EIA briefing to the 26th Meeting of the Montreal Protocol

17-21 November 2014
Paris, France

NEW TRENDS IN ODS SMUGGLING

All life on Earth is dependent upon the ozone layer, a thin layer of gas in the upper atmosphere which shields the Earth's surface from about 99 per cent of harmful solar ultraviolet radiation (UV).[1]

Increased exposure to UV radiation directly impacts human health. These effects include suppression of the immune system, photo-aging of the skin, cataracts and skin cancer. Plants and ecosystems are also at risk. Research has shown UV-B can significantly impair the reproductive capacity and early developmental stages of aquatic organisms.[2] In addition, increased exposure to UV light in terrestrial plants results in reductions in height, decreased shoot mass and reductions in foliage area.[3]

Following global concern regarding increased use of ozone-depleting substances (ODS), the Montreal Protocol on Substances that Deplete the Ozone Layer was created in 1987. It has since been ratified by 197 nations. The Protocol establishes legally binding controls on the national production and consumption of ODS, with complete phase-out as the final goal.

Illicit trade in ODS began following the first wave of chlorofluorocarbon (CFC) phase-outs and continues to this day, threatening to jeopardise the success of the world's 'most successful environmental treaty'. Global demand for refrigerants has risen significantly with peak hydrochlorofluorocarbon (HCFC) consumption approximately three times greater than CFC production at its peak. It is therefore likely that the scale of illegal HCFC trade will be larger than that seen with CFCs.

Despite imminent cuts in HCFC production and consumption necessitated by the 2007 decision to accelerate the phase-out of HCFCs, use of HCFC-22 in developing (Article 5) countries rose by 11 per cent (44,610 tonnes) between 2011-12.[4] This is a stark warning of the challenges faced by Article 5 countries in Stage II of the HCFC phase-out, which aims to cut HCFC consumption by 35 per cent of the baseline in 2020.

A range of initiatives designed to strengthen enforcement against illegal trade in ODS are proving effective against 'front-door smuggling'. For example, Informal Prior Consent (iPIC) procedures allow cross-checking of ODS export and import licenses. Yet new methods of smuggling require the deployment of intelligence-led enforcement methods such as detailed risk-profiling at the company level.

Far from going away, the threat of ODS smuggling and illegal ODS use is increasing. This report brings together an analysis of trade and emissions data, recent reported seizures and a look at the global refrigerant and feedstock market to highlight some key issues of concern to Parties of the Montreal Protocol.

eia
environmental investigation agency

ABOUT EIA

The Environmental Investigation Agency (EIA) is an independent charity founded in 1984 to fight environmental crime. We have developed innovative and effective investigative methods for defending the environment and seek lasting solutions to the problems we uncover. In three decades of work, EIA has amassed an impressive series of exposés and victories, from its key role in securing the 1989 international ivory trade ban and helping to bring in legislation to protect the world's precious forests to pushing whale meat off the menu in Japan. We have been involved in investigating and combatting illegal trade in ODS since the mid 1990s.

ACKNOWLEDGEMENTS

Report design by:
www.designsolutions.me.uk

November 2014

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HCFC TRADE DATA ANALYSIS

Customs trade data based on the Harmonized Commodity Description and Coding System, commonly referred to as HS Codes, can highlight the potential for illegal trade. Codes relating to trade in HCFCs were revised in 2012 and HCFC-22 was given a unique code (290371). Comparison of China's reported HCFC-22 exports in 2012 and 2013, with reported imports from its top 20 trading partners (according to Chinese export data), reveals that on average reported imports of HCFC-22 are 32 per cent lower than China's reported exports. In many instances, the discrepancy is larger.

Figures 1, 2 and 3 show HCFC-22 trade data comparisons between China and Singapore, Pakistan and Costa Rica in 2012 and 2013. In all three cases, China's reported exports are much higher than the receiving country's reported imports from China. These examples are by no means isolated. Of China's top 20 HCFC-22 importing countries (according to Chinese export data), Malaysia, Saudi Arabia, Iran and Egypt have more than 20 per cent average trade data discrepancies in 2012 and 2013, while the United Arab Emirates, Taiwan, Nigeria, Vietnam, Kuwait and Bangladesh have no HCFC-22 import trade data available.

