://www.coolingpost.com/world-news/dutch-authorities-intercept-illegal-r134a-refrigerant/>
31. Cooling Post (2018). Poland swamped by illegal refrigerant. Available at: <https://www.coolingpost.com/world-news/poland-swamped-by-illegal-refrigerant/>
32. Pers. Comm. (2018). Prozon.
33. Cooling Post (2018). Dutch authorities intercept illegal R134a refrigerant* Available at <https://www.coolingpost.com/world-news/dutch-authorities-intercept-illegal-r134a-refrigerant/> & Pers. Comm. (2018) Dutch Inspectorate.
34. Pers. Comm. (2018). Austrian stakeholder.
35. Cooling Post (2018). Baltic states hit by illegal imports. Available at: <https://www.coolingpost.com/world-news/baltic-states-hit-by-illegal-imports/>
36. Cooling Post (2018). Bulgarian Customs Seize Disposables. Available at: <https://www.coolingpost.com/world-news/bulgarian-customs-seize-disposables/>
37. Cooling Post (2018). German Thieves Target R134a. Available at: <https://www.coolingpost.com/world-news/german-thieves-target-r134a/>
38. Pers. Comm. (2018). Italian refrigerant supplier.
39. Pers. Comm. (2018). Industry stakeholder.
40. Pers. Comm. (2018). Italian refrigerant supplier.
41. Pers. Comm. (2018). Italian refrigerant supplier.
42. Anon. Pers. Comm. (2018)
43. Pers. Comm. (2018). Croatian refrigerant distributor.
44. Cooling Post (2018). Italy acts on illegal refrigerant sales. Available at: <https://www.coolingpost.com/world-news/italy-acts-on-illegal-refrigerant-sales/>
45. Cooling Post (2018). German ebay awash with illegal R134A. Available at: <https://www.coolingpost.com/world-news/german-ebay-awash-with-illegal-r134a/>
46. Cooling Post (2018). Phase down sparks rise in illegal sales. Available at: <https://www.coolingpost.com/world-news/phase-sparks-rise-illegal-sales/>
47. Regulation (EU) No 517/2014. Art 15. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&from=EN>
48. Trade Helpdesk (2019). Documents for customs clearance. European Commission. Available at: <http://trade.ec.europa.eu/tradehelp/documents-customs-clearance#Packinglist>
49. TARIC, the integrated Tariff of the European Union, is a multilingual database integrating all measures relating to EU customs tariff, commercial and agricultural legislation, which includes the Combined Nomenclature (CN) which is a further development of the World Customs Organisation Harmonized System nomenclature.
50. Commission Implementing Regulation (EU) 2016/879. Official Journal of the European Union. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0879&from=EN>
51. Fluorocarbons.org. (2017). Refrigerants subject to the F-gas Regulation 517/2014. Available at: <https://www.fluorocarbons.org/wp-content/uploads/2017/12/Refrigerant-Blends-Table-04.12.2017.pdf>
52. European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. P12. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
53. Montreal Protocol, Decision IX/8. Licencing System. Available at: <https://ozone.unep.org/en/handbook-montreal-protocol-substances-deplete-ozone-layer/740>
54. European Commission, Impact Assessment Accompanying the Proposal for a Regulation of the European Parliament and the Council on Fluorinated Greenhouse Gases. SWD(2012) 364 final. p. 171. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012SC0364&from=IT>
55. Commission Implementing Regulation (EU) 2015/1754. Official Journal of the European Union. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R1754&from=EN>
56. Council Regulation (EEC) No 2658/87. Official Journal of the European Communities. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31987R2658&from=en>
57. For example, CN codes cover multiple HFC chemicals and blends of varying global warming potentials (GWP) and, for pre-charged equipment, the quantities of HFC imports are not always readily available, making calculations of the TCE difficult.
58. HM Revenue & Customs (2015). Import Control System. Available at: <https://www.gov.uk/guidance/import-control-system>
59. OzonAction. Informal Prior Consent Mechanism. UN Environment. Available at: <https://www.ozonaction.org/IPIC/Account/Login.aspx?ReturnUrl=%2fipic%2f>
60. See Article 16 and Annex VI of Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.
61. Regulation (EC) No 237/2000, Article 16(4); Regulation (EC) No 1005/2009.
62. Regulation (EC) No 842/2006, Annex II; see also Regulation (EU) No 517/2014, Annex III(1).
63. See European Commission, Proposal for a Regulation on Certain Fluorinated Greenhouse Gases (11 August 2003), COM (2003) 492 final, p. 9.
64. Regulation (EU) No 517/2014, Article 2(13).
65. Decision XIX/12: Preventing Illegal Trade in Ozone-Depleting Substances, ¶ (3)(e). Available at: http://www.ciesin.columbia.edu/repository/entri/docs/cop/Montreal_COP019_Dec012.pdf
66. Cooling Post (2019). Illegal imports cost Polish treasury €7m in 2018. Available at: <https://www.coolingpost.com/world-news/illegal-imports-cost-polish-treasury-e7m-in-2018/>
67. Cooling Post (2018). Baltic states hit by illegal imports. Available at: <https://www.coolingpost.com/world-news/baltic-states-hit-by-illegal-imports/>
68. ACR Journal (2018). Greece calls for action on illegal refrigerants. Available at: <http://www.acrjournal.uk/international/greece-calls-for-action-on-illegal-refrigerants>
69. European Environment Agency (2018). Fluorinated Greenhouse Gases 2018. EEA Report No 21/2018. P54. Available at: <https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2018>
70. Gluckman, R. (2018). Presentation to EPEE roundtable.