FIGURE 1

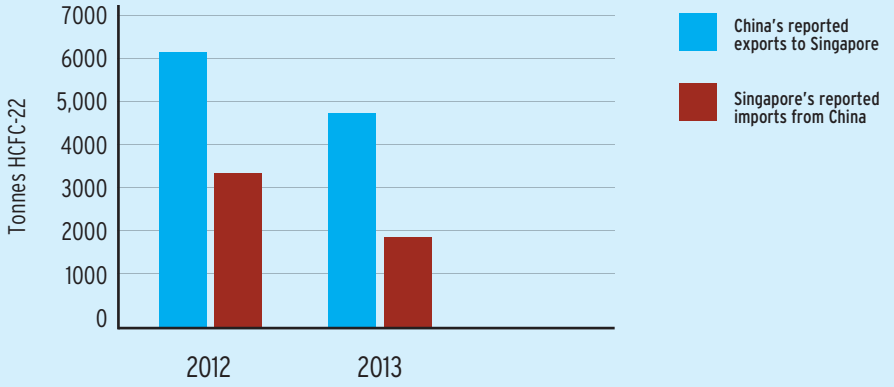


FIGURE 2

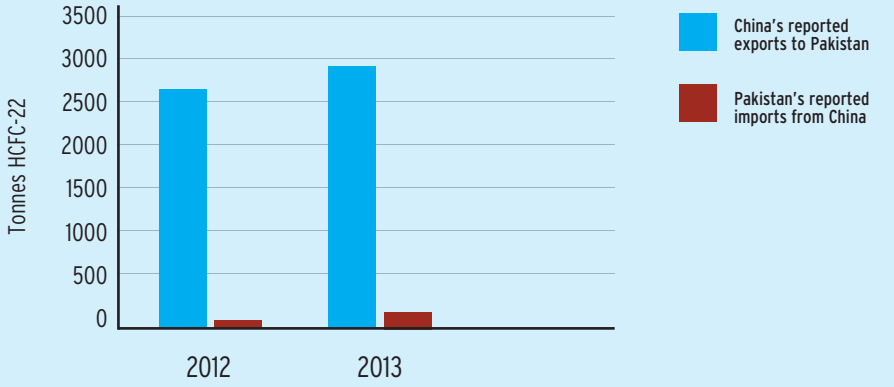
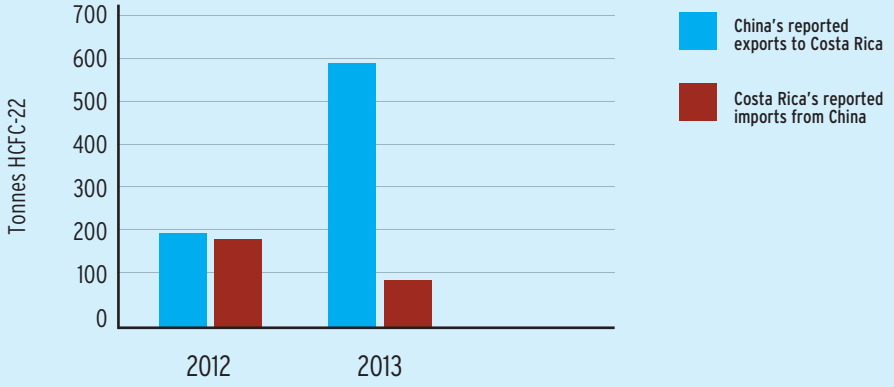


FIGURE 3



There could be multiple explanations for these discrepancies. For example, there may be a lack of reporting of imports by partner countries, inadvertent misdeclaration of the destination country or subsequent re-export from the destination country. It may be that importing countries are not correctly using the new HS code for declaring HCFC-22 imports. However, such high discrepancies should be of concern to Montreal Protocol Parties as they may be indicators of illegal trade. For example, shipments declared as HCFC-22 exports from China may be intentionally misdeclared as non-ODS alternatives upon import, or criminals might illegally divert HCFC-22 shipments after they leave one country so they never reach the intended import destination.

RECENT CASES OF ODS SMUGGLING

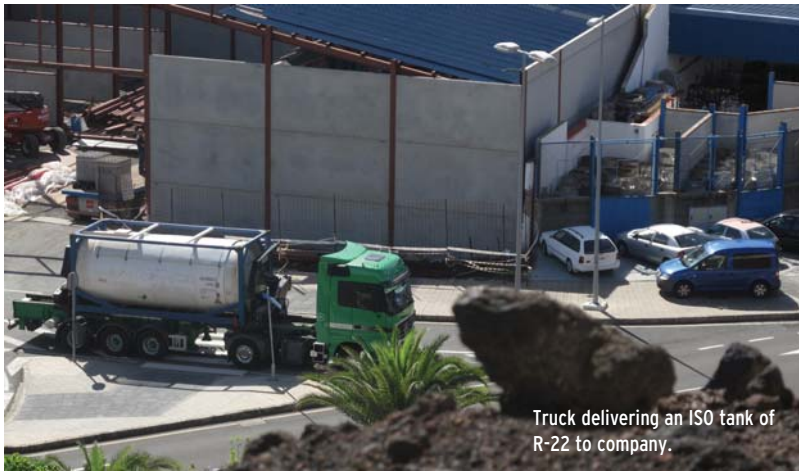
Spain:

In July 2012, Spanish state prosecution unit SERPONA conducted a raid on a Spanish company located in Las Palmas, Gran Canaria. The company was found to be in possession of over 30 1,000kg cylinders of HCFC-22. Smaller cylinders, including banned 13.6kg cylinders, and refilling equipment were also found. Photographic evidence also shows a suspected import of HCFC-22 in an ISO tank. The HCFC-22 had been originally imported into Spain using quotas given to companies which are allowed sell HCFCs to fishing vessels. SERPONA's operation involved large scale surveillance and telephone tapping which revealed that the company involved had been decanting HCFC-22 into smaller cylinders. It appears that another company was also involved in helping to declare the HCFC-22 as recycled so that it could be sold on the internal market. This black market trade was profit-driven as the EU ban on the use of virgin HCFC-22 had driven the price of recycled HCFC-22 from €3-4/kg to €25-40/kg.[5]

Russia:

In January 2014, Russian enforcement agencies launched an operation against ODS import smuggling. More than 1,500 cylinders of various sizes with CFC-11, CFC-12, HCFC-22 and HCFC-141b of Chinese origin were seized. The shipment papers indicated ethylene glycol instead of CFC-11 and HFC-134a instead of the other substances. Refrigerants were poured from original cylinders into Russian cylinders labelled as containing

900kg drum of HCFC-22 is offloaded from the ship to a waiting van.



Truck delivering an ISO tank of R-22 to company.

ISO tank with 100kg cylinders which it is suspected of being siphoned into.

1,000kg cylinders containing HCFC-22 at company premises.

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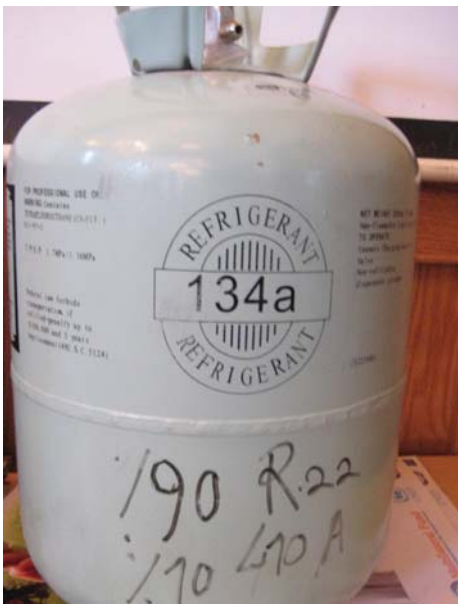

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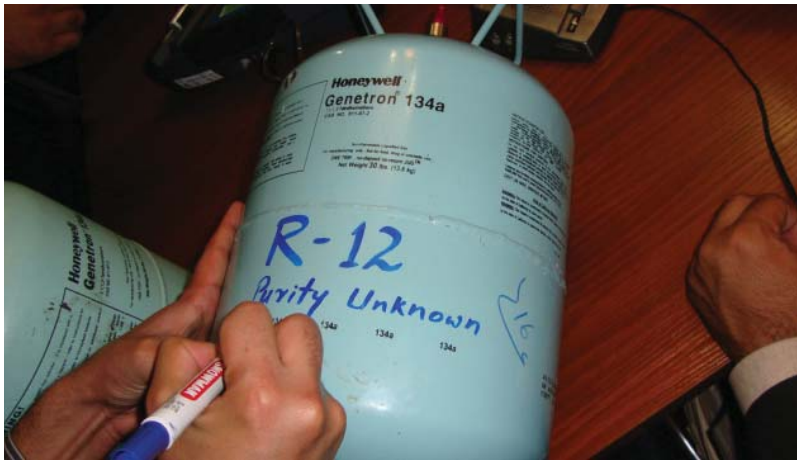

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TOP LEFT:
Seized drum of ODS mis-labelled as ethylene glycol.

TOP RIGHT:
A cylinder of HFC-134a is tested and found to contain HCFC-22 and HFC-410a.

ABOVE:
Counterfeit HFC-134a is tested and found to contain CFC-12.

ozone-safe refrigerants. It is expected that the perpetrators will receive custodial sentences of between two and 12 years, with the possibility of an additional fine.[6]

An earlier case of illegal trade in CFCs to Russia involved falsely labelling virgin CFCs as recycled material. In late 2010, the Russian authorities seized 39 tonnes of "recycled" CFCs at St Petersburg port. The shipment originated in China. Subsequent checking revealed that the Chinese exporter was not licensed to trade in ODS and that the Chinese ODS management authority had not licensed any exports of recycled CFCs. Background checks by EIA revealed some of the individuals and companies involved in the foiled smuggling attempt were implicated in the illegal CFC trade in the mid-1990s. EIA is concerned that CFCs were still available for export from China, given that production was phased out in 2007.[7] Whether the source was stockpiled material or unlicensed production is unknown.

India:

In March 2013, the Indian Directorate of Revenue Intelligence and Customs seized 182 tonnes of HCFC-22 stored in five ISO tanks as well as more than 350 disposable cylinders. The HCFCs were imported from China to the port of Nhava Sheva, near Bombay, where they had been declared as being imported for re-export. However, the importing company illegally diverted the refrigerant onto the Indian market. Fines of approximately US$22,730 were issued.[8]

In August 2013, customs officers at the Indian port of Tuticorin intercepted 1,305 cylinders of HCFC-22 concealed in a shipment of oranges from Dubai. The seizure was made following a tip-off and subsequent weighing of the container, which showed a large discrepancy between the declared and actual weight.[9]

China:

In May 2014, a television channel investigation revealed widespread use of CFC-12 in aerosol cans sold on the Chinese car trade market. The cans were labelled as HFC-134a and sold as top-ups for mobile air-conditioning. Of the 12 cans tested, only two were found to contain HFC-134a. The investigation estimated about 80 per cent of all cans marked as HFC-134a in the Chinese auto trade could contain CFC-12.[10]

Philippines:

In 2012, a DuPont investigation revealed Philippine company T. A. Fresco was selling counterfeit HFC-134a on the market. A raid on the premises netted 511 counterfeit 13.6kg cylinders, which were found to contain more than 90 per cent CFC-12.[11] In October 2014, in a separate incident, Philippine customs seized 110 cylinders of banned refrigerants including CFC-12.[12]

NEW TRENDS IN ILLEGAL TRADE; INCREASING TRADE IN ISO TANKS AND OTHER LARGE GAS CONTAINERS

Evidence from seizures shows that black-market ODS are commonly declared as popular non-ODS alternatives such as HFC-134a. HFC-134a belongs to the HS code grouping 290339. This code is defined as fluorinated, brominated, iodinated derivatives of acyclic hydrocarbons and encompasses a wide variety of HFCs as well as non HFC products. Having so many chemicals under one grouping makes it harder for customs officers to detect HFC-134a shipments. ***Targeted HS Codes dedicated to commonly traded HFCs including HFC-134a would help customs officers in identification of potential illegal shipments.***

Two of the cases documented in this briefing also reflect a change in the way refrigerants are transported. Increased global demand for refrigerants and improvements in the linings of tank containers means that an estimated 50-70 per cent of all refrigerants are shipped in large tank containers such as ISO tanks.[13] In fact, refrigerant shipping is now the most commonly reported use of gas tanks.[14]

Despite the significant market share of international trade carried in larger tanks, it appears that customs checking of ISO tanks and other gas tanks containing refrigerants is inadequate. National ozone units and customs officers have been encouraged to use hand-held identifiers to check contents of 13.6 kg disposable cylinders. However, there seems to be limited awareness that it is possible to use these hand-held identifiers to check larger tanks with the use of an adapter to reduce the valve size. Some tanks have different size values and so will require different adaptors; the importers of the refrigerant should have the correct valve in order to decant the refrigerant.

EIA is concerned that the lack of awareness over how to test the content of large gas tanks could mean that significant amounts of ODS are being declared as non-ODS alternatives such as HFC-134a and illegally shipped without any verification.

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ODS FEEDSTOCKS

Thirteen Parties to the Montreal Protocol reported close to 1.2 million tonnes of ODS used for feedstock applications in 2012.[15] EIA is concerned that observed atmospheric levels of some ODS are much higher than would be expected from reported feedstock use. This could be due to several factors including diversion of feedstock for banned uses, higher than anticipated emissions factors and higher than reported feedstock use. EIA urges Parties to urgently address these issues as they threaten the success of the Montreal Protocol.

ODS feedstocks are used as building blocks in the manufacture of other chemicals. They are most commonly used to manufacture HFCs, fluoropolymers and other ODS. When agreed, the Montreal Protocol considered feedstocks to be non-emissive and therefore exempted feedstock uses from ODS phase-outs. It does consider them controlled substances and Parties are required to report on their use, however reporting is said to be incomplete.[16]

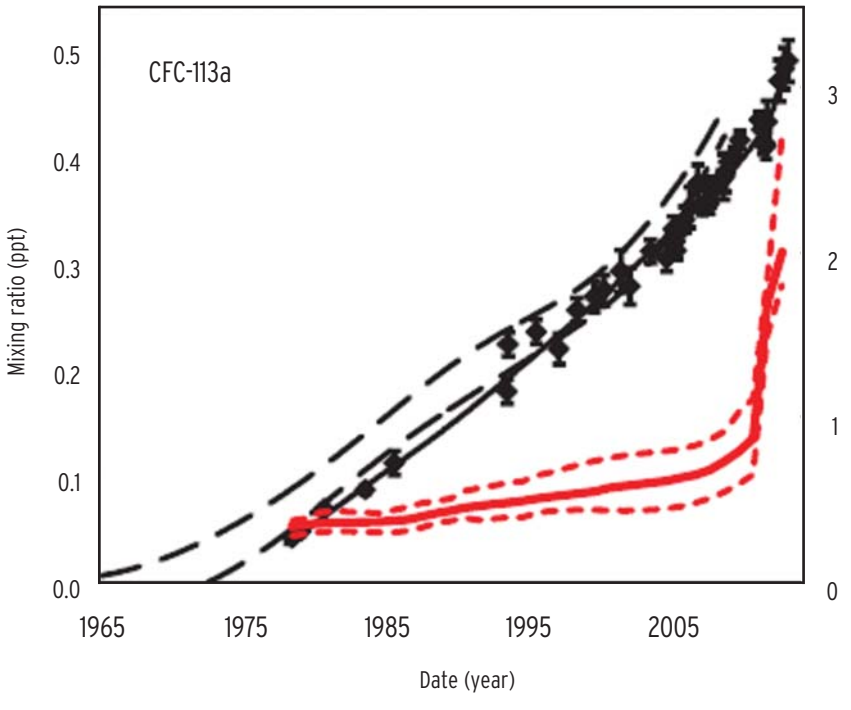
Available data shows that most commonly used ODS feedstocks are HCFC-22, CFC-113, CFC-113a and carbon tetrachloride (CTC or CCl4). HCFC-22 accounted for 40 per cent of feedstock production in 2012.[17] HCFC-22 is used as a feedstock in production of various chemicals and products including polytetrafluoroethylene (PTFE)[18] and HFC-32.[19] CFC-113 and CFC-113a are used as feedstocks in HFC-134a and insecticide production. CTC is used in the production of various chemicals including HFC-245fa and new HFOs.[20] According to the Technology and Economic Assessment Panel (TEAP), feedstock production rose by four per cent to 1,136,807 tonnes (equating to 461,314 ODP tonnes) between 2011-12.[21] The largest increase was for CFC-113, which rose by 23 per cent. TEAP does not specify production levels of CFC-113a; it is assumed that these have been combined with CFC-113.

INCREASING CFC EMISSIONS

A recent study by Laube *et al* published in Nature Geoscience has detected atmospheric concentrations of CFC-113a increasing at alarming rates.[22] Figure 4 shows CFC-113a atmospheric mixing levels in black and corresponding estimated emissions in red (in gigagrams). Recent annual emissions are estimated to be approximately 2,000 tonnes,

FIGURE 4: CFC-113a atmospheric mixing levels in black and corresponding estimated emissions in red (in gigagrams)

Source: Nature Publishing group



"If Parties are unwilling or unable to monitor and control feedstock uses then the Montreal Protocol should consider banning them."

equating to 6.6 million tonnes of CO_2 equivalence.[23]

The increasing amount of CFC-113a in the atmosphere could be due to emissions from feedstock use, which is primarily for the production of HFCs. In its May Progress report, the TEAP commented on Laube's study, suggesting that the findings of the study are consistent with reported CFC-113a feedstock uses for HFCs-134a, 125 and 143a if emissions were of the order of 1.6 per cent, which the TEAP considers to be a "realistic upper limit".

Whether the estimated emission factor of 1.6 per cent is a reflection of reality is not clear. EU data suggests an emission rate of 0.2 per cent is currently being achieved.[24] However, an increasing shift towards feedstock production in Article 5 countries, which may have more emissive operations, could explain a higher ratio. Another possible explanation is that unreported use and emissions of CFC-113a are occurring.

INCREASING CTC EMISSIONS

Recent research by NASA has revealed unexpectedly high emissions of CTC. Annual emissions, derived from measuring atmospheric concentrations of CTC, are estimated to be 39,000 tonnes, about 30 per cent of peak emissions prior to the advent of the Montreal Protocol.[25] Qing Liang, the lead author of the study, said: "It is now apparent there are either unidentified industrial leakages, large emissions from contaminated sites, or unknown CCl4 sources."[26]

According to the TEAP's Chemicals Technical Options Committee (CTOC), reported feedstock use of CTC in 2012 was 191,969 tonnes. In order to estimate resulting emissions, CTOC uses the Intergovernmental Panel on Climate Change's guidelines of 0.5 per cent of feedstock use, although it admits that emissions factors are largely unknown.[27] Using this 0.5 per cent emissions factor, expected emissions of CTC in 2012 would be 960 tonnes, some 38,040 tonnes less than observed emissions. Even with a five per cent emission factor, which has been suggested in a Multilateral Fund report,[28] emissions would be just 9,598 tonnes, leaving nearly 30,000 tonnes of CTC emissions unaccounted for.

The extraordinarily high emissions of CTC should be of great concern to Parties, given that CTC for emissive purposes has been banned since 2010. They are an indication that either significant quantities of CTC are being emitted during their use as feedstocks or that significant non-feedstock production and use is occurring despite the Montreal Protocol ban. Market analysis by EIA reveals that large amounts of CTC are openly available for sale for a variety of uses, including as a solvent. CTC is not only a powerful ODS and a greenhouse gas (GWP 1,400) but is also highly toxic and harmful to human health. Alternatives for both feedstock and other uses are available.[29]

The situation with CTC, a chemical which has primarily been used as a feedstock, bears close examination by the Montreal Protocol, not least because HCFC-22 production for feedstock purposes has already exceeded production for controlled uses and it is clear that current procedures for monitoring and controlling ODS feedstock uses are inadequate. If Parties are unwilling or unable to monitor and control feedstock uses then the Montreal Protocol should consider banning them.

Draft decision XXVI/[H] highlights concern over underestimation and under-reporting of ODS feedstocks and calls for further information on the issue. EIA supports this decision and believes it should be strengthened to ensure that the possibility of diverting ODS feedstocks to other markets is addressed. In particular, trade in ODS feedstocks should be closely monitored with end uses verified by customs and NOUs.

RECOMMENDATIONS

EIA urges Parties to the Montreal Protocol to:

- request a study analysing customs trade data discrepancies across a range of ODS and ODS-alternatives and to investigate the cause of any discrepancies that arise;
- request additional customs training to ensure large tanks, including iso-tanks, are routinely considered in efforts to prevent illegal trade, including via the use of hand-held identifiers;
- support draft decision XXVI/[G] aimed at creating individual HS Codes for commonly traded HFCs;
- support and strengthen draft decision XXVI/[H] aimed at reducing CTC and other ODS feedstock emissions by ensuring that ODS end uses are verified by customs and/or NOUs. If it is not this is not possible then Parties should consider banning feedstock uses, starting with CTC.

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